ESHID-601349

Environment Safety & Health
PO Box 1663, MS K491
Los Alamos, New Mexico 87545
(505) 667-4218/Fax (505) 665-3811

National Nuclear Security Administration
Los Alamos Field Office, A316
3747 West Jemez Road
Los Alamos, New Mexico, 87544
(505) 667-5105/Fax (505) 667-5948

Date: MAR 2 1 2016
Symbol: ADESH-16-028
LA-UR: LA-UR-16-21107
Locates Action No.: Not Applicable

Mr. John E. Kieling, Chief
Hazardous Waste Bureau
New Mexico Environment Department
2905 Rodeo Park Drive East, Building 1
Santa Fe, NM 87505-6303

Dear Mr. Kieling:

Subject: **Response to Ordered Action 9, Attachment A to Settlement Agreement and Stipulated Final Order HWB-14-20**

This letter responds to Ordered Action No. 9, pages 13 through 16 in Attachment A to the Settlement Agreement and Stipulated Final Order HWB-14-20 (SFO) entered into by the New Mexico Environment Department (NMED) (Complainant) and the U.S. Department of Energy (DOE) and Los Alamos National Security, LLC (LANS) (Respondents) on January 22, 2016. Paragraph 35 of the SFO requires the Respondents to complete corrective actions (called "Ordered Actions" in the "Topic" column of Attachment A of the SFO) and submit required Evidence of Completion to NMED for approval by the deadlines specified in SFO Attachment A, unless an alternate date is approved in accordance with SFO paragraph 58. Ordered Action 9 requires:

> *"No later than 60 days after this Order becomes final, Respondents shall revise and submit to NMED procedures and/or policies that ensure the proper LANL organizations and subject matter experts review and then approve or reject proposed waste management procedural changes."*

The documentation to provide as evidence of completion, as specified in Attachment A of the SFO, Ordered Action 9, is included as Appendices to Enclosure 1.

The Respondents would be pleased to meet with NMED-HWB personnel to discuss and explain the documentation included herein. If you have comments or questions regarding this submittal, please contact Mark P. Haagenstad (LANS) at (505) 665-2014 or David Nickless (EM-LA) at (505) 665-6448.

Sincerely,

3/7/16

Michael T. Brandt, DrPH, CIH
Associate Director
Environment, Safety & Health
Los Alamos National Security, LLC
Los Alamos National Laboratory

Sincerely,

Kimberly Davis Lebak
Manager
Los Alamos Field Office
U.S. Department of Energy

MTB:KBL:MPH/lm

Enclosure: (1) Response to Ordered Action 9, Attachment A to Settlement Agreement and Stipulated Final Order HWB-14-20

Cy: Ryan Flynn, NMED, Santa Fe, NM, (E-File)
Kathryn M. Roberts, NMED, Santa Fe, NM, (E-File)
Siona Briley, NMED/HWB, Santa Fe, NM, (E-File)
Neelam Dhawan, NMED/HWB, Santa Fe, NM, (E-File)
Todd Shrader, Manager, CBFO, (E-File)
J.R. Stroble, National TRU Program, CBFO, (E-File)
Kimberly Davis Lebak, NA-LA, (E-File)
Douglas E. Hintze, EM-LA, (E-File)
Peter Maggiore, NA-LA, (E-File)
Lisa Cummings, NA-LA, (E-File)
David Nickless, EM-LA, (E-File)
Jody Pugh, NA-LA (E-File)
Jordan Arnswald, NA-LA, (E-File)
Brian Hennessey, EM-LA, (E-File)
Ben Underwood, EM-LA, (E-File)
Kirsten M. Laskey, EM-LA, (E-File)
Craig Leasure, PADOPS, (E-File)
William Mairson, PADOPS, (E-File)
Randall M. Erickson, ADEM, (E-File)
David Funk, ADEM, (E-File)
Enrique Torres, ADEM, (E-File)
Cheryl D. Cabbil, ADNHHO, (E-File)
Michael T. Brandt, ADESH, (E-File)
Raeanna R. Sharp-Geiger, ADESH, (E-File)

Cy (continued):

John McCann, EPC-DO, (E-File)
Andrew Montoya, WM-DO, (E-File)
Jackie Hurtle, WM-DO, (E-File)
Mark P. Haagenstad, EPC-CP, (E-File)
Deborah Woitte, LC-LESH, (E-File)
Susan McMichael, LC-LESH, (E-File)
Deborah L. Guffee, SI-DC, (E-File)
Yvette S. Branch, SI-DC, (E-File)
Luciana Vigil-Holterman, EPC-CP, (E-File)
adesh-records@lanl.gov, (E-File)
lasomailbox@nnsa.doe.gov, (E-File)
emla.docs@em.doe.gov, (E-File)
locatesteam@lanl.gov, (E-File)
env-correspondence@lanl.gov, (E-File)

COPY

Environment Safety & Health
PO Box 1663, MS K491
Los Alamos, New Mexico 87545
(505) 667-4218/Fax (505) 665-3811

National Nuclear Security Administration
Los Alamos Field Office, A316
3747 West Jemez Road
Los Alamos, New Mexico, 87544
(505) 667-5105/Fax (505) 667-5948

Date: MAR 2 1 2016
Symbol: ADESH-16-028
LA-UR: LA-UR-16-21107
Locates Action No.: Not Applicable

RECEIVED
MAR 21 2016
NMED
Hazardous Waste Bureau

Mr. John E. Kieling, Chief
Hazardous Waste Bureau
New Mexico Environment Department
2905 Rodeo Park Drive East, Building 1
Santa Fe, NM 87505-6303

Dear Mr. Kieling:

Subject: **Response to Ordered Action 9, Attachment A to Settlement Agreement and Stipulated Final Order HWB-14-20**

This letter responds to Ordered Action No. 9, pages 13 through 16 in Attachment A to the Settlement Agreement and Stipulated Final Order HWB-14-20 (SFO) entered into by the New Mexico Environment Department (NMED) (Complainant) and the U.S. Department of Energy (DOE) and Los Alamos National Security, LLC (LANS) (Respondents) on January 22, 2016. Paragraph 35 of the SFO requires the Respondents to complete corrective actions (called "Ordered Actions" in the "Topic" column of Attachment A of the SFO) and submit required Evidence of Completion to NMED for approval by the deadlines specified in SFO Attachment A, unless an alternate date is approved in accordance with SFO paragraph 58. Ordered Action 9 requires:

> *"No later than 60 days after this Order becomes final, Respondents shall revise and submit to NMED procedures and/or policies that ensure the proper LANL organizations and subject matter experts review and then approve or reject proposed waste management procedural changes."*

The documentation to provide as evidence of completion, as specified in Attachment A of the SFO, Ordered Action 9, is included as Appendices to Enclosure 1.

CERTIFICATION

I certify under penalty of law that this document and all attachments were prepared under my direction or supervision in accordance with a system designed to assure that qualified personnel properly gather and evaluate the information submitted. Based on my inquiry of the person or persons who manage the system, or those persons directly responsible for gathering the information, the information submitted is, to the best of my knowledge and belief, true, accurate, and complete. I am aware that there are significant penalties for submitting false information, including the possibility of fine and imprisonment for knowing violations.

Michael T. Brandt, DrPH, CIH
Associate Director
Environment, Safety, and Health
Los Alamos National Security, LLC
Los Alamos National Laboratory
Operator

3/7/16
Date Signed

Kimberly Davis Lebak
Manager
Los Alamos Field Office
U.S. Department of Energy
Owner/Operator

3/14/14
Date Signed

ENCLOSURE 1

Response to Ordered Action 9, Attachment A to Settlement Agreement and Stipulated Final Order HWB-14-20

ADESH-16-028

Various LA-URs

Date: MAR 2 1 2016

Enclosure 1

Response to Ordered Action 9, Attachment A to Settlement Agreement and Stipulated Final Order HWB-14-20

INTRODUCTION

This document provides the Respondents' submittal in response to Ordered Action No. 9, pages 13 through 16 in Attachment A to the Settlement Agreement and Stipulated Final Order (SFO) HWB-14-20 entered into by the New Mexico Environment Department (NMED) (Complainant) and the U.S. Department of Energy (DOE) and Los Alamos National Security, LLC (LANS) (Respondents) on January 22, 2016. The SFO was entered into to resolve Administrative Compliance Order HWB-14-20, issued to Respondents on December 6, 2014.

The requirements for the Respondents' submittals in response to each of the NMED's Ordered Actions are specified in the "Response Actions" column of Attachment A to the SFO. Ordered Action No. 9 states:

> *"No later than 60 days after this Order becomes final, Respondents shall revise and submit to NMED procedures and/or policies that ensure the proper LANL organizations and subject matter experts review and then approve or reject proposed waste management procedural changes."*

As specified in SFO Attachment A, the documentation provided as evidence of completion for Ordered Action No. 9 is listed below.

Documentation to Provide as Evidence of Completion (per SFO Attachment A)	Location in this Enclosure
Summary of [revised] policies and/or procedure(s) that have Subject Matter Expert (SME) review and approval of proposed waste management aspects or impacts.	Appendix 1
Provide electronic access to the current document(s) revision.	Appendix 2 – consists of electronic copies of the following documents, provided on a digital compact disk (CD): • P409, R5, *LANL Waste Management*; • P315, R6, *Conduct of Operations*; • P300, R7, *Integrated Work Management*; • EP-AP-10007, R0, *ADEP[1]Technical Procedure Development;* • ENV-CP-AP-200, R1, *Regulatory Procedure Review of Waste Management Procedures;* • EP-AP-10001, R0, *ADEP Document Control*; • WM -AP-0005, R1, *Waste Characterization and Processing Review*;

Documentation to Provide as Evidence of Completion (per SFO Attachment A)	Location in this Enclosure
	• ADESH-IG-TOOL-101, R0, *Waste Management* Glossary; • ADESH- AP-TOOL-111, R0, *Waste Characterization;* • ADESH-AP-TOOL-115, R0,*Waste Compatibility Determinations;* • ADESH-AP-TOOL-206, R0, *Management of Hazardous Waste by Generators ;* • ADESH-AP-TOOL-300, R0, *Radioactive Waste Management;* • ADESH-AP-TOOL-314, R0, *Radioactive Characterization of Waste;* • ADESH-AP-TOOL-803, R0, *Facility TSF Operating Record;* • ADESH-AP-TOOL-810, R0,*Waste Processing at LANL Hazardous Waste Permitted Units;* • ADESH-AP-TOOL-901, R0, *Elementary Neutralization;* • ADESH-AP-TOOL-902, R0, *Sorption without a Permit;* • ADESH-AP-TOOL-906, R0, *Treatment by the Waste Generator;* • *EPC-DO-16-048, R0, Settlement Agreement and Stipulated Final Order (SFO), Ordered Action 9 - Evaluation of P300* Integrated Work Management *in Regards to Subject Matter Expert Engagement* • **[NOTE]** PA-AP-010016, R4, *Technical Procedure Use and Development Process* has been cancelled by TA-55 and users are referred to FSD-315-16-001, R), *Technical Procedure Writer's Manual* • **[NOTE]** ER-AP-10007, R0, *ADEP Technical Procedure Development* is a DUPLICATE LISTING of EP-AP-10007, R0, *ADEP Technical Procedure Development.* Document *EP-AP-10007, R0* is the correct reference. • WETF-AP-10, RH, *Document Development*
Periodic [Semi-annually, or upon NMED request] listing of document revisions.	Semi-annual updates to be provided on January 22 and July 22 of each year as required.

[1]*Note that recent LANL division name changes are not reflected in all the documents listed above or provided in this response. LANL Associate Directorate of Environmental Programs (ADEP) has been changed to the Associate Directorate of Environmental Management (ADEM). In the LANL Associate Directorate for Environment, Safety and Health (ADESH), the Environmental Compliance Division (ENV) has been renamed the Environmental Protection and Compliance Division (EPC).*

RESPONSE

Processes for waste management technical procedure development and review are governed at the institutional level in the following policy documents: P409, P315, and P300. These are the documents that define and require subject matter expert (SME) involvement in the review and approval processes for proposed waste management procedural changes. Appendix 1 of this response consists of a summary of each document listed in SFO Attachment A, Ordered Action 9. Please note that LANL Policy documents P315 *Conduct of Operations* and P300 *Integrated Work Management*, were not listed in the SFO Attachment A, however, they are included herein because the requirements for engagement of SMEs in the procedure development, review and approval process are inherent in P315 and P300. The summaries of these two policies and inclusion of the documents as Evidence of Completion is offered for clarity. The response below identifies how LANL policies and procedures engage SMEs in the process.

Policy document P409, *LANL Waste Management*, describes the requirements for waste generators and Treatment and Storage Facilities (TSFs) to safely and compliantly characterize, manage, store and treat waste. Updates to existing waste management and compliance guidance and the addition of new, focused guidance took place in 2015. The changes were implemented to provide more clarity of information and to raise awareness of available resources.

P409 is an institutional document and the associated tools are local instructions. Each tool was developed by Associate Directorate of Environment, Safety and Health (ADESH) waste management and environmental compliance staff and reviewed by SMEs from across the Laboratory. All waste generators, including subcontractors, must meet the waste requirements in P409 and the associated tools.

Policy P409 and associated tools are living guidance documents designed to orient the user and to provide resource contact information. The documents will be updated as needed to ensure clarity and consistency. The documents are issued, revised and controlled in accordance with Institutional Policy Office protocol.

Policy document P315, *Conduct of Operations Manual*, establishes a formally documented methodology for ensuring operations and programmatic activities are performed safely and securely in accordance with applicable codes, standards, and DOE directives. P315 states that work will be formally reviewed, approved, and authorized in accordance with P300, *Integrated Work Management* (IWM). Policy P315 was strengthened during the March 2015 (Rev. 5) revision, with additions to Section 12.0, “Forms”, in the body of the P315 document, which referenced P300 Integrated Work Management (IWM) forms used to support procedure planning. P315, Attachment 1, Section 1.12, “Work Authorization and Release,” was enhanced to include direct implementation of IWM and P300 requirements. P315 Attachment 16, “Local Procedures” provides technical procedure guidelines for scope development and the relationship of procedures to Integrated Work Documents (IWDs).

Identification of the reviewers is made in attachment 16, Section 16.5.1.i, “Reviewer Assignments”. When the RLM identifies the reviewers, he/she is uses Attachment 16, Appendix 16-I table, “Team Members/Review Disciplines”. Additionally, Attachment 16, Section 16.5.2.b, “Document Drafting”, requires the writer to engage the organization responsible for each hazard based on appendix 16-I. Guidance was clarified in the revision 5 of P315 to strengthen SME involvement by both waste management and environmental compliance staff from “suggested” to “required”. The revision states that “the Waste Management Coordinator is a required reviewer for all waste-related activities and Environmental Compliance is a required reviewer for all environmental compliance issues.”

Policy document P300, *Integrated Work Management* emphasizes the following:

- Management and worker accountability;
- Applying the worker’s knowledge, experience, skills, and training;

- Providing integrated, worker-friendly documentation that includes defined work tasks/steps linked to specific hazards and unambiguous controls;
- Identifying a single Person in Charge (PIC) for each work activity;
- Providing independent oversight and facility coordination; and
- Formally validating, releasing, and closing out work activities.

Both P315 and P300 documents stipulate that the project Responsible Line Manager (RLM) and PIC must engage SMEs in work document development and/or review. It is the responsibility of the RLM to resolve comments received during review and field validation to ensure safe and compliant work performance.

The RLM is responsible for documenting technical basis and comment resolution for all work activities in the Document History File, as noted in P315, Attachment 16, Section 16.5.1k. Work definition, requirements, hazards/risks and controls identified during project planning and review are managed by the RLM. P409 supports IWM principles by documenting LANL Hazardous Waste Permit and waste management requirements so that planned work to be performed in a facility can be documented, formally reviewed, approved, and authorized to ensure safe and compliant execution.

P300 has identified the requirement for SME engagement in work task planning and hazard analysis since 2010. The requirements were applicable to all LANL workers and subcontractors. Recommendations for types of SMEs and their level of involvement have been components of P300 since Revision 2, effective July 16, 2010. Review of P300 and P315 indicates that the documents clearly state the requirement for SME involvement in development, review and approval of work documents. The importance of the process and the requirement for a complete Document History File defining the technical basis is discussed in P315, Attachment 16, Section 16.2.2.

The review of existing procedures (those procedures effective prior to 2015) began in the 1st quarter of 2015. Available waste/permit related procedures across the laboratory were compiled and reviewed by EPC-CP staff. Over 175 procedures were reviewed from divisions and sites across the Laboratory. EPC-CP staff actively participated in review and comment resolution. The types of procedures reviewed included waste processing detailed operating procedures and administrative procedures. EPC-CP staff procedure reviews are ongoing and will continue as division-level procedure development, review and approval processes are implemented.
Additional detail regarding the ENC-CP Procedure Review process and summary of findings is provided in the Response to Ordered Action number 1, as noted on page 6 of Attachment A to Settlement Agreement and Stipulated Final Order HWB-14-20.

The following appendices are provided as Evidence of Completion as noted in SFO Attachment A, pages 13 through 16. The requested summaries of policies and procedures are provided in Appendix 1. Electronic copies are provided on a digital compact disk (CD) in Appendix 2. The Appendix 2 cover sheet presents an index of the electronic copies.

Appendix 1
Policy and Procedure Summary Table
LA-UR-16-21107

Appendix 1
Policy and Procedure Summary Table

Document Title	Location in this Ordered Action Response	Document Summary
P409, *LANL Waste Management*, R5, effective 07/30/15	Appendix 2, Document 1	The P409 policy document describes the LANL waste management requirements for waste generators and Treatment and Storage Facilities (TSFs) to safely and compliantly manage, store and treat waste. All waste generators, including subcontractors, must work with Waste Management Division (WM-DIV) to meet the waste requirements to ensure the waste is properly characterized, managed, stored and transported. Local level procedures for waste management activities must be reviewed by WM-DIV prior to implementation, per P409 Section 3.1, "Procedure Description, Overview."
P315, *Conduct of Operations Manual*	Appendix 2, Document 2	P315 establishes a formally documented methodology for ensuring operations and programmatic activities are performed safely and securely in accordance with applicable codes, standards, and DOE directives. Policy document P315, Conduct of Operations Manual, establishes a formally documented methodology for ensuring operations and programmatic activities are performed safely and securely in accordance with applicable codes, standards, and DOE directives. P315 states that work will be formally reviewed, approved, and authorized in accordance with P300, Integrated Work Management (IWM). Policy P315 was strengthened during the March 2015 (Rev. 5) revision, with additions to Section 12.0, "Forms", in the body of the P315 document, which referenced P300 Integrated Work Management (IWM) forms used to support procedure planning. P315, Attachment 1, Section 1.12, "Work Authorization and Release," was enhanced to include direct implementation of IWM and P300 requirements. P315 Attachment 16, "Local Procedures" provides technical procedure guidelines for scope development and the relationship of procedures to Integrated Work Documents (IWDs).

Document Title	Location in this Ordered Action Response	Document Summary
		Identification of the reviewers is made in attachment 16, Section 16.5.1.i, "Reviewer Assignments". When the RLM identifies the reviewers, he/she is uses Attachment 16, Appendix 16-I table, "Team Members/Review Disciplines". Additionally, Attachment 16, Section 16.5.2.b, "Document Drafting", requires the writer to engage the organization responsible for each hazard based on appendix 16-I. Guidance was clarified in the revision 5 of P315 to strengthen SME involvement by both waste management and environmental compliance staff from "suggested" to "required". The revision states that "the Waste Management Coordinator is a required reviewer for all waste-related activities and Environmental Compliance is a required reviewer for all environmental compliance issues."
P300, *Integrated Work Management*	Appendix 2, Document 3	P300 documents are in agreement that the project RLM and PIC must engage SMEs in the work document development and/or review. It is the responsibility of the RLM to resolve comments received during review and field validation to ensure safe and compliant work performance. The RLM is responsible for documenting technical basis and comment resolution for all work activities in the Document History File, as noted in the Technical Procedure Writer's Manual, FSD-315-16-001, R.0. Work definition, requirements, hazards/risks and controls identified during project planning and review are managed by the RLM.
EP-AP-10007, R0, effective, *ADEP Technical Procedure Development*	Appendix 2, Document 4	The Technical Procedure Development document defines the roles, responsibilities, requirements, and processes for development of technical procedures used within ADEP (now ADEM) organizations (Environmental Remediation [ER] Division; LANL Waste Disposition [WD]; TRU Waste Facility [TWF]; Environmental Waste Management Operations (EWMO) and Division Subcontractors). Sections 4.5 – "Subject Matter Expert" and 4.7 – "Integrated Process Control Team (IPCT)" define the respective roles and responsibilities.

Document Title	Location in this Ordered Action Response	Document Summary
		An IPCT is mandatory in the development of waste remediation and treatment processing procedures. The RLM may invoke an IPCT for other procedures, as well. The IPCT roles are as follows: • Define and document technical and regulatory functions and requirements for processes that require change control; • Develop baseline process flowchart; • Identify procedures required to support the process flowchart; • Provide discipline-specific review and comment; • Participate in round-table discussions in comment resolution meetings; and • Ensure procedures are accurate, complete and useable. Technical procedure development under this document is in accordance with P300 and P315 to produce accurate, complete and useable procedures to promote safe operations and formal work authorization by the RLM, per ADEP Technical Procedure Development, EP-AP-10007, R0. The procedure Section 4.1 "Responsible Line Manager" defines the responsibilities of the RLM to plan, validate, approve and execute work activities in accordance with IWM policies.
ENV-CP-AP-200, R1, *Regulatory Procedure Review of Waste Management Procedures*	Appendix 2, Document 5	ENV-CP-AP-200, Rev. 1, implements a formalized approach to procedure reviews of waste generation, management and treatment activities. The procedure includes a Procedure Review Checklist, ENV-CP-Form 1008 in Attachment 1, to guide ENV-CP (now EPC-CP) SME technical reviews. The procedure identifies the roles and responsibilities of the ENV-CP reviewer, the ENV-CP Group Leader and the project RLM, defining interaction between these staff in the event of a potential non-compliant technical approach or omission. Timely documentation and active participation in resolution of technical

Document Title	Location in this Ordered Action Response	Document Summary
		issues is a clearly defined ENV-CP responsibility.
EP-AP-10001, R0, *ADEP Document Control*	Appendix 2, Document 6	This procedure defines the process for managing controlled documents for ADEP, EWMO and Subcontractor's procedures used in execution of ADEP work. The procedure implements SD330; *LANL Quality Assurance Program*; P1020-2, *LANL Document Control Program*; EP-DIR-QAP-0001, *Quality Assurance Plan for the Environmental Directorate*; and P315, *Conduct of Operations Manual*, Attachment 16, "Local Procedures." This procedure defines the initiation, development, revision and/or review of non-proceduralized technical requirements. The procedure defines roles and responsibilities for RLM, facility operations director (FOD), Document Control, Preparer, Reviewers/Approvers, the IPCT, and Training Specialist in Sections 3.1 – 3.7. The RLM has lead responsibility, authority and accountability for procedures within their Scope of Work. The Reviewers/Approvers are responsible for interacting with RLM to address review comments. They are tasked with evaluation of the documents for conflict/inconsistencies with other documents, and to ensure that technical aspects of procedures are correct. The RLM provides final approval and work authorization, per Section 3.1.
WM-AP-0005, R1, *Waste Characterization and Processing Review*	Appendix 2, Document 7	This administrative procedure provides the framework for the Waste Characterization and Processing Review process established by the Waste Management Division, and documents the communication methods, members, scope, and decision making processes. The Waste Characterization and Processing Review is chartered to enhance Resource Conservation and Recovery Act (RCRA) compliance, reduce hazards, and improve safety associated with LANL waste management. To achieve the chartered mission, the Waste Characterization and Processing Review uses a

Document Title	Location in this Ordered Action Response	Document Summary
		variety of communication methods to engage multi-discipline SMEs for reviewing and providing compliant resolution on complex waste issues. The complex waste issues may include Waste Stream Profile (WSP) reviews and supporting Acceptable Knowledge (AK) documentation, new and revised waste management and processing procedures, and waste, secondary material and container compatibility determinations. Issues and their resolution will be communicated to the affected and potentially affected LANL and subcontract workers and managers using established LANL communication venues.
ADESH-IG-TOOL-101, *Waste Management Glossary*	Appendix 2, Document 8	Tool 101 provides definitions of LANL waste management terms.
ADESH-AP-TOOL-111, *Waste Characterization*	Appendix 2, Document 9	Tool 111 provides the requirements for compliant waste characterization, which is defined as characterization by direct sampling and analysis of the waste, acceptable knowledge (AK), or a combination of the two methods. Tool 111 provides the documentation required, at a minimum, to qualify as adequate AK. The AK is to be relevant and traceable to the particular waste stream and must be accurate, sufficient and current to the waste stream's generation, characterization and management. Acceptable documentation includes but is not limited to, waste generating process descriptions (material inputs and the chemical/physical generating process), the physical, chemical and regulatory waste descriptions, and waste identification basis and bounds (min-max ranges and how the ranges are determined).
ADESH-AP-TOOL-115, *Waste Compatibility Determinations*	Appendix 2, Document 10	Generators must collect characterization data and/or AK for generated wastes and provide a compatibility determination. The compatibility determination is required to demonstrate generator understanding of the waste and to identify the potential for reactions between incompatible constituents, secondary job wastes, additives, and between the waste and packaging materials or containers.

Document Title	Location in this Ordered Action Response	Document Summary
		Documentation obtained for the compatibility determination should be placed in the characterization record (i.e. as Acceptable Knowledge per ADESH-AP-TOOL-111 or as documentation posted to or uploaded to the Waste Compliance and Tracking System [WCATS], per Section 3.5). The documentation supporting the compatibility determination should be complete enough so that an independent auditor can re-create the compatibility determination without obtaining any additional information or data. Documentation that shows compatibility within a container and with the packaging materials should be included in WCATS. If the determination can be shown with a simple statement, it should be included as text in the Waste Description panel or Additional Information Panel of WCATS. If the determination involves stand-alone documents, the documents should be uploaded into WCATS.
ADESH-AP-TOOL-206, *Management of Hazardous Waste by Generators*	Appendix 2, Document 11	Tool 206 provides waste management requirements and references for characterization, storage, inspection and recordkeeping as associated with any hazardous, universal or used oil waste at LANL. The requirements apply to any LANL employee, contractor, or sub-contractor who has been identified as a waste generator.
ADESH-AP-TOOL-300, *Radioactive Waste Management*	Appendix 2, Document 12	Tool 300 lists the DOE and LANL requirements for characterization, certification, staging/storage, site registration, inspection, and documentation of radioactive waste at LANL. Low-level waste (LLW), mixed low-level waste (MLLW), transuranic waste (TRU), and mixed transuranic waste (MTRU) must meet waste package certification requirements before the waste is packaged, shipped, and disposed.
ADESH-AP-TOOL-314, *Radioactive Characterization of Waste*	Appendix 2, Document 13	Tool 314 provides generator requirements for radiological characterization of waste and summarizes DOE Manual 435.1-1 and DOE O 458.1 requirements. This Tool addresses only the

Document Title	Location in this Ordered Action Response	Document Summary
		radiological characterization portion of mixed waste. Hazardous waste characterization must follow ADESH-AP-TOOL-111.
ADESH-AP-TOOL-803, *Facility TSF Operating Record*	Appendix 2, Document 14	Tool 803 summarizes the requirements of Title 40, Code of Federal Regulations (CFR) § 264.73 (Operating Record), and Section 2.12.2 of LANL's Hazardous Waste Facility Permit. The facility TSF Operating Record applies to the management of hazardous waste activities at the facility and shall describe: • Hazardous waste received, • Methods and dates of treatment, and • Location of wastes in the facility The Operating Record for each hazardous/mixed waste stream and individual waste container is maintained in WCATS. The Facility Operating Record (for the operations of each permitted unit and interim status unit at the Facility) is maintained for the life of the unit. Tool 803 provides specifics on the elements of the Operating Record.
ADESH-AP-TOOL-810, *Waste Processing at LANL Hazardous Waste Permitted Units*	Appendix 2, Document 15	Tool 810 summarizes, by TSF location, activities that are authorized and may be conducted at permitted units under the storage portions of the LANL Hazardous Waste Facility Permit. Requirements established in the 2010 Los Alamos National Laboratory Hazardous Waste Facility Permit (and all updates) must be met for all waste processing activities. The Tool defines and distinguishes the difference between waste processing and treatment. Tool 810 defines waste processing terms and describes allowable/permitted waste processing. The following elements of the waste processing are noted: • Waste processing - includes any process tasks that change the contents, composition, or form of the waste being prepared for disposal. • Waste processing at the Facility that is not defined as treatment is limited to sorting,

Document Title	Location in this Ordered Action Response	Document Summary
		segregating, repackaging, non-invasive testing, drum venting, and heated storage. (These activities can be conducted within generator areas and at TSFs to make waste amenable for shipment off-site for disposal.) • Waste processing activities described above are not considered treatment of waste because they do not change the physical, chemical, or biological characteristics of the waste. Secondary material should be segregated from the regulated waste being processed. If secondary material is added during the process, the activity becomes a waste generating process and must undergo waste characterization. Additionally, the waste generator must ensure that any secondary material added to the waste is compatible (see ADESH-AP-TOOL-115, *Waste Compatibility Determinations*) with the waste. Prior to conducting any resizing activities, consult ENV-CP, to determine whether or not a permit modification is required.
ADESH-AP-TOOL-901, *Elementary Neutralization*	Appendix 2, Document 16	Tool 901 provides guidance for complying with 40 CFR §264.1(g)(6) and 260.10. Neutralization of a hazardous waste meets the RCRA definition of treatment (see Section 4.0). The LANL Hazardous Waste Facility Permit and the hazardous waste management regulations prohibit treatment without a permit except in a few very limited circumstances. This document discusses the *Elementary Neutralization Unit* (ENU) exemption, which allows generators and TSF operators to neutralize certain hazardous and mixed wastes without a permit, provided certain criteria are met. To be exempt, the generator or TSF operator may only neutralize hazardous/mixed waste that is corrosive ONLY (D002), i.e., it has no other EPA Hazardous Waste Numbers), and may only conduct neutralization in a unit that meets the RCRA definition of a tank, tank system, container, transport vehicle, or vessel.

Document Title	Location in this Ordered Action Response	Document Summary
ADESH-AP-TOOL-902, *Sorption without a Permit*	Appendix 2, Document 17	The LANL Permit and RCRA regulations prohibit treatment without a permit, unless specific exemptions are met. The United States Environmental Protection Agency provided a sorbent material exemption, which allows generators and Treatment, Storage or Disposal facility operators to place sorbents in a container without a permit provided the following criteria are met. To be exempt, the generator or operator must meet the following requirements: • The sorbent must be added to waste in a container (or waste is added to the sorbent) at the time waste is first placed in the container, • The addition of sorbent cannot create an ignitable, reactive, or incompatible waste, and • The sorbent must be compatible with the type of waste and container; cannot result in reactions that damage the structural integrity of the container or facility. To be compliant with these requirements, LANL has established a procedure to make a compatibility determination (per ADESH-AP-TOOL-115) to ensure that the sorbent material and secondary material can be safely mixed with the waste. Secondary materials must not result in potential reactions or damage to the container, including the inner liner. The addition of absorbents must be well-documented for safe and compliant processing.
ADESH-AP-TOOL-*906, Treatment by the Waste Generator*	Appendix 2, Document 18	The purpose of this document is to provide requirements for treatment of waste by the waste generator. The procedure summarizes the requirements in 40 CFR §262.34, 40 CFR §264.1(g)(6), 40 CFR §260.10 and 40 CFR §264.1(g)(10), 40 CFR §270.1 (c)(2)(vii), and 40 CFR §264.314. A Hazardous Waste Treatment Report Form (WTRF) must be approved by EPC-CP before any treatment can occur. The WTRF must be submitted annually to EPC-CP for approval.

Document Title	Location in this Ordered Action Response	Document Summary
		Waste generator treatment can be conducted in a < 90 day accumulation area provided the activities are compliant with all applicable provisions in 40 CFR 262.34. Several conditions must be met before treatment can occur. EPC-CP staff must be engaged for technical input prior to implementing plans.
EPC-DO-16-048, *Settlement Agreement and Stipulated Final Order (SFO), Ordered Action 9 – Evaluation of P300 Integrated Work Management with Regards to Subject Matter Expert Engagement* (memo)	Appendix 2, Document 19	A description of revisions to P300, *Integrated Work Management*, was provided above. This memo documents LANL's review and evaluation. The memo states that the Policy has been strengthened with the addition of peer reviews (Section 3.1.3.b) and SME involvement (Sections 3.1.2.a and 3.1.3.c). Revisions to the Policy in July 2010, as documented in P300, Section 10.0 "History", have strengthened the process and emphasized the need for SME input into hazard analysis and controls development (e.g., document development and review).
PA-AP-01016, *Technical Procedure Use and Development Process*	See **[NOTE]** – document has been cancelled by TA-55 and users are referred to FSD-315-16-001, R0, *Technical Procedure Writer's Manual*. Coversheet with cancellation stamp provided in Appendix 2, Document 20	**[NOTE]** PA-AP-01016 was cancelled by TA-55 and users are referred to FSD-315-16-001, R0, *Technical Procedure Writer's Manual*.
FSD-315-16-001, R0, *Technical Procedure Writer's Manual*	See **[NOTE]** – document replaces PA-AP-01016, *Technical Procedure Use and Development Process,* Appendix 2, Document 21	FSD-315-16-001, R0, *Technical Procedure Writer's Manual* addresses processes that ensure proper SME engagement in several areas, Planning and Development, Procedure Format, Writing Action Steps, Key Information/Steps and Responsibilities. The document provides detailed guidance and references for identification of the Design Bases and Source Documents (e.g., identified requirements). It provides guidelines for defining work steps and determining appropriate level of detail. Elements of Section 4.0 "Procedure Format" are identified as mandatory, in accordance with DOE Order 422.1 *Conduct of Operations*. An example

Document Title	Location in this Ordered Action Response	Document Summary
		of a mandatory requirement is the inclusion of a Prerequisite Actions subsection. Prerequisite Actions may include the identification of special tools or supplies. SMEs provide technical, system, process and administrative information for writing of technical procedures. The SME works in coordination with the RLM to determine data collection requirements and records requirements. The RLM is responsible for the development and technical content of the technical procedure.
ER-AP-10007, R0, *ADEP Technical Procedure Development*	See **[NOTE]** - document provided is EP-AP-10007, R0, *ADEP Technical Procedure Development*, Appendix 2, Document 4	**[NOTE]** ER-AP-10007, R0, *ADEP Technical Procedure Development* is a DUPLICATE LISTING of EP-AP-10007, R0, *ADEP Technical Procedure Development.* Document *EP-AP-10007, R0* is the correct reference.
WETF-AP-10, *Document Development*	Appendix 2, Document 22	Revision of the WETF document development procedure to incorporate ENV-CP (now EPC-CP) reviews has been performed. The Weapons Engineering Tritium Facility (WETF), a component of the Weapons Facilities Operations (WFO) Division, has procedure development guidance, WETF-AP-10, Rev. H, which establishes the responsibilities and requirements for the development, review, verification, validation, approval and revision of WETF documents. The guidance identifies the involvement of SMEs (from Emergency Planning to Waste Management and Environmental Compliance) and the level of their involvement in document reviews. Both Waste Management and Environmental Compliance SMEs are required in initial development, document revision and Interim Procedure Change revisions. Revision H of WETF-AP-10 was effective July 2015. EPC-CP staff provided comments which have been resolved and are to be incorporated into revision J.

Appendix 2

Electronic Copies of Policies and Procedures (CD)

Appendix 2 Document List

Doc. # on CD	Document Title	Revision and Effective date	LA-UR Reference No.
1	P409 LANL Waste Management	R5, 07/30/2015	LA-UR-16-21295
2	P315 *Conduct of Operations Manual*	R6, 07/08/2015	LA-UR-16-21626
3	P300 *Integrated Work Management*	R7, 12/09/2015	LA-UR-16-21584
4	EP-AP-10007, *ADEP Technical Procedure Development*	R0, 08/13/2015	LA-UR-16-21326
5	ENV-CP-AP-200, R1, *Regulatory Procedure Review of Waste Management Procedures*	R1, 09/15/2015	LA-UR-16-21106
6	EP-AP-10001, *ADEP Document Control*,	R0, 08/13/2015	LA-UR-16-21327
7	WM-AP-0005, *Waste Characterization and Processing Review*	R1, 02/18/2015	LA-UR-16-20994
8	ADESH-IG-TOOL-101, *Waste Management* Glossary	R0, 12/10/2015	LA-UR-16-21250
9	ADESH-AP-TOOL-111, *Waste Characterization*	R0, 12/15/2015	LA-UR-16-21249
10	ADESH-AP-TOOL-115, *Waste Compatibility Determination*	R0, 01/14/2016	LA-UR-16-21248
11	ADESH-AP-TOOL-206, *Management of Hazardous Waste by Generators*	R0, 12/15/2015	LA-UR-16-21247
12	ADESH-AP-TOOL-300, *Radioactive Waste Management*	R0, 02/08/2016	LA-UR-16-21246
13	ADESH-AP-TOOL-314, *Radioactive Characterization of Waste*	R0, 02/10/2016	LA-UR-16-21245
14	ADESH-AP-TOOL-803, *Facility TSF Operating Record*	R0, 12/15/2015	LA-UR-16-21244
15	ADESH-AP-TOOL-810, *Waste Processing at LANL Hazardous Waste Permitted Units*	R0, 01/14/2016	LA-UR-16-21243
16	ADESH-AP-TOOL-901, *Elementary Neutralization*	R0, 01/14/2016	LA-UR-16-21242
17	ADESH-AP-TOOL-902, *Sorption without a Permit*	R0, 12/23/2015	LA-UR-16-21241
18	ADESH-AP-TOOL-906, *Treatment by the Waste Generator*	R0, 02/24/2016	LA-UR-16-21240
19	EPC-DO-16-048, *Settlement Agreement and Stipulated Final Order (SFO), Ordered Action 9 - Evaluation of P300 Integrated Work Management in Regards to Subject Matter Expert Engagement*	R0, 02/22/2016	LA-UR-16-21108
20	PA-AP-01016, *Technical Procedure Use and Development Process* – Document Cancelled	R4, 05/29/2014	Not Applicable

Doc. # on CD	Document Title	Revision and Effective date	LA-UR Reference No.
	12/2/2015, Refer to FSD-315-16-001, *Technical Procedure Writer's Manual*		
21	FSD-315-16-001, *Technical Procedure Writer's Manual*	R0, 03/03/2015	LA-UR-16-21687
22	WETF-AP-10, *Document Development*	RH,	LA-UR-16-21755

Los Alamos
NATIONAL LABORATORY
EST. 1943

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LANL Waste Management

1.0 PURPOSE

This document describes Los Alamos National Laboratory (LANL or the Laboratory) requirements for waste generated and managed by Waste Generators and Treatment Storage Facilities (TSFs) to ensure compliance with legal mandates and Laboratory requirements as necessary to protect human health, safety, and the environment. This document has been revised as part of a process in which the Laboratory systematically plans, documents, executes, and evaluates its management of regulated waste streams.

This document addresses LANL's waste management requirements for Waste Generators and TSFs as necessary to safely manage, store, and treat wastes. The Waste Generator must know and document what is in the waste, and TSFs must meet waste analysis requirements under the LANL Hazardous Waste Facility Permit. This document also addresses LANL's Waste Certification and Self-Assessment Programs, to ensure there is a systematic, documented approach for compliance with requirements in this document.

All Waste Generators, including subcontractors, who generate a regulated waste, must work with Waste Management (WM) to meet the requirements in this and other required documents to ensure that the following are met:

- the waste is properly characterized, managed, stored, and transported, and
- the waste certification program is implemented at the waste generating site before the waste is shipped off-site from LANL.

The Environmental Protection Agency (EPA) and the New Mexico Environment Department (NMED) have established requirements, which are addressed in this document, for Waste Generators and TSFs to ensure regulated waste is characterized, managed, stored, treated, and transported compliantly. To ensure compliance with legal mandates, the requirements in this and other requirements documents (i.e., P930-1, *LANL Waste Acceptance Criteria*, Associate Director for Environment, Safety, and Health [ADESH], and Functional Series Documents [FSDs]) are established to be consistent with Department of Energy (DOE) Orders, federal and state laws and regulations, the LANL Hazardous Waste Facility Permit, and reporting requirements.

2.0 AUTHORITY AND APPLICABILITY

2.1 Authority

This document is issued under the authority of the Laboratory Director to direct the management and operation of the Laboratory, as delegated to ADESH as provided in the Prime Contract. This document derives from the Laboratory Governing Policies, particularly the section on Environment, and implements requirements in the Prime Contract, particularly Department of Energy Acquisition Regulation (DEAR) 970.5223-1, *Integration of Environment, Safety, and Health into Work Planning and Execution* (Dec. 2000); Part III, Section J, Appendix B 4.2 and Part III, Section J, Appendix G; DOE Order (O) 435.1, *Radioactive Waste Management*; DOE Manual (M) 435.1-1; *Radioactive Waste Management Manual*; the Resource Conservation and Recovery Act (RCRA); the Toxic Substances Control Act (TSCA); New Mexico Special Waste Act; 74-9-1 NMSA 1978, *Solid Waste Act*, and the 74-4-1 NMSA 1978, *Hazardous Waste Act*.

- Issuing Authority (IA): Associate Director for Environment, Safety, and Health (ADESH)
- Responsible Manager (RM): Waste Management (WM) Division Leader
- Responsible Office (RO): Waste Management-Division Office (WM-DO)

2.2 Applicability

This document applies to all workers, including subcontractors, who generate, manage, treat, or store regulated waste at the Laboratory as a Waste Generator or at a TSF. Regulated waste, as used in this document, refers to all types of waste including office waste, solid waste, universal waste, hazardous waste, mixed radioactive waste, and radioactive-only waste. Waste Generators include workers who generate regulated waste and store the waste in staging areas, accumulation areas, or less-than 90 day storage areas. TSFs include workers who manage, treat, or store regulated waste under the LANL Hazardous Waste Facility Permit. All other persons working at the Laboratory must follow the requirements as set forth in their contractual agreements or subcontracts.

3.0 PROCEDURE DESCRIPTION

3.1 Overview

There are two main aspects to this document. First, it establishes specific responsibilities for Waste Generators and TSFs to manage and store regulated wastes to ensure the protection of human health, safety, and the environment (Sections 3.2 through 3.7). Second, it describes LANL's Waste Certification Program, which requires a documented approach to ensure that waste management (treatment, storage and disposal) of waste streams complies with applicable requirements (Section 3.8) prior to off-site shipment.



Fig. 1. LANL Waste Management Components

Waste Generators and TSF workers will find more detailed information on waste compliance in the ADESH FSDs. These FSDs may consist of non-mandatory information, such as aids and guidance (ADESH-TOOLS) or mandatory requirements, regarding waste type and compliance factors. These FSDs are issued by ADESH in accordance with PD311, *Requirements System and Hierarchy* and ADESH-AP-007, *Document Control*.

If a Facility Operations Director (FOD), the Facility Responsible Line Manager (RLM), a Facility Point of Contact and/or a Waste Generator chooses to specify additional local-level procedures for waste management activities, those local procedures and changes thereto must be reviewed and approved through WM-DO before they are issued and implemented. Such procedures, including ADESH Administrative Procedures (ADESH-APs) and ADESH Technical Procedures (ADESH-TPs), may be subject to review in accordance with Safety Basis Procedure (SBP) SBP-112-3-R1.2, *Unreviewed Safety Question (USQ) Process*, and P315, *Conduct of Operations Manual*. WM-DO confirms that Waste Generators are compliant with potential waste streams through oversight requirements for their waste streams and that waste requirements are met in the planning stage for all waste and potential waste streams.

Before waste generating projects (remediation, Demolition and Decontamination, Footprint Reduction, etc.) begin, WM-DO must review (1) all characterization methodologies that were part of the planning stage and the preparation for waste disposition and (2) all requests for use of a DOE or LANL subcontractor that was not procured through WM-DO via e-mail.

Before generating regulated waste or commencing waste characterization activities, a Waste Generator must consult with their Waste Management Coordinator (WMC). TSFs must comply with their local-level procedures and the LANL Hazardous Waste Facility Permit.

Waste Generators and TSFs must also meet the requirements of the LANL Pollution Prevention Program, which implements pollution minimization goals through Pollution Prevention Opportunity Assessments and other tools. The LANL Pollution Prevention Program requires Waste Generators and TSFs to identify potential alternatives to the generation of waste including use of less toxic materials, alternative processes, waste minimization techniques, and following the requirements DOE O/M 435.1, *Radioactive Waste Management/Manual* and DOE O 436.1, *Departmental Sustainability*. In addition, TSFs must meet waste minimization requirements of the LANL Hazardous Waste Facility Permit.

The Waste Certification Official (WCO) must be notified by the originating organization when a Nonconformance Report (NCR) or a Performance Feedback and Improvement Tracking System (PFITS) issue is entered into the system regarding regulated waste. WCO concurrence for corrective actions must be obtained by e-mail prior to closure.

3.2 Identifying Waste

Waste Generators must correctly identify their waste through waste characterization as specified below. If a Waste Generator needs assistance with and/or cannot identify the waste type, the worker must contact their WMC. In addition, if a LANL worker or subcontractor discovers a waste stream with no identifiable Waste Generator, the worker must contact their WMC. See ADESH-TOOL-213, *No Owner Waste*.

"Office waste" refers to wastes generated in an office environment and can include solid waste (e.g., office paper, food waste, trash), recyclables (e.g., paper, cardboard, plastics), universal waste (e.g., batteries and fluorescent light bulbs) and hazardous waste (e.g., aerosol cans). ADESH-TOOL-114, *Office Waste Tool*, ADESH-TOOL-111, *Waste Characterization*, and ADESH-TOOL-314, *Radioactive Characterization,* help Waste Generators quickly identify their regulated waste types and describe additional tools with requirements for their regulated waste types.

Project Management (PM) projects, Environmental Remediation (ER) or decontaminated and decommissioned must notify WM-DO via e-mail of upcoming waste generation projects and provide all pertinent planning documentation and characterization documentation for evaluation. Use of the Permits and Requirements Identification (PRID) system is required (see PD400, *Environmental Protection*).

3.2.1 Waste Characterization

Waste Generators and TSFs are required to ensure that waste characterization is accurate, complete and up-to-date. Waste Generators must make a waste determination and characterize regulated waste by appropriate analytical testing or use of acceptable knowledge e.g., Material Safety Data Sheets (MSDSs), product labels, and historical data. TSFs must meet waste analysis plan requirements under the LANL Hazardous Waste Facility Permit prior to acceptance of the generator's waste for treatment or storage. If a Waste Generator does not supply complete and adequate waste characterization information, the TSF or off-site Treatment Storage and Disposal Facility (TSDF) may not accept the waste. Waste Generators and TSFs must ensure that waste characterization documentation is maintained, protected, controlled, and available for internal and/or any third party reviews.

Note: TSF workers become "Waste Generators" when activities at the TSF (e.g., repackaging, sorting, and segregation) lead to the generation of regulated waste or trigger re-characterization of the waste stream as described within this section.

Waste Generators must consult with their WMCs to start the waste characterization process, when working with a new process that may create a new regulated waste stream, or when waste processing has been modified. ADESH-TOOL-111, *Waste Characterization* and ADESH-TOOL-314, *Radioactive Characterization,* help Waste Generators document and characterize regulated wastes, and describe additional tools with requirements for their regulated waste types. The Waste Generator must sign a Waste Stream Profile (WSP) Certification Statement in the Waste Compliance and Tracking System (WCATS), assuring that waste characterization is correct and meets applicable waste acceptance criteria. This certification attests to the accountability and legal defensibility of the waste characterization for internal or external third party reviews.

As part of the requirement to characterize regulated waste, the Waste Generator must

- submit a waste stream profile in WCATS for each waste stream;
- upload all waste characterization documentation into WCATS and ensure that all valid documentation is referenced in WCATS with a unique identifier;
- sign the WSP Certification Statement assuring accurate and complete characterization of the waste; and
- annually re-evaluate waste characterization for each WSP to verify accuracy of the waste characterization. For compliance purposes, this annual period is defined as less than one year since the original waste characterization or the last recharacterization.

After waste has been identified and entered into WCATS, the waste characterization will be reviewed by the WM-DO prior to a new waste stream identification number being activated. WM-DO screens documentation for LANL facilities that characterize waste streams by acceptable knowledge, process knowledge (or knowledge of process), historical knowledge, etc.

Note: If waste with no disposal path must be generated, the Waste Generator must contact WM-DO via e-mail for prior authorization.

TSFs must meet waste characterization requirements of the LANL Hazardous Waste Facility Permit, including specifically the Waste Analysis Plan (WAP).

3.2.1.a Waste Generator Recharacterization

Waste Generators must recharacterize and update waste characterization based on the following conditions if

- after an annual re-evaluation, there is any change to waste characterization information, including changes to the waste-generating process or operations;
- there is a change to the waste-generating processes or operations;
- analytical results indicate a change in the waste stream;
- new characterization information becomes available;
- a waste container is opened and secondary material is added to the container;
- waste is repackaged and secondary material is added during this process;
- there is a change in the ownership of a WSP; or
- the Waste Generator is notified that waste received at an off-site facility does not match a pre-approved waste analysis certification or accompanying shipping documentation.

Note: TSF workers may become Waste Generators when waste processing includes one of the activities described above.

The Waste Generators must contact the WM-DO in the event it is required to update waste characterization information described above. WM-DO will work through appropriate subject matter experts to assess the identified changes in the waste characterization and recommend actions.

3.2.1.b Recharacterization at Treatment and Storage Facilities (TSFs)

Under the LANL Hazardous Waste Facility Permit, TSFs must update their waste characterization when the following occurs:

- a Waste Generator determines one or more of the above conditions in Section 3.2.1.a has occurred;
- TSF workers have reason to believe that the process or operation generating the waste has changed;
- waste is repackaged and secondary material is added during this process;
- waste received at an off-site facility does not match a pre-approved waste analysis certification or accompanying shipping documentation; or
- an inspection reveals that the waste does not match the identity of the waste specified by the Waste Generator or a manifest on a shipping paper.

3.2.2 Waste Containing Potential Radioactive Contamination

Potentially radioactive wastes (e.g., the waste or waste item was generated in a radiologically contaminated area) are summarized in ADESH-TOOL-306, *Potentially Radioactive or Mixed Investigation-Derived Waste*. The Waste Generator is required to meet the actions specified in the tool.

If radioactive contamination is reasonably suspected to be present at a site (e.g., in wastes from potential release sites or poorly documented decontaminated and decommissioned sites), the waste must be characterized. See ADESH-TOOL-314, *Radioactive Characterization*. The Authorized Release Limits Process is defined in P411, *Authorized Release Limits Proposal Process* and is applicable only to materials that

- have residual radioactivity below the dose limits specified in DOE O 458.1, *Radiation Protection of the Public and the Environment*; and
- do not contain 74-4-1 NMSA 1978, *Hazardous Waste Act* and Resource Conservation and Recovery Act [RCRA]) constituents.

Note: For release of potentially activated metals previously stored in Radiation Control areas, see RP-SOP-077.004, *LANSCE Metals Clearance Process* and RP-SVS-RIC-TBD-03, *Technical Basis Documentation Regarding Health Physics Measurements for the Unrestricted Release of Metals from LANSCE*.

3.2.3 Waste Verification

To ensure compliance with DOE Directives, federal and state laws and regulations, P930-1, *LANL Waste Acceptance Criteria*, and reporting requirements, WM-DO completes a verification checklist in accordance with WM-PROG-QP-236, *Waste Certification Program Waste Verification,* and must verify accurate and thorough waste characterization. This includes the random or selected waste stream and can include the following (if applicable):

- a review of radiological assay;
- a visual examination of the waste;
- a sampling and chemical analysis of the waste;
- a verification that the waste has been properly characterized in accordance with applicable procedures, acceptable knowledge documentation, non-destructive assay records, chemical analysis documentation, and, if applicable, documentation of past visual examinations of the waste;
- a review of past verification results to determine the nature of any pre-existing problems; and
- a review of facility waste processes and procedures to verify operations meet waste certification requirements.

Note: The LANL Hazardous Waste Facility Permit requires an annual verification of the waste characterization of one percent of the total number of hazardous waste streams characterized solely by acceptable knowledge and managed at TA-54 in the previous calendar year.

3.3 Packaging Waste

Low-Level Waste (LLW) and Mixed Low-Level Waste (MLLW) must meet waste package certification requirements before the waste is disposed. Waste Generators of LLW and MLLW must make a request via e-mail to WM-DO to arrange for waste package certification. If there are specific waste issues regarding LLW and MLLW, the Waste Generator must contact the WCO. To ensure compliance with federal and state laws, regulations and reporting requirements, the WCO will rely on established waste disposition requirements that are consistent with Waste Acceptance Criteria (WAC) requirements from the Nevada National Security Site (NNSS).

To prepare for waste disposition, the Waste Generator must refer to the 600 Series FSDs, (*Transport of Waste*). All waste information regarding waste disposition must be documented in WCATS and a disposal request must be submitted through the WCATS system by the WMC. This will prompt WM-DO to initiate a waste shipment. WM-DO must be consulted on all specific waste issues as WM-DO is responsible for compliance with safe packaging and transportation requirements to off-site receiving facilities.

3.4 Storing Waste

Waste Generators and TSFs will store their waste in accordance with the requirements listed below.

3.4.1 Waste Areas

Waste Generators are responsible for ensuring that on-site waste accumulation and temporary storage (e.g., less-than 90-day storage areas) are conducted in Registered Waste Areas. For more detailed instruction see the following:

- ADESH-TOOL-206, *Hazardous Waste;*

- 300 Series Tools, (*Radioactive Waste*);
- 400 Series Tools, (*Universal Waste*);
- 500 Series Tools, (*NM Special Waste*);
- ADESH-TOOL-712, *Polychlorinated Biphenyl (PCB) Waste;* and
- ADESH-TOOL-716, *Used Oil for Recycle*.

TSFs can meet the requirements in the LANL Hazardous Waste Facility Permit by operating to the 800 Series Tools, (*Treatment, Storage, and Disposal Facilities*).

The WMC must also certify waste protection and storage by evaluating the waste and using ADESH-TOOL-300, *General Radioactive Waste Management*, and P930-1, *LANL Waste Acceptance Criteria*.

3.4.2 Site Treatment Plan (STP) for Mixed Transuranic (MTRU) and Mixed Low-Level Waste (MLLW) at TSFs

In accordance with the Site Treatment Plan (STP), LANL must report to NMED all MTRU waste and MLLW that will be stored at the Laboratory after 1-year of its accumulation start date. For STP waste containers, the start date refers to the date of receipt for storage at the LANL TSF. The STP summarizes the status of the current inventory, describes the progress being made to dispose of the waste, identifies treatment and disposal options for addressing the STP inventory, and provides overall schedules for management and disposition of mixed waste to demonstrate compliance with Land Disposal Requirement storage prohibitions under the RCRA and demonstrates compliance with the Federal Facility Compliance Order issued by NMED under the New Mexico Hazardous Waste Act.

To meet these compliance requirements, Waste Generators must notify the STP Manager via e-mail at least three months prior to the waste exceeding its 1-year accumulation start date that their waste must be added to the STP. The Waste Generators must provide the following:

- for MLLW and MTRU waste, an explanation as to why the waste will exceed its 1-year accumulation start date; and
- for MLLW only, compliance milestone dates when waste will be shipped off-site for treatment and disposal.

3.4.3 Radioactive Waste Management Basis

For Radioactive Waste, the FOD or RLM must submit Form 2107, *Radioactive Waste Management Basis Report Form* (RWMB) to WM-DO. The Waste Generator must submit an updated RWMB to WM when there are changes in facility operations or waste status. For assistance in completing the RWMB, contact WM-DO. The LANL RWMB consists of

- identification of the generating process owner;
- identification of every area where radioactive waste is generated;
- identification of waste management activities;
- reference to documents that support the RWMB;
- institutional documents applicable to waste management;
- waste authorization basis documents pertinent to the waste generating facility;
- waste management processes within the facility and their locations;

- waste matrix (solid or liquid);
- waste categories generated, i.e., LLW, MLLW, TRU, and MTRU;
- volumes of generated waste by matrix, category, and annual estimates;
- characterization methods for each waste stream;
- how waste certification is protected when waste is transported;
- how waste certification is protected during waste storage;
- how the waste management quality assurance program protects waste certification; and
- proposed disposition for each waste stream (reported under "Life-Cycle Waste Management").

WM-DO then reviews, edits, and forwards the RWMB to the DOE Field Element Manager for review and approval. WM-DO monitors compliance and is responsible for reporting the status of compliance to the DOE Field Element Manager. If WM-DO detects radioactive waste activities that were not included in the RWMB, WM-DO will notify the FOD or RLM to submit an updated RWMB with a description of the newly identified activities. DOE will not approve radioactive waste management activities that were not included in the RWMB, and may terminate the activities if not reported.

WM-DO may allow facilities to generate radioactive waste without continuous updates to the RWMB, e.g., remedial projects, superfund projects, etc., so long as

- the facilities (1) are performing work in accordance with EP-DIR-SOP-10021, *Characterization and Management of Environmental Programs Waste* and (2) have provided WM-DO a completed and signed Waste Characterization Strategy Form (WCSF); and
- WM-DO has approved the work being performed at the facility and DOE concurrence has been obtained by WM-DO.

3.4.3.a Storage Extension Requests

If a determination is made that radioactive waste cannot be shipped for final disposition within one year of waste generation, the FOD or RLM (or Facility Point of Contact) must submit a request for storage extension to WM-DO at least three months before exceeding the one year expiration of the date the container was sealed. The storage extension request must be submitted by e-mail an updated RWMB that contains

- a checked box, "Extension Request;"
- a specific description of the waste;
- a specific description of the location of the waste;
- the specific length of time it will take to dispose of the waste; and
- the reason the extension is needed.

After reviewing the request, WM-DO will send a letter to the DOE Field Element Manager at least 60 days prior to the storage expiration requesting DOE approval for continued storage. If DOE approval has not been received and the waste is nearing the storage expiration, the Waste Generator must notify WM-DO via e-mail at least three days prior to the expiration date that DOE approval has not been received. If approval for extension is not granted, DOE will provide direction back to WM-DO.

Note: If WM-DO discovers that an extension request was never submitted, WM-DO will initiate a PFITS issue in accordance with P322-4, *Laboratory Performance Feedback and Improvement Process*.

3.4.4 Processing Waste at Treatment and Storage Facilities (TSFs)

Waste processing at TSFs is conducted within storage units and includes all activities that require opening of a container after it has been characterized and sealed, including but not limited to sorting, segregating, repacking, and resizing of waste. TSFs cannot engage in any sorting, segregating, repackaging, or resizing activities that involve the addition of any new material (e.g., sorbents, inert materials, secondary waste) or an activity that could potentially change the chemical or physical composition of the waste (i.e., that could constitute "waste treatment"). These activities at TSFs must be described in the LANL Hazardous Waste Facility Permit or a permit modification is required. If processing will require a change to the physical, chemical or biological character or composition of the waste, or any secondary material will be added to the waste, a permit modification may be required and Environmental Protection-Compliance Programs (ENV-CP) must be contacted via e-mail. Waste processing activities are conducted in the areas outlined in ADESH-TOOL-810, *Waste Processing at Permitted Units*.

3.4.5 Treating Waste

Waste Generators and TSFs cannot engage in waste "treatment" activities unless one of two conditions exist

- the waste treatment is authorized under the LANL Hazardous Waste Facility Permit; or
- the waste treatment is exempt from permitting requirements.

Waste treatment, as broadly defined, includes "any method ... or process ... designed to change the physical, chemical, or biological character or composition of any hazardous waste so as to neutralize such waste, or so as to recover energy or material resources from the waste, or so as to render such waste nonhazardous; less hazardous; (or) safer to transport, store, or dispose of" (40 CFR Section 260.10, *Hazardous Waste Management System: General, Definitions*). Waste treatment may be conducted under the LANL Hazardous Waste Facility Permit or interim status documents as outlined in the following:

- ADESH-TOOL-903, *TA-55 Storage in Tanks and Treatment by Stabilization*;
- ADESH-TOOL-904, *Treatment by Open Burning*; and
- ADESH-TOOL-905, *Treatment by Open Detonation*.

All LANL workers and subcontractors must contact ENV-CP prior to engaging in an activity that may constitute waste treatment (e.g., addition of sorbents or evaporation). Requirements for other permit exempted treatment that do not have specific location requirements (i.e., Waste Generator areas or TSFs), are found in ADESH-TOOL-901, *Elementary Neutralization* and ADESH-TOOL-902, *Absorption without a Permit*.

3.5 Shipping Waste

Once the waste is ready for shipment, the Waste Generator must contact the WCO, who serves as the LANL Point of Contact for the off-site receiving facility and the Los Alamos Field Office. The WCO reviews the appropriate documentation pertaining to the off-site receiving facility and/or the Los Alamos Field Office, such as the TSDF waste profiles, DOE profiles, subcontracts, etc.

3.5.1 Shipments of Radioactive Waste to Non-Department of Energy (DOE) Treatment, Storage, and/or Disposal Facilities (TSDFs)

If a Waste Generator would like to send waste to a facility that is not owned or operated by DOE, the Laboratory must obtain an "exemption request for direct off-site shipment of Radioactive Waste to Non-DOE and TSDFs" (DOE O 435.1 Exemption Request). To obtain this exemption, the Waste Generator must send an e-mail to WM-DO identifying

- the specific waste stream with background description (including radioactivity);
- the exact location and volume of waste to be generated or placed in a container; and
- the length of time needed to complete the project's waste disposition.

WM-DO reviews the e-mail and coordinates the shipment with appropriate LANL workers, organizations and subcontractors. WM-DO and LANL's shipping subcontractor prepare the DOE O 435.1 Exemption Request, which includes a cost analysis and description of the Waste Generator's request. WM-DO then submits the final DOE O 435.1 Exemption Request to the DOE Los Alamos Field Office.

The DOE Los Alamos Field Office will review WM-DO's submittal and evaluate the request. If approved, the DOE Los Alamos Field Office will forward the request to DOE Headquarters. WM-DO will be notified if the request has been approved by DOE. If notification is not received within 15 working days from WM-DO's submittal to the DOE Los Alamos Field Office, WM-DO will contact the DOE Los Alamos Field Office for a documented response.

3.6 Disposing Waste

LANL does not have on-site disposal capacity for RCRA, TRU, or MLLW wastes. LANL retains limited capacity for on-site disposal for LLW under special circumstances and with prior approval from WM-DO. WM-DO will determine the optimal disposal path for each waste stream in consultation with its disposal subcontractor(s) and DOE and based on a cost benefit analysis of available options. Primary consideration will be given to off-site DOE TSDFs, commercial TSDFs approved by DOE, and on-site disposal respectively.

All waste shipments (on-site and off-site) must be coordinated through WM-DO. This process supports waste certification to final TSDF destination.

3.7 LANL's Oversight of Waste Management

Compliance oversight at LANL occurs throughout the life-cycle of waste planning, minimization, generation, characterization, accumulation, packaging, management and disposition. ENV-CP provides guidance on DOE Directives and State Regulatory requirements. Waste management operations, including waste certification, are conducted by WM-DO to meet additional requirements from DOE Directives. Internal assessments and external inspections are performed to ensure institutional waste management compliance is met and waste certification is maintained.

3.7.1 Certification Assessments for All Waste Types

To certify that facility waste operations are in accordance with WM-PROG-QP-250*, Radioactive Waste Facility Certification,* and ADESH-TOOL-300, *General Radioactive Waste Management*, WM-DO performs compliance assessments at a facility level against DOE O 435.1, *Radioactive Waste Management,* DOE M 435.1, *Radioactive Waste Management Manua*l, RCRA regulations, and this document. These assessments are documented in an Independent Assessment report in

accordance with P328-2, *Independent Assessment*, and distributed to the FOD, RLM and participants after the assessment has been completed.

Assessments include, but are not limited to

- an effectiveness evaluation to determine the nature of any pre-existing problems. When pre-existing problems are found, the assessment team reviews corrective actions that have been taken and determines whether the corrective actions are effective for continuous quality improvement;
- an evaluation of registered waste areas for waste certification compliance. RCRA corrective actions and opportunities for improvement must be reported to Environmental ENV-CP;
- an inspection of the registered waste area and review of the inspection records;
- a tracking and review of past corrective actions resulting from independent assessments conducted by other LANL organizations, DOE, or their contractors, if possible and;
- a review of nonconformance and corrective action documentation and, when appropriate, an action plan to periodically monitor facilities to ensure appropriate corrective actions are being taken.

WM-DO must notify the FOD and RLM in advance of upcoming site visits and assessments. Registered waste area information will be recorded and tracked in a database managed by ADESH.

3.7.2 LANL Self-Assessment

DOE and NMED expect LANL to assess compliance of the Waste Generator's waste management activities and TSF permit compliance. Waste Generator assessments include but are not limited to, accumulation and registered waste areas, LANL inspection forms, containers or tanks, labels, time limits, worker health and safety practices, and the Waste Generator's records and training records. Compliance evaluations routinely include sites outside registered areas (see the ADESH-FSD for requirements on various registered waste areas including TSF requirements). Assessments of registered waste areas are performed by WM-DO and ENV-CP in addition to periodic Independent Assessments (see P328-2, *Independent Assessment*) and Management Assessments (see P328-3, *Management Assessment*).

Waste Generators and TSFs must retain waste documents and records in accordance with PD1020*, Document Control and Records Management.*

3.8 Waste Certification

The LANL Waste Certification Program was developed, documented and implemented to ensure that the waste acceptance requirements of off-site facilities receiving waste for storage, treatment, and disposal are met. LANL waste management components that are provided complex wide support waste certification.

Waste certification is a process by which a Waste Generator affirms that waste meets the waste acceptance criteria of the off-site facility to which the Waste Generator intends to transfer the waste for treatment, storage, and disposal. As such, LANL's Waste Certification Program includes the waste certifying process from generation to disposition (cradle-to-grave) for all regulated wastes. Identifying, characterizing and recharacterizing waste with consideration for associated hazards and signing the WSP certification statement is conducted by the Waste Generator and WMC. Assuring compliance performance includes waste verification, storage certification, packaging certification, data management, and STP and RWMB reporting. Finally, preparing waste for shipment, disposal acceptance, final disposition and on-going assessments completes LANL's Waste Certification Program.

Waste certification includes WM-DO providing oversight of Waste Generator activities to meet the requirements of this document and the waste acceptance criteria of the receiving TSDF. LANL's Waste Certification Program includes compliance for all waste types. Fig. 2 illustrates key components of LANL's Waste Certification Program.



Fig. 2. Key components of the LANL Waste Certification Program

4.0 RESPONSIBILITIES

4.1 Facility Operations Director (FOD)

- If needed, issues local-level procedures for waste management activities in accordance with Section 3.1.
- Routes local level procedures through review and approval process adopted by WM-DO.
- Ensures completion and management of their facility's *Radioactive Waste Management Basis Report* (RWMB Form 2107, *Radioactive Waste Management Basis Report Form*).

4.2 Responsible Line Manager (RLM)

- Participates and encourages others' participation in WM-DO's assessment for facility certification.
- Assists in the management and implementation of corrective actions, findings and opportunities for improvement regarding their facilities.
- Ensures waste management compliance at their facilities.

4.3 Waste Management Division Leader

- Ensures waste management compliance processes are implemented across the Laboratory.
- Ensures waste management oversight processes are implemented.

- Acknowledges the process by which local waste management procedures are reviewed and approved before they are issued or implemented.
- Initiates the review of waste characterization documentation by subject matter experts when new information or discrepancies in waste characterization are discovered.
- Monitors work in progress and conducts effectiveness evaluations (i.e., through facility assessment and waste verification).
- Documents compliance or noncompliance with characterization/certification requirements.
- Identifies the facility's waste management quality assurance program and how it protects waste certification and the proposed disposition for each waste stream.
- Performs re-evaluation and verification of characterization information for facilities' waste generation operations.
- Evaluates corrective actions regarding waste management as timely or untimely.
- Reports corrective action regarding waste management adequacy to management.
- Provides notification to facility RLMs of the status and performance of activities under assessment.
- Documents facility waste certification reviews resulting from internal (e.g., Authorization Authority) or external (e.g., DOE) audits and assessments, tracking corrective actions and reporting observations to management.
- Determines whether waste management staging/storage facilities and systems are adequate to certify waste and to maintain waste certification until shipment.
- Ensures LLW/MLLW waste containers are certified by a qualified Waste Package Certifier (WPC).
- Completes receiving facility documentation and notifications for LANL.
- Maintains LANL facility operations certification and off-site receiving facility certification.
- Provides WCO disposition approval for final TSDF destination.
- Performs LANL Self Assessments of radioactive waste staging and storage areas in accordance with Section 3.7.2.
- Ensures that the WCO and designees certify waste for disposition to off-site TSDFs.
- Performs annual verification of the waste characterization of one percent of the total number of hazardous waste streams characterized solely by acceptable knowledge and managed at TA-54 in the previous calendar year.
- Provides notification and reporting to regulatory oversight bodies.
- Provides WMC qualification training.

4.4 Waste Management Coordinators (WMCs)

- Certify waste for storage in LANL's registered storage areas.
- Verify waste containers or tanks meet the requirements for transfer into storage at their facility or verify waste can be transferred to a TSF or TSDF.

- Ensure waste characterization and acceptable knowledge documentation is accurate, defensible, and complete.
- Ensure waste meets accepting facility WAC and follows the ADESH-FSD processes.
- Ensure the WSP is completed and submitted in WCATS.
- Support Waste Generators in internal assessments and external inspections.
- Ensure waste containers are closed in accordance with manufacturer's instructions prior to shipment.
- Ensure waste container or tank is adequate to protect the waste against external sources of contamination, and ensure waste management integrity and compatibility.

4.5 Environmental Protection - Compliance Programs (ENV-CP) Group Leader

- Directs the waste management compliance process.
- Coordinates information and compliance requests and activities with regulators.
- Manages the ADESH-FSD collection.
- Receives information on RCRA corrective actions and opportunities for improvement from WM-DO's assessment of facility certification.
- Ensures that LANL Self Assessments in accordance with Section 3.7.2 are performed.
- Assists WM-DO by providing regulatory information and institutional guidance on waste management requirements.
- Maintains the LANL Hazardous Waste Facility Permit and is responsible for developing permit modification requests.

4.6 Waste Generators

- Comply with the requirements in this document and other requirements documents referenced herein.
- Characterize waste pursuant to the requirements in this document and the ADESH-FSDs.
- Before waste is generated and/or packaged, conduct waste avoidance or minimization analysis in consultation with the WMC.
- Ensure adequacy of the documentation used for waste characterization (acceptable knowledge and physical/chemical analysis).
- Maintain registered waste areas within their span of control.
- Manage on-site storage as required in this document.
- Initiate the WSP.
- Notify the STP Manager via e-mail, at least three months prior to the waste exceeding its 1-year accumulation start date that their waste must be added to the STP.

5.0 IMPLEMENTATION

The requirements in this document are effective on the issue date. All ADESH FSDs that are referenced in this document will be reviewed and updated by December 31, 2015, in accordance with ADESH-AP-007, *Document Control* and PD311, *Requirements System and Hierarchy*. The FSDs will be reviewed and updated on a three year schedule beginning with the issue date of P409, Rev.5.

6.0 TRAINING

The training courses listed in this section are required for all workers who generate waste (except office trash) and workers who manage waste or work at TSFs. Workers must notify their managers of expired training. Unless specified, there is no grace period for the training requirements below; this training must be completed and kept current.

Note: Site-specific training may be required and directed by RLMs.

6.1 Waste Generators and WMCs must complete:

- Course #23263, *Waste Generation Overview Live*; and
- Course #21464, *Waste Generation Overview Refresher SS*, every three years.

6.2 Persons who work in, or are owners of, less-than-90-day waste accumulation areas must complete:

- Course #7488, *RCRA Personnel Training*, and
- Course #28582, *RCRA Refresher (Self-Study)*, every twelve months.

Note: The RCRA-related training listed above must be completed within six months of employment or new assignment; during this period, workers must work under the supervision of a trained worker.

6.3 Persons who work in TSFs must complete:

- Course #7488, *RCRA Personnel Training*;
- Course #28582, *RCRA Refresher (Self-Study)*, every twelve months; and
- Course #23263, *Waste Generation Overview Live*.

Note: The RCRA-related training listed above must be completed within six months of employment; during this period, workers must work under the supervision of a trained worker.

6.4 Remediation Workers must complete:

- Course #23263, *Waste Generation Overview Live;*
- Course #4464, *HAZWOPER: General Site Worker*, or Course #4465, *HAZWOPER: Limited Site Worker*;
- Course #28652, *HAZWOPER: Refresher*, every twelve months;
- Course #7488, *RCRA Personnel Training*;
- Course #28582, *RCRA Refresher (Self-Study)*, every twelve months; and

or other courses as assigned by the supervisor.

7.0 EXCEPTION OR VARIANCE

Changes in the processes conducted at the TSF or changes to the TSF structure must be reviewed by ENV-CP for necessary permit modifications. Hazardous waste treatment activities that are not authorized by the LANL Hazardous Waste Facility Permit or interim status documents must be reviewed by ENV-CP for regulatory compliance.

8.0 DOCUMENTS AND RECORDS

8.1 Office of Record

The Policy Office is the Laboratory Office of Record for this Institutional Document and maintains the administrative record.

8.2 Waste Management Records

WM-DO and ENV-CP work with Waste Generators, FODs and RLMs to ensure that the following records and documentation are kept in accordance with PD1020, *Document Control and Records Management*:

- WCATS for waste characterization
- Form 2107, *Radioactive Waste Management Basis Report Form*
- *RWMB Storage Extension Request*
- DOE O 435.1, *Exemption Request*
- STP plan and correspondence to and from NMED
- Independent Assessment Reports
- Trend analysis on waste management data
- ADESH database containing Registered Waste Area information
- Inspection Forms

9.0 DEFINITIONS AND ACRONYMS

9.1 Definitions

See LANL *Definition of Terms* and ADESH-TOOL-101, *Waste Management Glossary*.

9.2 Acronyms

See LANL *Acronym Master List*.

ADESH	Associate Director for Environment, Safety, and Health
AP	Administrative Procedures
DEAR	Department of Energy Acquisition Regulation
DOE	Department of Energy
DOT	Department of Transportation
ENV-CP	Environmental Protection-Compliance Programs
EPA	Environmental Protection Agency
ER	Environmental Restoration
FOD	Facility Operations Director
FSD	Functional Series Documents
IA	Issuing Authority
LANL	Los Alamos National Laboratory
LLW	Low-Level Waste
M	Manual
MLLW	Mixed Low-Level Waste

MSDSs	Material Safety Data Sheets
MTRU	Mixed Transuranic
NCR	Nonconformance Report
NMED	New Mexico Environment Department
NNSS	Nevada National Security Site
O	Order
OP	Operating Tools
PFITS	Performance Feedback and Improvement Tracking System
PRID	Permits and Requirements Identification
PM	Project Management
RCRA	Resource Conservation and Recovery Act
RLM	Responsible Line Manager
RM	Responsible Manager
RO	Responsible Office
RWMB	Radioactive Waste Management Basis
SBP	Safety Basis Procedure
SOP	Standard Operating Procedure
STP	Site Treatment Plan
TP	Technical Procedure
TRU	Transuranic
TSCA	Toxic Substances Control Act
TSDF	Treatment, Storage, and/or Disposal Facility
TSFs	Treatment Storage Facilities
WAC	Waste Acceptance Criteria
WAP	Waste Analysis Plan
WCATS	Waste Compliance and Tracking System
WCO	Waste Certification Official
WCSF	Waste Characterization Strategy Form
WSP	Waste Stream Profile
WM	Waste Management
WMC	Waste Management Coordinator
WM-DO	Waste Management-Division Office

10.0 HISTORY

Revision History		
03/27/08	P409, Rev. 0	Initial Issue. This document and its linked Waste Management Tools replaces and cancels the Laboratory Implementation Requirements (LIRs) and Laboratory Implementation Guidance (LIG) listed below. The LIRs will remain in force and effect for each nuclear facility until that facility completes the Unreviewed Safety Question (USQ) or Unreviewed Safety Issue (USI) review determinations. ▪ LIG 404-00-02, *Acceptable Knowledge Guidance*

Revision History		
		▪ LIR 404-00-02, *General Waste Management Requirements* ▪ LIR 404-00-03, *Hazardous and Mixed Waste Requirements* ▪ LIR 404-00-04, *Managing Solid Waste* ▪ LIR 404-00-05, *Managing Radioactive Waste* ▪ LIR 404-00-06, Managing Polychlorinated Biphenyls
05/22/08	P409, Rev. 1	Section 6.0 Training: Changed Waste Profile Form Signers to Waste Generators and removed Waste Documentation Forms from the Waste Generators list.
06/04/10	P409, Rev. 2	Extensive revision: Clarified training requirements and responsibilities, corrected links to tools, clarified tool creation process, and simplified the document.
03/19/12	P409, Rev. 3	This document cancels RN0808, *Requirements for Recycling Metal from Areas posted for Radiological Hazards*. Section 6.0: Separated the third bullet into two bullets, reflecting the separate training requirements for persons who work in Treatment, Storage, and/or Disposal Facilities (TSDFs) and Remediation Workers, to align with the Laboratory's Hazardous Waste Permit. Added Course #23263, *Waste Generation Overview Live,* as a training requirement for persons who work in TSDFs and Remediation Workers.
04/10/13	P409, Rev. 4	Removed references to cancelled Form 1346, *Waste Profile Form*, which has been replaced by the Waste Stream Profile (found in the Waste Compliance and Tracking System (WCATS). Section 5.0: Updated to reflect effective date of May 28, 2013 for applicable nuclear, high- and moderate-hazard facilities and accelerators. Performed three year review in accordance with PD311, *Requirements System and Hierarchy*. Updated links, titles, and acronyms.
07/30/15	P409, Rev. 5	Performed three-year review in accordance with PD311, *Requirements System and Hierarchy*. This document cancels P930-2, *Radioactive Waste Certification Program* and P930-3, *Off-Site Shipment of Chemical, Hazardous, or Radioactive Waste.* Although this is not "a new document," it is a complete re-write of P409, Rev. 4 as the requirements from P930-2 have been merged with this document. P409 title has also changed to "LANL Waste Management."

11.0 REFERENCES

Prime Contract:

- DEAR 970.5223-1, Integration of Environment, Safety, and Health into Work Planning and Execution (Dec. 2000)
- Part II, Section H-83 (DEAR 5223-1)
- Part III, Section J, Appendix B 4.2

- Part III, Section J, Appendix G
- Appendix B, Statement of Work: §1.0 General
- DOE O 435.1, *Radioactive Waste Management*
- DOE M 435.1-1, *Radioactive Waste Management Manual*
- DOE O 436.1, *Departmental Sustainability*
- 40 CFR Section 260.10, *Hazardous Waste Management System: General, Definitions*
- DOE O 458.1, *Radiation Protection of the Public and the Environment*

11.1 Other References

- LANL Hazardous Waste Facility Permit
- P930-1, *LANL Waste Acceptance Criteria*
- *Resource Conservation and Recovery Act* (RCRA)
- Toxic Substances Control Act (TSCA)
- New Mexico Special Waste Act
- 74-9-1 NMSA 1978, *Solid Waste Act*
- 74-4-1 NMSA 1978, *Hazardous Waste Act*
- PD311, *Requirements System and Hierarchy*
- ADESH-AP-007, *Document Control*
- SBP-112-3-R1.2, *Unreviewed Safety Question (USQ) Process*
- P315, *Conduct of Operations Manual*
- ADESH-TOOL-213, *No Owner Waste*
- ADESH-TOOL-114, *Office Waste Tool*
- ADESH-TOOL-111, *Waste Characterization*
- ADESH-TOOL-314, *Radioactive Characterization*
- PD400, *Environmental Protection*
- Waste Compliance and Tracking System (WCATS)
- ADESH-TOOL-306, *Potentially Radioactive or Mixed Investigation-Derived Waste*
- P411, *Authorized Release Limits Proposal Process*
- RP-SOP-077.004, *LANSCE Metals Clearance Process*
- RP-SVS-RIC-TBD-03, *Technical Basis Documentation Regarding Health Physics Measurements for the Unrestricted Release of Metals from LANSCE*
- WM-PROG-QP-236, *Waste Certification Program Waste Verification*

- ADESH-TOOL-600, *Certification, Documentation, Shipment of ChemHaz*
- ADESH-TOOL-206, *Hazardous Waste*
- 300 Series Tools, (Radioactive Waste)
- 400 Series Tools, (*Universal Waste*)
- 500 Series Tools, (*NM Special Waste*)
- ADESH-TOOL-712, *Polychlorinated Biphenyl (PCB) Waste*
- ADESH-TOOL-716, *Used Oil for Recycle*
- 800 Series Tools,(*Treatment, Storage and Disposal Facilities*)
- ADESH-TOOL-300, *General Radioactive Waste Management*
- EP-DIR-SOP-10021, *Characterization and Management of Environmental Programs Waste*
- P322-4, *Laboratory Performance Feedback and Improvement Process*
- ADESH-TOOL-810, *Waste Processing at Permitted Units*
- ADESH-TOOL-903, *TA-55 Storage in Tanks and Treatment by Stabilization*
- ADESH-TOOL-904, *Treatment by Open Burning*
- ADESH-TOOL-905, *Treatment by Open Detonation*
- ADESH-TOOL-901, *Elementary Neutralization*
- ADESH-TOOL-902, *Absorption without a Permit*
- WM-PROG-QP-250*, Radioactive Waste Facility Certification*
- P328-2, *Independent Assessment*
- P328-3, *Management Assessment*
- PD1020*, Document Control and Records Management*
- PD311, *Requirements System and Hierarchy*
- ADESH-TOOL-101, *Waste Management Glossary*

12.0 FORMS

Form 2107, *Radioactive Waste Management Basis Report Form*

13.0 ATTACHMENTS

There are no attachments associated with this document.

14.0 CONTACT

Waste Management Division Office
Telephone: (505) 667-2211
Fax: (505) 667-1945
Website: http://int.lanl.gov/org/padops/adesh/waste-management/index.shtml

IMPORTANT

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Conduct of Operations Manual

1.0 PURPOSE

The purpose of this document is to describe the implementation of Conduct of Operations at Los Alamos National Laboratory (LANL or the Laboratory).

In July of 1990, the Department of Energy (DOE) issued DOE Order (O) 5480.19, *Conduct of Operations Requirements for DOE Facilities*. The Order's guidelines were designed to form a compendium of good management practices and describe key elements that support excellence in operation. In 2001, this Order was added to the Prime Contract and was a fundamental component of the Los Alamos National Security, Limited Liability Company (LANS, LLC) proposal to DOE to manage the Laboratory. In June of 2010, DOE O 422.1, *Conduct of Operations*, superseded DOE O 5480.19 and was added to the Laboratory contract in January of 2011.

Conduct of Operations is a philosophy of working in a formalized, disciplined manner with an aim to achieving operational and programmatic excellence. It requires a personal commitment to maintain the highest standards of quality. Properly integrated, Conduct of Operations, Conduct of Engineering (COE), Conduct of Maintenance, Conduct of Training, and a formal method for research and development become the foundation of the Laboratory's safety culture.

This document establishes a formally documented methodology for ensuring operations and programmatic activities are performed safely and securely in accordance with applicable codes, standards, DOE directives, and sound business practices. Success of this methodology depends on implementing established requirements using approved procedures for conducting operations and programmatic activities in a systematic and prescribed manner, and ensuring that workers are trained to those procedures. It is the Laboratory's policy that workers will not compromise safety for personal, programmatic, operational, or any other reason. Applying the formality and discipline of Conduct of Operations will enable Laboratory workers to achieve enhanced safety, security, environmental compliance, quality, consistency, and excellence. In a broad sense, Conduct of Operations principles and requirements apply to all endeavors at the Laboratory. These standards comply with the requirements of DOE O 422.1.

2.0 AUTHORITY AND APPLICABILITY

2.1 Authority

This document is issued under the authority of the Laboratory Director to direct the management and operation of the Laboratory, as delegated to the Associate Director for Nuclear and High-Hazard Operations (ADNHHO) as provided in the Prime Contract. This document is derived from the Laboratory Governing Policies, particularly the section on Management Systems, and DOE O 422.1, *Conduct of Operations*.

- Issuing Authority (IA): Associate Director for Nuclear and High-Hazard Operations (ADNHHO)
- Responsible Manager (RM): Operations Support (OS) Division Leader
- Responsible Office (RO): Operations Support–Readiness and Technical Support (OS-RTS)

2.2 Applicability

This document applies to all Laboratory workers performing facility or programmatic work.

This document applies to subcontractors and their employees to the degree specified in their subcontracts.

This document provides the conduct of operations program for all Laboratory facilities; facility-specific manuals are not required. Implementation of the conduct of operation program is in accordance with P315-2, *Formality of Operations Change Control*, as described in Section 3.1 of this document and supported by the institutional programs described in Sections 3.2.1 through 3.2.3.

If an organization elects to use local implementing procedures for conduct of operations, those procedures may augment or complement this document, but may not conflict with it. Such conflicts must be resolved through the exception or variance process described in P315-2.

3.0 PROCEDURE DESCRIPTION

Operating in accordance with the requirements of this document and its attachments is fundamental to the safety of employees, the public, and facilities. Compliance with these requirements provides defense-in-depth against many kinds of accidents and adverse incidents by minimizing error and confusion. Furthermore, these requirements provide a clear means to identify problems, determine underlying causes, take preventive action before adverse events occur, and bring about continuous improvement in the safety and quality of operations.

3.1 Graded Approach

Conduct of Operations at the Laboratory is applied using the graded approach as defined in SD330, *Los Alamos National Laboratory Quality Assurance Program*. The graded approach is incorporated into all activities performed at the Laboratory as a process of ensuring that the level of analysis, documentation, and actions used to comply with requirements are commensurate with the following:

- The relative importance to safety, safeguards, and security
- The magnitude of any hazard involved
- The life cycle stage of the facility
- The programmatic mission of a facility
- The particular characteristics of a facility
- The relative importance of managing radiological and non-radiological hazards
- Any other relevant factor

The institution establishes the requirements for the Conduct of Operations Program through this document, but the implementation is the responsibility of the individual facility through the facility's Facility Operations Director (FOD) organization based on the graded approach described above and the requirements of the institutional programs described in Section 3.2, *Institutional Programs and Integration*.

3.2 Institutional Programs and Integration

Improving overall performance at the Laboratory requires integration of institutional documents that direct the manner in which work will be conducted at the Laboratory. These documents establish requirements for the conduct of operations, engineering, maintenance, and training.

P315-2, *Formality of Operations Change Control*, describes the process for developing an implementation strategy for formality of operations and for assessing the effectiveness of the resulting program. The criteria for assessing the effectiveness of the implementation of Conduct of Operations are available from the OS-RTS website.

The institutional guidelines for the formal application of scientific methodology to research and development are addressed in a companion document, SD601, *Conduct of Research and Development*. Research and Development (R&D) work done in a facility (for example a nuclear or radiological facility) must be executed in a way that complies with the facility requirements including the applicable controls and formality of operations. See additional discussion in Attachment 16 of this document.

This document is intended to integrate fully with the Laboratory's Integrated Work Management Program (P300, *Integrated Work Management*). See additional discussion in Attachment 16.

3.2.1 Conduct of Maintenance

The institutional Conduct of Maintenance program consists of policies, programs, and practices associated with the performance of maintenance, work management, and related activities. P950, *Conduct of Maintenance*, establishes the formality for ensuring that the practice of maintenance at the Laboratory meets customer requirements while complying with applicable codes, standards, Code of Federal Regulations (CFR) directives, DOE directives, and efficient business practices. Maintenance program procedures are to be implemented at nuclear facilities through DOE O 433.1B, *Maintenance Management Program for DOE Nuclear Facilities*. For non-nuclear facilities, the maintenance Administrative Procedures (APs) will be implemented using a graded approach. In accordance with DOE O 430.1B, Chg. 1, *Real Property Asset Management*, non-nuclear facilities must implement processes supporting condition assessment surveys; work management; preventive, predictive, and corrective maintenance; configuration management; management of maintenance backlogs; and seasonal facility preservation.

The criteria for assessing the effectiveness of the implementation of Conduct of Maintenance are available from the Maintenance and Site Services (MSS) Division.

3.2.2 Conduct of Engineering (COE)

The COE program defines the requirements and processes for the practice of engineering at the Laboratory to ensure that engineering products and services satisfy requirements, needs, and customer expectations in a safe, secure, and environmentally-responsible manner. COE establishes formally documented procedures for ensuring that the practice of engineering at the Laboratory meets customer requirements while complying with applicable codes, standards, CFR directives, DOE directives, and efficient business practices.

Success of the COE program depends on implementing the Prime Contract engineering requirements by using approved institutional engineering programs and standards for engineering practices (e.g., the systematic application of engineering disciplines within a framework of Laboratory-developed processes that are governed by national codes and standards, recognized quality standards, DOE orders, regulations, and other contractual requirements), while ensuring that trained and qualified engineering personnel perform these activities systematically and as prescribed. The program is addressed by PD340, *Conduct of Engineering for Facility Work*.

The criteria for assessing the effectiveness of the implementation of COE are available from the Conduct of Engineering Office (CENG-OFF).

3.2.3 Conduct of Training

The Conduct of Training program is comprised of policies, procedures, tools, and other training resources necessary to train, qualify or certify, and authorize Laboratory workers in accordance with applicable regulatory drivers and contractual requirements. PD781, *Training Program Management*, serves as the overarching training Program Description document for the Laboratory. P781-1, *Conduct of Training*, provides detailed requirements and guidance necessary to implement, using a graded approach, training and qualification programs at the institutional, facility, and activity (job task) levels. These documents are supplemented by other procedures that address specific aspects of training program implementation.

The Conduct of Training program is not implemented by a single organization, but is distributed to a number of organizations to best implement a specific aspect of the program. The Service Innovation Division–Institutional Training Services (SI-ITS) group is responsible for institutional training program and policy and administration of Laboratory-wide training courses. SI-ITS deploys some training professionals to Laboratory organizations. The Nuclear and High Hazard Operations–Training (NHHO-TR) group deploys training professionals to nuclear, nonnuclear and other facilities. The Software and Applications Engineering Division–Business Systems Solutions Center (SAE-4) is responsible for maintaining the Laboratory's training data management systems.

The Responsible Associate Directors (RADs) and the ADNHHO—with the support of NHHO-TR—share responsibility for the development, implementation, and maintenance of training programs for nuclear facilities and activities that meet expectations of DOE O 426.2, *Personnel Selection, Training, Qualification, and Certification Requirements for DOE Nuclear Facilities*.

Facility owners and managers are responsible for the development, implementation, and maintenance of facility-specific training. Line managers (including facility owners and managers) are responsible for development, implementation, and maintenance of training required for the safe conduct of activities within their purview. All line managers are responsible for assuring workers have completed Laboratory-wide, facility-specific, and activity-specific training required for their work location and assigned job tasks.

The criteria for assessing the effectiveness of the implementation of Conduct of Training are available from the SI-ITS group.

3.3 Periodic Assessment

DOE-O-422.1, *Conduct of Operations*, Paragraph 2.a.(3) requires "monitoring and self-assessment of operations." One of the methods to meet this requirement is the periodic assessment of the implementation and maturity of Conduct of Operations within the various LANL facilities and/or operating organizations. This periodic assessment will be managed by the OS-RTS organization by implementing the following requirements:

- The assessments will be performed following the requirements of P328-3, *Management Assessment*.
- Develop and maintain a set of assessment criterion in the form of Criteria Review and Approach Documents (CRADs) that evaluate implementation of the requirements of this document. These CRADs will be performance based and allow for assessing maturity of the implementation.

- Develop and maintain an assessment Plan of Action (POA) that describes the purpose, scope, depth, and breath of the periodic assessments. A separate POA will be developed for nuclear and non-nuclear facilities to support the graded implementation in the non-nuclear facilities. This POA will utilize the above CRADs as the assessment criteria.
- Establish a basic schedule of every three (3) years for the nuclear facilities and every five (5) years for non-nuclear facilities. These basic assessment schedules may be waived or modified by the OS Division Leader.
- The CRADs and POAs will be posted on the OS-RTS website.

4.0 RESPONSIBILITIES

Specific Roles, Responsibilities, Accountabilities, and Authorities related to this document are documented in P313, *Roles, Responsibilities, Authorities, and Accountability*.

5.0 IMPLEMENTATION

The requirements in this document are effective on the issue date.

6.0 TRAINING

There is no specific mandatory training required to implement this document. It is recommended that all personnel implementing this document complete UTrain Course #24648, *OS-RTS ConOps, Conduct of Operations Overview*. This training will enhance the employee's knowledge as required and as outlined in DOE O 422.1, *Conduct of Operations*. The Conduct of Operation program is one of the Safety Management Programs (SMPs) recognized in the Nuclear Safety Rule [Title 10 Code of Federal Regulations (CFR) Part 830, *Nuclear Safety Management*]. The Conduct of Operations Program at LANL is implemented as an SMP. This document is the tool used to meet the implementing requirements as outlined in DOE O 422.1. Additional, attachment-specific training to meet these requirements is identified in the individual attachments of this document.

7.0 EXCEPTION OR VARIANCE

To obtain an exception or variance to the requirements of this document, follow the requirements of Section 7.0 of P315-2, *Formality of Operations Change Control*.

8.0 DOCUMENTS AND RECORDS

8.1 Office of Record

The Policy Office is the Laboratory Office of Record for this Institutional Document and maintains the administrative record.

The FOD organizations are the Office of Record for all documents (e.g., procedures, round sheets, logs, etc.) generated using this document.

8.2 Records Processing

Records, including logs, as required by the attachments or implementing programs must be managed in accordance with P1020-1, *Laboratory Records Management*, and any local processes.

9.0 DEFINITIONS AND ACRONYMS

9.1 Definitions

See LANL *Definition of Terms*.

9.2 Conventions

Document conventions include the following:

Term	Usage
must	Indicates a requirement. If the intent cannot or will not be met, the process described in Section 7.0, *Exception or Variance*, must be followed.
should	Indicates a recommendation.
may	Indicates an option.
supervisory titles	Titles for supervisory positions--for example, Operations Manager (OM), Associate Director, or Responsible Line Manager (RLM)—indicate the position that is ultimately accountable for the referenced action. Personnel holding these positions may delegate the performance of the work, but not the accountability for the outcome.
document references	References to other documents must be interpreted as referring to any successor documents as well.
organizational references	References to organizations must be interpreted as referring to the functional equivalents, should the organization be re-named or restructured.

9.3 Acronyms

See LANL *Acronym Master List*.

ADNHHO	Associate Director for Nuclear and High-Hazard Operations
AP	Administrative Procedure
CENG-OFF	Conduct of Engineering Office
CFR	Code of Federal Regulations
COE	Conduct of Engineering
DOE	Department of Energy
FOD	Facility Operations Director
IA	Issuing Authority
IV	Independent Verification
LANL	Los Alamos National Laboratory
LANS, LLC	Los Alamos National Security, Limited Liability Company
MSS	Maintenance and Site Services
NHHO-TR	Nuclear and High Hazard Operations–Training
O	Order
OM	Operations Manager
OS	Operations Support
OS-RTS	Operations Support–Readiness and Technical Support
POA	Plan of Action
R&D	Research and Development

RAD	Responsible Associate Director
RLM	Responsible Line Manager
RM	Responsible Manager
RO	Responsible Office
SAE-4	Software and Applications Engineering–Business Systems Solutions Center
SI-ITS	Service Innovation–Institutional Training Services
SMP	Safety Management Program
USI	Unreviewed Safety Issue
USQ	Unreviewed Safety Question

10.0 HISTORY

Revision History		
10/31/08	P315 Rev. 0	Initial Issue. This document replaces and cancels P315.0, *Conduct of Operations Manual*.
06/24/10	P315, Rev. 1	The entire document has been reformatted in compliance with P311-1, *Creating, Revising, and Cancelling Institutional Documents.* Document and organizational references have been updated. Several sections, as well as chapters (Attachments) 6 and 18 in entirety, have been replaced by reference to applicable institutional documents. Attachments 13 and 16 have been rewritten.
11/28/12	P315, Rev. 2	Entire document: ▪ Updated to implement DOE O 422.1, *Conduct of Operations*. ▪ Updated links, titles, and acronyms. ▪ Made editorial changes to improve consistency with other institutional documents and among related requirements within this document. Main Body: ▪ Section 5.0: Updated to reflect effective date of January 14, 2013 for nuclear, high- and moderate-hazard facilities and accelerators. ▪ Section 7.0: Replaced the Exception and Variance process with a link to P315-2, *Implementing Formality of Operations*; All Attachments: ▪ Updated Records sections to link to P1020-1, *Laboratory Records Management*, for processing any record generated by this document; Attachment 8: ▪ Added a discussion of out of service equipment/systems linking to caution tags and control locks as potential control methods; ▪ Changed the periodicity for the review of control locks; Attachment 10: ▪ Added a discussion and requirements for the use of “concurrent dual verification” when performing Independent Verification (IV); Attachment 12: ▪ Updated the turnover process and Appendix 12-A to require

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		a review of shift and standing orders; Attachment 15: ▪ Added a requirement for Safety Basis to review shift and standing orders and perform a Unreviewed Safety Question/Unreviewed Safety Issue (USQ/USI) review; Attachment 16: ▪ Revised the section regarding document types excluded from the requirements of Attachment 16 to provide criteria and add Appendix 16-J to document the review of current excluded document types; ▪ Revised existing and added new definitions to support specific changes to Attachment 16; ▪ Added a note to acknowledge that the performance of a validation may result in re-invoking the Review and Comment and USQ/USI processes; ▪ Deleted "first time use" as an approved validation method; ▪ Clarified that the date for existing operations procedures to meet the format of Appendix 16-C is 06/24/2013; ▪ Added an option for performing an "additional validation" as part of implementation after a procedure has been approved; ▪ Re-wrote the entire section dealing with periodic reviews of procedures; ▪ Clarified the expectation that validating the current version of a procedure extends to reference procedures; Attachment 18: ▪ Limited the minimum scope to be the equipment/systems identified in Attachment 8 as requiring status control; and ▪ Added requirements to address administrative control of component tags.
02/20/13	P315, Rev. 3	Section 5.0: Updated to reflect effective date of April 8, 2013 for nuclear, high- and moderate-hazard facilities and accelerators. Attachment 1 ▪ Section 1.5, clarified the requirement regarding informing workers following an event. Attachment 8 ▪ Section 8.1.2, clarified the expectation that technical procedure generated to support the status control of equipment and systems are in accordance with Attachment 16. ▪ Section 8.1.11, clarified the requirements that the controlling temporary modifications is done in accordance with AP-341-504 and its supporting documents. Attachment 10 ▪ Section 10.1.2, clarified the scope of the requirement for components within safety-related systems that require IV. Attachment 15 ▪ Section 15.0, deleted Table 15-1 to eliminate confusion with detailed requirements of Sections 15.1 and 15.2. ▪ Section 15.1, deleted the requirement that shift orders be reviewed by safety basis and obtain a USQ/USI as appropriate. ▪ Section 15.1, deleted the link to Table 15-1 in Section 15.0.

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		▪ Section 15.2, deleted the link to Table 15-1 in Section 15.0. Attachment 16 ▪ Section 16.2.3, deleted the criteria for excluding a document type. ▪ Section 16.4, deleted the second sentence of the definition for "Expiration Date." ▪ Section 16.4, in the definition of a "Reference Procedure," clarified the requirement regarding the usage designation is not to be used for IWD-equivalent procedures. ▪ Section 16.4, clarified the definition for "Working Copy" to acknowledge an approved EDMS may also be the source for verifying the most current and approved version of a procedure. ▪ Section 16.5.1.h, deleted the requirement that a Reference procedure cannot be used as an IWD-equivalent procedure. ▪ Section 16.5.2.b, added a note acknowledging that the FOD may modify Appendix 16-B and 16-C for other types of technical procedures. ▪ Section 16.5.2.b, clarified the requirement regarding the alarm response procedures to be developed to support alarms credited in Attachment 8. ▪ Section 16.6.1.e, clarified the note requiring the RLM to have Training review the IPC for long-term training requirements. ▪ Section 16.9.1, clarified the requirements regarding ensuring that workers are using the correct and latest procedure. ▪ Section 16.9.2.a, clarified the expectation that validating the current version of a procedure extends to any associated reference procedures. ▪ Section 16.9.2.a, clarified the requirement that an IWD-equivalent procedure that is a "Reference Procedure" be present at the job site. ▪ Appendix 16-B, added the expectation that the FOD may modify Appendix 16-B for other types of technical procedures.
07/17/14	P315, Rev. 4	▪ Section 5.0: Updated language to reflect USQ/USI process and implementation dates for affected facilities. ▪ Attachment 16: Minor update to clarify the expectations regarding the highlighting of key procedure steps and/or information, including the methods to be used for safety basis and criticality safety steps and/or information.
09/23/14	P315, Rev. 4	Administrative Change Updated language in Section 5.0 to reflect that this update was categorically excluded from the USQ/USI process. Corrected link to AP-341-504, Temporary Modification Control in Section 8.1.11 of Attachment 8. Corrected link and title change to AP-341-516, title changed from "Operability Determination and Functionality Assessment" to "Operability Determination" in Sections 8.1.13 and 8.5 of Attachment 8.

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03/03/15	P315, Rev. 5	▪ Section 3.1: Added an acknowledgment in the main body that the institution establishes requirements, but the detailed implementation is the responsibility of the individual facility and coordinated through the facility's FOD organization. ▪ Section 3.3: Added a new section to the main body to require the performance of periodic assessments of the implementation of the Conduct of Operations Safety Management Program (SMP) and added a reference in Section 16.1 of Attachment 16. ▪ Added to the main body and to each attachment, a recommendation to take the associated new OS-RTS ConOps training. ▪ Section 5.0: Updated to reflect that this document is effective on the date of issue. ***Note***: This document is no longer subject to the USQ/USI process. ▪ Section 8.1: Added an acknowledgement that FOD organizations are the Office of Record for the documents generated by this document. ▪ Section 8.3: Added new acronyms for organizations supporting Conduct of Training. ▪ Section 12.0: Identified in the main body the P300, *Integrated Work Management* forms used to support procedure planning, execution, and close out. Attachment 1: ▪ Section 1.2: Clarified that R2A2s come from P313, *Roles, Responsibilities, Authorities, and Accountability,* and other institutional guidance documents. ▪ Section 1.4: Clarified the expectation to believe all indications, alarms, and other process inputs until proven otherwise. ▪ Section 1.7: Modified to reference a specific section of P761, *Work Schedules*, for overtime requirements. ▪ Section 1.11: Acknowledged that P102-3, *Medical Evaluation for Work*, also supports fitness for duty. Attachment 2: ▪ Section 2.1: Updated the reference for the Laboratory's emergency planning documents. Attachment 4: ▪ Sections 4.2, 4.3, and 4.4: Combined into a single section, and renumbered sections accordingly. ▪ Sections 4.3.2 and 4.6: Clarified that the scope of Attachment 4 only applies to PA Systems credited in either the Safety Basis and/or Building Emergency Plan (BEP). ▪ Section 4.7: Modified to link to Section 12.2.2 of Attachment 12 instead of referring to P300. Attachment 8: ▪ Section 8.1.5: Clarified the expectation that Hazardous Energy Control (HEC) locks are only used to control hazardous energy and clarified expectations for the inspection of administrative control locks that are not routinely accessible. ▪ Appendices 8-E and 8-H: Updated to reflect the standard

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		position titles used in this document. Attachment 9: ▪ Section 9.0: Clarified that log keeping requirements, including the use of electronic logs, are established in P101-3, *Lockout/Tagout for Hazardous Energy Control*. Attachment 10: ▪ Appendix 10-A: Updated references to reflect the current document numbers. Attachment 12: ▪ Section 12.2.2: Modified to link to the P300 forms for Pre-Job Brief and Post-Job Reviews. Attachment 13: ▪ Changed the title of the attachment and section to match DOE Order title. Attachment 14: ▪ Section 14.0: Clarified that Required Reading must not be included in initial training for qualifications/certifications. Attachment 16: ▪ Sections 16.1, 16.5.2.b, 16.6.2.b, 16.9.2.b, 16.9.2.c, 16.9.2.f, and 16.9.2.g; and Appendices 16-B, 16-C, and 16.-E: Deleted the current procedure template and all references (including DOE standard) in order to add references to the new Writer's Manual. ▪ Section 16.2.3: Clarified the purpose and scope of Appendix 16-J, *Excluded Procedure and Document Types*. ▪ Sections 16.4, 16.4.1, 16.5.1.h, 16.9, 16.9.1, 16.9.2.a, and 16.9.2.c: Deleted the definition of the terms "UET" and "Reference" and added a new "Usage Level" definition and section which details the current usage levels (currently UET and Reference). Deleted all individual UET and Reference procedure usage expectations in favor of a reference to the new section. Added a definition for the term "Immediate Actions." ▪ Sections 16.9.2.b, 16.9.2.c, and 16.9.2.f: Modified to link to the P300 forms for Pre-Job Brief and Post-Job Reviews. ▪ Sections 16.5.1.h and 16.5.1.i: Added requirements for concurrence by another, independent RLM for the usage level and reviewer decisions. ▪ Sections 16.5.1.i, 16.6.1.c, and Appendix 16-I: Clarified that Appendix 16-I, *Team Members/Review Disciplines*, must be used to determine review organizations for all new and changed procedures. ▪ Section 16.5.3.e: Updated to clarify the requirements for Training to evaluate all new and revised procedures to determine associated training requirements and the name of the associated training organizations. ▪ Section 16.9.2.e: Updated to clarify requirements for addressing a procedure change that occurs during an evolution. ▪ Appendices 16-A and 16-E: Updated to reflect the above changes. ▪ Appendix 16-B: Added a new procedure format and content

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		appendix to provide basis for requirements in the Writer's Manual. ▪ Appendix 16-I: Updated to clarify that Training is a required reviewer and provide required reviewing organizations based on procedure content. Attachment 17: ▪ Clarified that the scope only extends to postings not covered by another SMP. ▪ Section 17.5.1: Changed from monthly to semi-annual reviews of the Operator Aid Record Index and clarified how to document this review. ▪ Section 17.5.2: Changed from quarterly to semi-annual audits and clarified how to document this audit. ▪ Appendices 17-C and 17-D: Updated to reflect the standard position titles used in this document.
07/08/15	P315, Rev. 6	Attachment 16: ▪ Clarified the minimum set of reviewing organizations for procedures to ensure that controls to address all hazards can be properly implemented. ▪ Clarified the minimum expectations for completing a procedure's periodic review to ensure that the entire procedure is reviewed. ▪ Updated Appendix 16-H to ensure a Verification and Validation of an entire procedure in order for it to be considered a Periodic Review. ▪ Updated Appendix 16-I to ensure that the Waste Management Coordinator is a reviewer for all waste-related activities and Environmental Compliance is a reviewer for all environmental compliance issues.

11.0 REFERENCES

Prime Contract:

- DOE O 422.1, *Conduct of Operations*
- DOE O 433.1B, *Maintenance Management Program for DOE Nuclear Facilities*
- DOE O 430.1B, Chg. 1, *Real Property Asset Management*
- DOE O 426.2, *Personnel Selection, Training, Qualification, and Certification Requirements for DOE Nuclear Facilities*

11.1 Other References

- P315-2, *Formality of Operations Change Control*
- SD330, *Los Alamos National Laboratory Quality Assurance Program*
- OS-RTS website
- SD601, *Conduct of Research and Development*
- P300, *Integrated Work Management*
- P950, *Conduct of Maintenance*

- PD340, *Conduct of Engineering for Facility Work*
- PD781, *Training Program Management*
- P781-1, *Conduct of Training*
- P328-3, *Management Assessment*
- P313, *Roles, Responsibilities, Authorities, and Accountability*
- PD110, *Safety Basis*
- 10 CFR 830, *Nuclear Safety Management*
- P1020-1, *Laboratory Records Management*
- P311-1, *Creating, Revising, and Cancelling Institutional Documents*

12.0 FORMS

Form 2101, *Integrated Work Document (IWD) Part 2, FOD Requirements and Approval for Entry and Area Hazards and Controls – Non-Tenant Activity Form*
Form 2102, *Integrated Work Document (IWD) Part 2, FOD Requirements and Approval for Entry and Area Hazards and Controls – Tenant Activity Form*
Form 2103, *Integrated Work Document (IWD) Part 3, Validation and Work Release*
Form 2104, *Integrated Work Document (IWD) Part 4, Feedback/Post-Job Reviews*

13.0 ATTACHMENTS

Attachment 1. Operations Organization and Administration
Attachment 2. Shift Routines and Operating Practices
Attachment 3. Control Area Activities
Attachment 4. Communications
Attachment 5. Control of On-Shift Training
Attachment 6. Investigation of Abnormal Events
Attachment 7. Notifications
Attachment 8. Control of Equipment and System Status
Attachment 9. Lockouts and Tagouts
Attachment 10. Independent Verification
Attachment 11. Log Keeping
Attachment 12. Operations Turnover
Attachment 13. Control of Interrelated Processes
Attachment 14. Required Reading
Attachment 15. Timely Orders to Operators
Attachment 16. Local Procedures
Attachment 17. Operator Aid Postings
Attachment 18. Equipment and Piping Labeling

14.0 CONTACT

Operations Support–Readiness and Technical Support (OS-RTS)
Telephone: (505) 665-3154
Fax: (505) 667-9829
Location: TA-03-0030
Website: https://int.lanl.gov/orgs/os/rts/

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1.0 OPERATIONS ORGANIZATION AND ADMINISTRATION

This attachment describes the organizational structure of the operations function of Los Alamos National Laboratory (LANL or the Laboratory) facilities and provides administrative guidance and establishes criteria for using written standards to control operating activities, to monitor and assess performance, and to hold personnel accountable for their performance.

1.1 General

Activities are performed in a manner to achieve facility safety in all modes of operation (e.g., normal, shutdown, standby, etc.), such that the safety of the public, workers, environment, and national security assets are paramount. Consideration for maintaining production and/or schedule is secondary.

This attachment describes the standards of excellence under which all Laboratory operations are conducted as reflected in

- clear lines of authority and responsibility for normal, off-normal, and emergency conditions;
- effective implementation and control of operating activities through the establishment and communication of high operating standards;
- encouragement and consideration of employee input on the establishment of operating standards and goals;
- periodic monitoring and assessment of operational performance;
- establishment of personal accountability for operational performance;
- team member treatment of each other with respect and dignity;
- provision of sufficient resources to accomplish work safely and efficiently; and
- personnel who are well trained and qualified for the work they perform.

1.2 Facility Operating Standards

This attachment establishes the responsibilities, administrative guidelines, and requirements necessary for daily facility operations. Management will ensure that personnel are well trained, work as a team, that operating performance is properly monitored, and that employees are held accountable for their performance.

Operations management will establish high operating standards while considering input from the employees who will live by those standards.

When establishing operating standards, operations management and supervisors will refer to the following guidelines:

- Operating standards will define operating objectives, establish expected levels of performance, and clearly define responsibilities for facility operations. These are detailed in P313*, Roles, Responsibilities, Authorities, and Accountability*, and the specific institutional guidance document (e.g., P101-3, P121, etc.).
- Employees will have input into the development of operating standards that directly affect them.

- Standards for operating activities will be integrated into operations department procedures and programs so as to indicate acceptable levels of performance.
- Operations Management and Supervision must ensure that workers are trained to operating standards using qualifications standards or training curricula that are appropriate to their job and the "skill of the craft" in accordance with the requirements of P781-1, *Conduct of Training*.
- When monitoring facility operations for overall compliance with standards, management and supervision will pay particular attention to and closely monitor operators for compliance with the established standards.

Sufficient staff, equipment, and funding will be allocated to the operations organization to permit them to effectively perform work to these standards. Adequate material, tooling, equipment, safety gear, and facilities are available for safe operation.

1.3 Operations Policies and Procedures

It is the policy of the Laboratory that the primary consideration in operation of its facilities is the safety of the public, workers, environment, and national security assets and to perform its operations effectively.

When faced with an abnormal facility operating condition, operations personnel are to take the actions required to best protect safety and security interests; consideration for maintaining production is secondary.

The operations and support organizations operate by approved procedures that specify requirements needed to perform work in a safe and efficient manner.

If any person using a procedure does not understand it, feels that it is in error or needs revision, he/she is to stop and consult supervision, and, if needed, request a procedure change to get the appropriate correction made.

Personnel using procedures must clearly understand their authority, responsibility, accountability, and interface with support groups. These are detailed in P313*, Roles, Responsibilities, Authorities, and Accountability*.

Personnel must meet the qualification/certification requirements for the activities they perform, including holding current certificates and/or licenses as required by state and federal agencies.

1.4 Principles of Conservative Operation

Personnel must follow the Principles of Conservative Operations listed below; especially when faced with abnormal, off-normal, or emergency conditions that may threaten the health, safety, and well being of the public, employees, environment, or facilities and equipment:

- Personnel will ensure the safety of the general public, workers, environment, and national security assets and will perform operations effectively by the proper operation and frequent monitoring of their equipment and facilities.
- Operations, maintenance, testing, engineering, and other activities will be conducted in an orderly and professional manner following approved procedures and in accordance with guidance spelled out in Conduct of Operations or Conduct of Maintenance manuals.

- Personnel will use "thinking compliance" when supervising activities, performing work, and using written procedures. Where the employee believes a procedure to be wrong, the employee will stop work and advise supervision.
- Management will conduct periodic assessments, including Management Observations and Verifications (MOVs), relating to operating standards, work activities, and facility conditions.

Believe all indications, alarms, and other process inputs; but follow up to confirm.

1.5 Expectations for Operations Management

To foster an environment that encourages teamwork, open and honest communication, and employee commitment, management and supervision should perform the following actions:

- Managers and supervisors should spend sufficient time in the work spaces of their employees to understand the status of work, the condition of their work spaces, and the concerns and mood of their personnel. A minimum of 10-15% of their time is considered appropriate.
- Managers and supervisors should always respond directly and honestly.

Managers and supervisors should receive all news with consistent professionalism and make every effort to encourage subordinates to evaluate problems, provide feedback, and help resolve problems.

Following an event, workers must be appropriately informed (e.g., formal training, briefed, lessons learned, etc.).

1.6 Guidelines for Use of Operations Resources

The Operations Manager (OM) (or designee, as described in Section 9.2, *Conventions* under “supervisory titles”) will plan for sufficient resources, materials, and personnel to accomplish the assigned tasks based on the following guidelines:

- The OM reviews overtime for operations personnel routinely to ensure that excessive hours have not been worked.
- The Facility Operations Director (FOD) will plan for technical support personnel in sufficient numbers and with adequate technical qualifications to perform required functions (see P313, *Roles, Responsibilities, Authorities, and Accountability*, Attachment A).

The Responsible Associate Director (RAD), with the support of the FOD, develops and uses a long-range staffing plan for operations to anticipate personnel losses, increased personnel needs during outages, etc. (see P313, Attachment A).

1.7 Guidelines for the Administration of Overtime

The following general guidelines should be applied when using overtime with operations, program, and support personnel:

- Adequate shift coverage should be maintained without the heavy use of overtime.
- The use of overtime to cover for vacationing employees should be avoided.

Note: If a person is required to work in excess of 12 continuous hours, excluding shift turnover time, his/her duties should be carefully selected. It is preferable that this person not be assigned any task that could possibly endanger himself or herself, his/her crew, or the safe operation of the facility.

In the event that unforeseen problems require substantial amounts of overtime to be used (for example, emergency shutdowns, extended outages, technical problems, weather occurrences, etc.) the requirements of Section 3.2.5, *Limitations on Hours Worked*, of P761, *Work Schedules*, must be followed for the administration of overtime.

The FOD or Associate Director (or designees, as described in Section 9.2, *Conventions* under "supervisory titles") authorizes in advance any deviation from the overtime requirements on a case-by-case basis and documents the basis for granting the deviation. This may be done by making a signed entry in the operations logs. Deviations are subject to labor union restrictions.

1.8 Monitoring Operational Performance

Operational performance will be monitored, documented, and trended for future reference and to make improvements in operational performance. In addition to the frequent and direct observation of operations activities by supervisors and managers (minimum of 10-15% of time in the field), various successes and performance problems will be monitored, documented, and trended on a regular basis.

1.9 Establishment and Use of Operating Performance Goals Program

The RAD establishes and uses an Operational Performance Goals Program as a management tool for improving operational performance and measuring operational effectiveness (see P313, *Roles, Responsibilities, Authorities, and Accountability*, Attachment A). The operational performance goals will be

- established by operations management
- measurable, auditable, realistic, and challenging

Meeting goals should require a definite set of actions or an action plan.

- The action plan should be developed with input from the facility operators and operations supervision.
- The action plan should be reviewed and approved by the OM.

Goals should be specific, measurable, achievable, relevant, and trackable. Meaningful metrics should be developed to indicate progress on goals. Operations goals in the following areas should be established:

- maximizing the availability of safety systems
- minimizing personnel errors
- minimizing the impacts of adverse events
- maintaining exposures to As Low As Reasonably Achievable (ALARA)
- minimizing lost facility capability
- minimizing the number of unscheduled facility shutdowns per year

- timely completion of surveillances
- minimizing the amount of overtime
- achieving and maintaining complete staffing and training of operating positions
- minimizing waste and environmental impact
- minimizing causes that lead to the number of actuated alarms
- minimizing the time to resume operations after a stop work scenario

As required by SD320, *Los Alamos National Laboratory Contractor Assurance System Description Document*, the RAD periodically reviews performance goals and improvement or failure to improve in operational performance and takes appropriate actions (see P313, *Roles, Responsibilities, Authorities, and Accountability*, Attachment A). Progress toward completing applicable action plans should be included in this review. A significant variance from the desired progress in achieving goals requires that management review the action plan to ensure its adequacy and that it is being correctly executed.

In accordance with the requirements of PD324, *LANL Metrics Program*, operating and safety goals must be set and used as motivators for improvement. Performance appraisals and promotions will be reflective of success in meeting or exceeding operational performance goals.

The RAD must report (see SD320) facility performance against established operations. Safety goals will be reported to Department of Energy (DOE) management on a periodic basis as required by PD324.

Line managers and supervisors should perform routine observations of personnel performing operating activities. Any deficiencies identified should be documented, trended, and corrected as soon as possible.

1.10 Management, Supervisory, and Re-Qualification Training Requirements

Managers and their deputies must meet all Laboratory-mandated training requirements as set forth in Curriculum 9533, *LANL Management Qualification Standard*. The Standard, in conjunction with P781-1, *Conduct of Training*, supports the training and qualification implementation of DOE O 151.1C, *Comprehensive Emergency Management System*; DOE O 414.1D, *Quality Assurance*; DOE O 470.4B, *Safeguards and Security Program*, and DOE O 426.2, *Personnel Selection, Training, Qualification, and Certification Requirements for DOE Nuclear Facilities*.

Curriculum 9533 sets forth the minimum training requirements for all managers and an additional set of requirements for nuclear managers. Nuclear managers include first line managers through responsible division leaders and FODs whose assigned responsibilities include ensuring that a facility on the LANL Nuclear Facilities List is safely and reliably operated.

Position specific qualification standards (e.g., FOD, OM, Facility Coordinator, Maintenance Manager, etc.) or training requirements are available through the deployed training staff.

Additional site-specific or job-specific training may be assigned at the local level. Nuclear facilities are subject to the requirements of DOE O 426.2 which includes the development of a Training Implementation Matrix that defines the selection, qualification, and training requirements of the Order.

The training process must be documented in accordance with P781-1.

1.11 Fitness for Duty

Fitness for duty must be administered in accordance with P732, *Substance Abuse*, and P102-3, *Medical Evaluation for Work*.

1.12 Work Authorization/Work Release

Work performed in a facility will be formally reviewed, approved, and authorized in accordance with P300, *Integrated Work Management*.

1.13 Monitoring Operating Performance

P328-4, *Management Observation and Verification*, establishes guidelines for monitoring operating performance with the primary goal of improving operations. Managers are actively involved with the work activities under their cognizance to assess performance and reinforce safety, security, and environmental standards. Monitoring of facility activities ensures that problems are promptly identified and corrected. A manager's routine must include frequent tours of the workplace. Monitoring by management also includes a program for self-assessment of facility performance through reporting and trend analysis of selected parameters. Supervisors are expected to set a professional example and to monitor and correct problems related to facility procedures and training.

1.14 Training

There is no specific mandatory training or qualification required to implement this attachment. It is recommended that all personnel implementing this document complete UTrain Course #24650, *OS-RTS ConOps, Attachment 1, Operations Organization and Administration*. This training will enhance the employee's knowledge as required and as outlined in DOE O 422.1, *Conduct of Operations*.

1.15 Acronyms

ALARA	As Low As Reasonably Achievable
DOE	Department of Energy
FOD	Facility Operations Director
LANL	Los Alamos National Laboratory
MOV	Management Observation and Verification
OM	Operations Manager
RAD	Responsible Associate Director

1.16 References

- P313*, Roles, Responsibilities, Authorities, and Accountability*
- P781-1, *Conduct of Training*
- P761, *Work Schedules*
- SD320, *Los Alamos National Laboratory Contractor Assurance System Description Document*
- PD324, *LANL Metrics Program*

- Curriculum 9533, *LANL Management Qualification Standard*
- DOE O 151.1C, *Comprehensive Emergency Management System*
- DOE O 414.1D, *Quality Assurance*
- DOE O 470.4B, *Safeguards and Security Program*
- DOE O 426.2, *Personnel Selection, Training, Qualification, and Certification Requirements for DOE Nuclear Facilities*
- P732, *Substance Abuse*
- P102-3, *Medical Evaluation for Work*
- P300, *Integrated Work Management*
- P328-4, *Management Observation and Verification*
- DOE O 422.1, *Conduct of Operations*

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Attachment 2. Shift Routines and Operating Practices (Page 1 of 17)

2.0 SHIFT ROUTINES AND OPERATING PRACTICES

The purpose of this attachment is to describe the facility shift routines and operating practices that will be observed by Los Alamos National Laboratory (LANL or the Laboratory) personnel. The attachment includes standards for professional conduct, good watch-standing practices, equipment monitoring, and management responsibilities, which are fundamental to operating a facility that meets Department of Energy (DOE) expectations.

2.1. Facility Operating Practices

- Personnel must take appropriate emergency actions if there is an immediate threat to health, the facility, or the environment. Personnel who are trained in accordance with SEO-DO-PLAN-100, *The Los Alamos National Laboratory and Los Alamos Site Office Hazardous Materials Program Emergency Plan*, the facility-specific Building Emergency Plan, or local emergency procedures must take the actions described in those documents. Personnel should report actions taken to the Operations Manager (OM) at the earliest possible time.

  Note: For facilities with a centralized operations area, e.g., an Operations Center or Control Room, management notifications may be routed through this function. Adequate equipment for making notifications must be available at the Operations Center, Control Room, and/or other appropriate locations.

- The OM and the qualified operators on shift must authorize the operation of mechanisms and apparatus that may indirectly affect the system operation.
- Facility personnel performing functions that may affect process operations or control area indications (in the form of alarms, signal light indications, or instrumentation response) obtain permission from the Control Area and cognizant operator of the affected process before initiating such action.
- Operations personnel respond to instrument indications and alarms until such indications and alarms are proven to be false. The first response to an alarm should be a verification of system status (level, flow, temperature, etc.). Appropriate actions should then be taken toward restoring normal status.
- Operators must verbally announce alarms so that others in the control area or near the vicinity of the alarm know the alarm has been acknowledged and what the alarm is.
- All operations activities (e.g., operating logs, round sheets, turnover sheets, verbal communications, etc.) should be recorded in 24-hour time (e.g., 0823 for 8:23 A.M., 1956 for 7:56 P.M., etc.).
- Personnel mark recorder charts with the date, time, recorder identification number, and initials upon installation of a new chart and removal of a completed chart. Recorders are inspected for proper operation daily with date, time, and operator's initials annotated on the chart. When significant events or unusual trends in parameters occur, the resulting recorder traces are marked as to the time and event to assist in operation analysis.
- The OM will be promptly notified of all changes in facility status, abnormalities, or difficulties encountered in performing assigned tasks.
- Operators must adhere to all posted personnel protection requirements and observe proper practices and precautions.

- Operations supervisors ensure that operators' primary duties are not compromised by distracting materials and devices.

2.2 Operation During Abnormal Conditions

Operators believe instrument indications and alarms unless proven to be false.

When process operations are not as expected, operators establish a known safe condition, ensuring that any Technical Safety Requirement (TSR) requirements are maintained (see P313, *Roles, Responsibilities, Authorities, and Accountability*, Attachment A).

Note: This could entail returning to a previous state, moving forward in the process, or taking no action.

Cognizant supervisors must be informed promptly of these actions. If conditions warrant, operators discontinue operations until the cause of the condition has been determined and safe conditions restored.

Operators manually shut down the process using approved procedures if system parameters for trips or safety systems exceed their actuation set point and automatic actuation does not occur. Operators promptly inform the appropriate supervisors of these actions.

2.3 Authority to Operate Equipment

The OM directs the overall operation of the facility. In general, Control Area operators (where assigned) and OMs should be aware of all activities affecting facility equipment. However, activities that do not affect safety, regulatory requirements, or operating capability could be performed without informing the Control Area operator or OM, if decided on in advance of the activity and documented. Routine activities are controlled through the facility work planning and authorization process (e.g., plan of the day, plan of the week, etc.). The OM specifies and documents those general activities that normally can be performed without informing the Control Area or OM, and OMs should amplify these specifications as appropriate. Examples of such activities are pumping certain uncontaminated sumps and the routine minor adjusting of systems in manual control. The performance of these types of activities is documented in the operator's narrative log. In addition, during emergencies, operators are expected to take necessary immediate actions required to ensure personnel, facility, environment, and general public safety without prior approval; however, appropriate supervisors must be informed promptly of these actions.

2.4 Operator Rounds and Tours

Operators conduct a thorough tour of all areas within their responsibility following the instructions given in Section 2.5, and make inspections specified by the appropriate round sheet.

Operator tours must be of sufficient detail to ensure that the status of equipment is known. Each operator conducts a thorough tour of all areas within the operator's responsibility, making appropriate equipment inspections at designated times at least once per shift. However, the OM may designate specific locations to be inspected less frequently because of adverse radiological or equivalent personnel safety conditions, or more frequently if problems have been encountered. In these cases, the OM specifies an alternate inspection schedule. Facility security concerns must not stop the operator from completing appropriate equipment inspections. Initial operator tours normally should be made early in the shift, before the operator attends to other duties, so that the operator can become familiar with the condition and status of equipment for which the

operator is responsible. During tours, equipment is inspected to ensure that it is operating properly or, in the case of standby equipment that it is fully operable. In addition, operators conduct the following activities in conjunction with the tours:

- Determine the status of equipment (e.g., operating, standby, work in progress, or out-of-service) so that the operator will be best able to respond to problems that may occur during the operator's shift.
- Inspect components, such as electrical panels, alarm panels, autostart standby equipment, and breakers for abnormal or unusual conditions. Report unexpected conditions such as equipment vibrations, unusual equipment noises or smells, or excessive temperatures to the Control Area so that supervision will be aware of the conditions and be able to direct repairs, troubleshooting, or additional operator action, as necessary.
- Periodically check equipment panel alarm light bulbs and enunciators to ensure satisfactory operations of visual and audible abnormal condition indicators.
- Inspect all areas for which the operator is responsible and note any deficiencies that may be present. These deficiencies may include steam, oil, or water leaks; fire and safety hazards or radiological problems; seismic concerns such as open electrical panels and mobile objects; clogged floor drains; housekeeping or cleanliness problems; and building deficiencies such as inoperative lighting, roof leaks, or doors that do not close properly.

Operators take appropriate action to correct and report deficiencies noted during tours. Equipment deficiencies also are documented in accordance with the facility maintenance work control system.

Each OM reviews and initials round sheets and log books for those key positions under his/her supervision at least once per shift. For facilities where no direct supervision is present on a given shift, the log books and round sheets are reviewed during the next regular shift when supervision is present.

The OM ensures appropriate corrective action has been initiated for each abnormal condition noted in round sheets and log books.

2.5 Round Sheet Preparation and Use

This section provides instructions for the preparation and use of round sheets, the review of completed round sheets, and the performance of operator rounds.

2.5.1 General

Round sheets provide operators with guidance on the extent to which equipment and areas should be inspected during routine tours. The recording of key equipment parameters during tours provides a record of equipment performance and can be used to reconstruct events leading up to abnormal operating occurrences or system malfunctions. This record permits short-term trending by operators and supervisors so that undesirable trends and equipment problems can be identified and corrected. In addition, this record also permits long-term trending by maintenance and system engineers so that corrective, preventive, and/or predictive maintenance programs may be adapted to maximize equipment reliability. The system engineers analyze data from round sheets for system health reports.

Round sheets also facilitate operator turnover of equipment status and aid in the training and qualification of new operators. Therefore, it is critical that the operators frequently tour their area of responsibility and understand the significance of all parameters observed.

2.5.2 Preparation of Round Sheets

Note: The bullets below are examples of general requirements. Safety Basis requirements take precedence.

- The OM approves the development of round sheets for each facility under his/her cognizance. Round sheet content should be limited to necessary parameters needed to baseline facility (equipment) operations.
- The blank round sheet should be treated as a controlled document in accordance with P1020-2, *Laboratory Document Control*, and any local procedures.
- The Engineering Manager or designated representative must concur with the contents of round sheets and round sheet revisions.
- Personnel should develop round sheets for specific key positions, and not to specific areas to be monitored (e.g., a round sheet would be developed for the TA 50-1 Surveillance Operator and would include parameters for all areas and equipment that the TA 50-1 Surveillance Operator monitors). Areas and equipment to be monitored should be listed in the same sequence that they would be normally encountered during the round.
- Each round sheet (sample shown in Appendix 2-A) is uniquely identified, including a descriptive title, document number, revision number, and approval or effective date.
- The period of time covered by a round sheet will be dependent upon the frequency of data collection required to achieve the trending objectives. Normally, round sheets should cover a period of no less than 24 hours and no greater than 7 days.
- Each round sheet includes a space on each page to identify the actual time period covered by the round sheet. (See Appendix 2-A)
- The round sheet specifies the frequency for recording all parameters. Each round sheet includes a space for the operator to record the specific start and completion times for each round as shown on the sample in Appendix 2-A. Personnel should use 24-hour time (e.g., 0823 for 8:23 A.M., 1956 for 7:56 P.M., etc.).
- When determining the frequency for the recording of parameters, the OM and the system engineers ensure recording of parameters should be frequent enough to recognize trends in order that equipment may be protected from damage (e.g., taking readings once per hour for operating equipment versus once every eight hours).
- The OM may designate specific areas to be inspected less frequently because of adverse radiological or equivalent personnel safety conditions, or more frequently if problems have been encountered.
- Personnel should include on each round sheet spaces to record all important parameters for equipment and areas within the responsibility of the key position. Personnel should do the following:
  - Keep in mind that important equipment parameters include, but are not limited to, operating limits as specified by equipment manufacturers, TSR limits, Technical Standard/Process Requirement limits, Resource Conservation and Recovery Act (RCRA) or New Mexico Environment Department (NMED) requirements, etc.

- Designate round sheet parameters derived from TSR limits or Technical Standard/Process Requirement limits by a dollar sign ($) or other designator defined by the facility (such as highlighting) in order that these parameters may be easily recognized as requiring special attention. Review the TSR and Safety Analysis Report (SAR), Safety Assessment Document (SAD), or Transportation Safety Document (TSD) and the appropriate manager's document before making any revision to the parameters or limits. Changes to steps marked with ($) require Engineering approval of the change.
- Assign each operating parameter appearing on a round sheet an item number.
- Group parameters for a particular piece of equipment together on the round sheet to facilitate trending on that particular equipment (e.g., parameters for the pump bearing cooling water temperature and the pump discharge pressure should be grouped together rather than placing the pump bearing cooling water temperature parameter among other equipment cooling water parameters). Areas and equipment to be monitored should be listed in the same sequence that they would be normally encountered during the round.
- Sufficiently describe operating parameters, including specific equipment identification number, to permit a clear identification of the instrument being used to obtain the data for the parameter being recorded. The system engineer furnishes a list of process instruments that are to be used for the collection of operating parameters for round sheets.
- Ensure that each parameter includes the units of measurement of the data, where applicable. Make the units of measurement to be recorded on the round sheet the same as the units indicated on the instrument, except when an operator aid or controlled conversion chart is provided.
- In those instances where parameters are not measured using specific units of measurement as indicated on an instrument (e.g., measuring an oil level with a dipstick), specify specific measurement values (e.g., full, three-quarter full, half full, one-quarter full) rather than the use of "OK" or a check mark on the round sheet.
- Where appropriate, provide maximum and/or minimum acceptable values to allow quick identification of out-of-specification parameters.
- Provide a narrative section on each round sheet unless an operating log is maintained by the operator affected.
- Provide a separate block(s) as necessary to document each required supervisory review of completed round sheets in accordance with the requirements of this attachment.

2.5.3 Performance of Rounds

- Personnel performing rounds must comply with all facility safety rules and exercise caution around rotating equipment and in other hazardous environments so as not to place themselves in a situation in which they may be exposed to personal injury.
- Data must be recorded at the time(s) or frequency specified on the round sheets. When round sheet data is not obtained within one hour from the time(s) or frequency specified on the round sheet, the actual time the data was obtained should be noted on the round sheet. Notify the OM of the missed round and an explanation entered in the narrative section of the round sheet or logbook. Evaluate the data as soon as possible for potential out-of-limit conditions that may have occurred during the period missed. Rounds should be completed prior to the scheduled start of the next set of readings.

- When used, the operator making the entries completes and signs narrative section of the round sheet in accordance with the guidelines in Attachment 11, *Log Keeping*. The narrative section entries should include a description of significant events occurring, major evolutions, causes of abnormal conditions, actions taken to correct abnormal conditions, and indications that supervisors have been notified where appropriate.
- Personnel performing rounds must be continuously alert for fire hazards, smoke or unusual odors, improper storage of flammables, improperly barricaded radiological controlled areas, improperly barricaded tripping and bumping hazards, oil and grease spills, water and steam leaks or other discharges, exposed rotating equipment and electrical wiring, equipment making unusual noises, etc. Personnel must notify supervision immediately of any such hazards and take immediate steps to eliminate or barricade these hazards whenever possible. If any equipment deficiencies are found, they should be recorded in the narrative section, reviewed with supervision and documented in accordance with the facility maintenance Work Control System. Additionally, operators will periodically inspect equipment and areas not included on the round sheets, but within their work station.
- Maintain equipment operating parameters within limits in accordance with the specific instructions for each round sheet. Personnel performing rounds must be aware of the rate at which parameters are changing or should be changing such that action can be taken prior to a limit being reached.
- Whenever equipment is started, immediately begin continuous visual monitoring of its associated data points until the data points stabilize. Note the equipment starting time in the narrative section of the round sheet. After the data points have stabilized, record the specified parameters on the round sheets. If data points appear to be heading out of limits, if necessary to prevent equipment damage, shut down the equipment and notify supervision immediately.
- Personnel performing rounds replace defective bulbs as soon as possible (if authorized) or ensure (through approved work control practices) that they are replaced as soon as possible, and service chart recorders as required, or ensure (through approved work control practices) that they are serviced as required. Personnel follow up to ensure that defective bulbs are replaced and are serviced as required, ideally, prior to the next scheduled readings.
- Personnel practice good housekeeping while performing rounds. Keep the facility in as good or better condition than found. Each operator keeps his/her areas of responsibility clean and orderly. Personnel must attempt to correct any minor housekeeping deficiencies noted while performing rounds. Report major deficiencies to supervision.
- During the performance of rounds, personnel will have available (in their possession or at their shift operating base) completed round sheets which allow for identification of trends. The number of completed round sheets in their possession should cover a time period sufficient to obtain a genuine trending period, e.g., during the performance of rounds using a weekly round sheet, the operator should have available, in their possession or at their shift operating base, the completed round sheet for the previous week in addition to the current weekly round sheet or for daily round sheets, the previous day's round sheet.
- When round sheets are commenced for a "new" time period, then the oldest completed round sheet(s) is forwarded to the OM for filing in accordance with facility requirements.

2.5.4 Taking and Recording Data

- Avoid, where possible, recording process values from chart recorders onto round sheets unless the recorder is the only available monitoring instrument. Chart recorders provide a

quick indication of changes in a parameter and the rate of change. They are generally not designed for precise measurement.

- Record data taken during the performance of rounds onto round sheets in the following manner:
  - Personnel enter the actual data value obtained for those parameters that require recording specific units of measurement. If the reading is outside the specified minimum or maximum allowed values, the data is highlighted according to the facility's practice for marking abnormal readings.
  - If parameter units listed on a round sheet are not the same as indicated on an instrument (e.g., the instrument is calibrated in units other than required by the round sheet -- a differential pressure cell with a voltage output and the round sheet parameter is tank level in feet), personnel stop, notify the OM, and follow the appropriate change control process to revise the round sheet.
- Personnel promptly report to the OM or appropriate supervisor those highlighted data points that are identified as critical by a facility-designated system such as asterisks or dollar signs. Personnel report all other highlighted data points at the completion of the rounds, but before the end of the shift in which they were recorded.
- Personnel initiate prompt corrective action, as appropriate, in accordance with facility operating procedures, for out of specification data.
- The causes of abnormal readings are promptly investigated with supervisors becoming involved as appropriate.
- All highlighted items must have a corresponding entry in the appropriate narrative log or the narrative section of the round sheet, referencing the round sheet item number, indicating the probable cause and action taken.
- Operators should believe their instrument readings and treat them as "accurate" unless proven otherwise. Operators should check other indications, if possible, when unexpected readings are observed. Prompt action should be taken to investigate the cause of abnormal or unexpected indications so prompt corrective action can occur.
- When malfunctioning or inaccurate instruments are discovered or process instruments are found to be out of calibration or past calibration due dates, they should be appropriately identified to prevent subsequent confusion and instrument and control personnel should be notified to effect repairs.
- Enter "Standby" (STBY) for data points or equipment that is not operating and is available for operation if required. Data limits are not applicable for equipment in standby.
- Enter "Out of Service" (OOS) for data points or equipment that is not operating and is not available for operation (e.g., shutdown for maintenance) if required. Data limits are not applicable for equipment OOS. Highlight all OOS entries according to the facility system for marking. Explain all OOS entries in the narrative section and notify the appropriate supervisor.
- Enter "No Reading Taken" (NRT) for data points that are inaccessible for monitoring. Highlight all NRT entries as required by the facility marking system. Explain all NRT entries in the narrative section and notify the appropriate supervisor.

2.5.5 Supervisory Review of Round Sheets

- Each supervisor, if applicable, on shift reviews the round sheets for positions under his/her cognizance before the end of each shift. This review is to ensure that all out-of-limit data and abnormal or unexplained conditions and/or trends have been properly identified, that proper actions have been taken, and that adequate descriptions have been entered in the narrative section of the round sheet. For facilities without 24-hour/day supervision, supervisors review round sheets on the next shift worked.
- Supervisors document the review by entering their initials, the date, and time directly on the data portion of the round sheet (the date and time are not required for daily reviews performed the same day as the performance of rounds) either in the margin above the last reading reviewed or in a separate block (if provided) on the round sheet (as shown in Appendix 2-A). The supervisor's initial on the data portion of the round sheet implies that the entire round sheet (both data portion and narrative section) have been reviewed.
- If a narrative section is not included as part of a round sheet but appears in a separate log, then the supervisor initials the last entry reviewed in accordance with the guidelines established in Attachment 11, *Log Keeping*.
- Supervisors request OM assistance as necessary to correct out-of-limits data and other deficiencies found by the data takers as required.
- The OM makes periodic tours of facilities and random reviews of facility round sheets to ensure that round sheets are being properly executed. The OM may accompany the operators during the performance of the rounds to accomplish this task. The reviews are documented in accordance with the requirements of this attachment.
- Supervisory personnel periodically monitor operator rounds to ensure that comprehensive tours are being conducted and to ensure that the round sheets reflect any changed facility conditions.
- Other managers (e.g., maintenance, engineering, etc.) conducting random reviews of facility round sheets document their review in accordance with bullet 2 of this Section (2.5.5) of this attachment.

2.5.6 Operations Manager (OM) Review

- Round sheets should be maintained in the facility for as long a period as necessary to allow for identification of long-term trends. For example: retain daily round sheets for 120 days, weekly round sheets for 6 months, etc., to allow sufficient data to be available to support the OM review as noted below.
- The OM periodically reviews completed round sheets in sufficient detail to ensure that the round sheets are being completed in accordance with the guidelines of this attachment and to identify any long-term trends of operating equipment parameters (e.g., slowly increasing bearing temperature, slowly unexplained decreasing tank level, etc.) which could indicate future potential problems. The Engineering Manager must be consulted when negative trends are identified in Structures, Systems, and Components (SSCs) performance. Following completion of the review, file the appropriate round sheets as records in accordance with the guidelines of this attachment. This review is documented by the OM’s initial and date in the margin of the round sheet or in a formal log as appropriate to the facility.

2.6 Personnel Protection

Operations personnel must be appropriately qualified to follow good personnel protection practices to minimize exposure to radiation, chemicals, electromagnetic fields, toxic materials, and other personnel hazards. In particular, operations personnel must observe the following requirements:

- adhere to the requirements of the facility safety program;
- adhere to all posted personnel protection requirements and observe proper practices and precautions;
- correctly use appropriate monitoring instruments when required;
- be cognizant of their own exposure and take appropriate action to minimize their exposure;
- be knowledgeable in the proper use of radiation work permits and other permits;
- promptly report protection deficiencies and hazards to supervision and appropriate protection personnel. In addition, operators take appropriate immediate actions to reduce or correct the hazards;
- notify appropriate protection personnel (e.g., Radiological Control Technician [RCT], Industrial Hygienist, Fire Department personnel, etc.) prior to evolutions or activities that have a potential to significantly change conditions in the facility;
- wear proper hearing, eye, head, foot and respiratory protection in designated areas to reduce the potential for injury;
- use ladders, or other approved means, to access equipment located in the overhead when permanent steps or catwalks are not available;
- do not routinely climb or walk on facility components and insulation;
- exercise appropriate precautions when entering or working in or around energized panels or equipment.

Supervisory personnel periodically review exposure trends of operations personnel to detect and correct adverse factors that contribute to personnel exposure.

2.7 Shift Operating Bases

Facility Operations Directors (FODs) may establish an area where an operator returns when the operator is not performing in-facility duties. An operating base is designated for each shift position. A single base may be common to several positions. The base should be located at a convenient place within the operator's area of responsibility and appropriately equipped with the office equipment necessary for the operator(s) to maintain necessary procedures and references to conduct administrative duties and maintain adequate communications equipment.

Shift turnovers should typically be conducted at the operating base. This requirement is not intended to preclude group shift turnover briefings at a central location as part of the turnover process.

2.8 Resetting of Alarms or Protective Devices

Personnel must not reset any protective device unless such action is specifically authorized by approved procedures (e.g., institutional documents, Authority Having Jurisdiction [AHJ] interpretation, guidance document, etc.). Devices are reset only after an attempt is made to determine the cause of the trip and assuring that no abnormal condition exists that would cause a trip, and if authorized by the aforementioned process.

Personnel must not adjust or operate any alarm, interlock, or equipment operating set points unless such action is specifically authorized by approved procedures and the person is qualified to perform the action.

Operating or resetting electrical breakers must be performed in accordance with AHJ Interpretation No. 010, *LANL Policy for Operating Circuit Breakers on 120V – 480V Systems*, available from the Laboratory Electrical Safety website.

2.9 Potentially Distractive Written Material and Devices

Written materials that do not relate to operation, and entertainment devices such as radios, televisions, tape players, and computer games are prohibited from use by operations personnel to minimize distractions from their responsibilities. Do not bring non-work related written material and entertainment devices to work stations. However, operators may read training bulletins, technical manuals, or operating experience information or review other written, audible, or visual materials that relate to operator duties.

2.10 Key Control

To facilitate control over keys that are used in the day to day operations, there is a key accountability log in place to record what keys are being used by which individuals. The key storage cabinet contains an inventory list to expedite location of keys. Key accountability is maintained by conducting routine inventories. The periodicity of routine inspections is based on the facility and considers the number of keys and the risk associated with losing inventory control, but the periodicity must not exceed annually. Additionally, keys that are inventoried through another institutional program (e.g., Lockout/Tagout, Security, etc.) are excluded from this inventory. The key accountability log should be maintained in the control area.

2.10.1 KNOX™ Key Box Operation and Control

2.10.1.a Definitions

KNOX™ Key Box—Also known as an access box, is an approved secure box, accessible by the AHJ's master key or control, containing entrance keys or other devices to gain access to a structure or area (National Fire Protection Association [NFPA] 1, *Uniform Fire Code™ 2006*). At the Laboratory, this consists of a weatherproof black steel plate box with an integral alarm tamper switch; the box uses a high-security Medco lock and key series controlled by the LANL Fire Protection Group.

Supervisory Alarm—A signal/alarm indicating the need for action in connection with the supervision of guard tours, fire suppression system or equipment, and/or maintenance features of related systems (NFPA 72, *National Fire Alarm Code*®)

Trouble Alarm—A signal/alarm initiated by the Fire Alarm Control Panel (FACP) or fire alarm system device indicative of a fault condition in a monitored circuit or component (NFPA 72).

2.10.1.b Operations

KNOX™ key boxes are located throughout the Laboratory and are used to house facility keys in support of LANL emergency response operations (i.e., Los Alamos Fire Department [LAFD], LANL Security and Emergency Operations Division [SEO], LANL Fire Protection Group, and the Facility Supervisors and Fire Protection Maintenance Department). The KNOX™ key box is electronically supervised by a building FACP, which initiates a supervisory or trouble alarm condition on the FACP and transmits a supervisory or trouble signal to the Lab-wide proprietary fire alarm supervising station system when tampered with.

Level I, II and III security keys (see NNSA Policy Letter NAP-70.2, *Physical Protection*, Chapter V "Locks and Keys," for security key definitions) must not be placed within LANL KNOX™ key boxes.

The KNOX™ key box tamper switch is routinely tested as part of the Inspection, Testing and Maintenance (ITM) program for the facility fire detection and alarm system (see *Operations and Maintenance [O&M] Manual* Criterion 720, "Fire Alarm Systems").

Upon receipt of an unanticipated fire alarm supervisory or trouble alarm signal associated with a KNOX™ key box, the Central Alarm Station (CAS) must notify the LANL Trouble Desk (during normal working hours) or the Facility Night Supervisor (during non-working hours).

If facility keys are identified as missing and/or a KNOX™ key box is found open, contact the FOD immediately.

2.10.1.c Roles and Responsibilities:

2.10.1.c(1) Facility Operations Directors

- Notify the LANL Fire Protection Group KNOX™ Box Program Core Custodian for access to a KNOX™ key box, the addition or deletion of facility keys within a KNOX™ key box, and the return of any KNOX™ key box keys; and
- Prepare and execute design change documentation in accordance with the Conduct of Engineering program (see PD340, *Conduct of Engineering for Facility Work*, and P341, *Facility Engineering Processes Manual*) for the installation, upgrade, relocation or removal of KNOX™ key boxes at Laboratory facilities.

2.10.1.c(2) LANL Fire Protection Group KNOX™ Box Program Core Custodian

- Manages the KNOX™ box program in accordance with LANL requirements for Key Custodians and applicable security requirements;
- Establishes and maintains a database with the location of all LANL KNOX™ key boxes, facility keys retained within each KNOX™ key box, and assignment of KNOX™ key box key recipients and/or key holders;
- Provides design criteria to organizations requesting the installation, upgrade, relocation or removal of KNOX™ key boxes at LANL facilities;
- Review and approve design submittals for KNOX™ key box installations, upgrades, relocations and removals, and associated modifications to fire alarm systems, at LANL facilities;

- Witness acceptance/commissioning testing of KNOX™ key box installations, upgrades, relocations and removals, and associated fire alarm system post-modification testing, at LANL facilities;
- Orders new KNOX™ key boxes to be installed at LANL facilities;
- Retains removed KNOX™ key boxes from LANL facilities;
- Informs LAFD and the LANL SEO Division of new, relocated or removed KNOX™ key boxes at LANL facilities;
- Completes a documented annual self-assessment of the KNOX™ box management and key control program, and provides a copy of the assessment report to the LANL Fire Protection Group Leader; and
- Provides a copy of this process and a briefing on requirements for safeguarding KNOX™ key box keys to recipients of KNOX™ key box keys, which includes the following elements –
  - Expectations for reporting lost, misplaced or broken KNOX™ key box keys;
  - Prohibition on loaning a KNOX™ key box key to another individual;
  - Prohibition on the unapproved opening of a KNOX™ key box for the purpose of removing or adding facility keys for emergency or maintenance use; and
  - The return of KNOX™ key box keys.

2.10.1.c(3) Authorized Maintenance and Site Services (MSS) Personnel

- Perform post-modification testing of modified facility fire detection and alarm systems in support of KNOX™ key box installations, upgrades, relocations or removals;
- Perform periodic ITM activities for facility fire detection and alarm systems and associated with KNOX™ key boxes in accordance with O&M Criterion 720, "Fire Alarm Systems;" and
- Update the FACP Zone Sheets to reflect the installation relocation or removal of KNOX™ key boxes at LANL facilities.

2.11 Training

There is no specific mandatory training or qualification required to implement this attachment. It is recommended that all personnel implementing this document complete UTrain Course #24652, *OS-RTS ConOps, Attachment 2, Shift Routines and Operating Practices*. This training will enhance the employee's knowledge as required and as outlined in DOE O 422.1, *Conduct of Operations*.

2.12 Records

The following are considered records generated by this attachment and must be managed in accordance with P1020-1, *Laboratory Records Management*, and any local procedures:

- KNOX™ key box database
- Annual KNOX™ Box Program Core Custodian self-assessment reports
- LANL Fire Protection Maps
- Facility FACP Zone Sheets
- Completed Round sheets

2.13 Acronyms

AHJ	Authority Having Jurisdiction
CAS	Central Alarm Station
DOE	Department of Energy
FACP	Fire Alarm Control Panel
FOD	Facility Operations Director
ITM	Inspection, Testing and Maintenance
LAFD	Los Alamos Fire Department
LANL	Los Alamos National Laboratory
MSS	Maintenance and Site Services
NFPA	National Fire Protection Association
NMED	New Mexico Environment Department
NRT	No Reading Taken
O&M	Operations and Maintenance
OM	Operations Manager
OOS	Out Of Service
RCRA	Resource Conservation and Recovery Act
RCT	Radiological Control Technician
SAD	Safety Assessment Document
SAR	Safety Analysis Report
SEO	Security and Emergency Operations
SSC	Structure, System, and Component
STBY	Standby
TSD	Transportation Safety Document
TSR	Technical Safety Requirement

2.14 References

- SEO-DO-PLAN-100, *The Los Alamos National Laboratory and Los Alamos Site Office Hazardous Materials Program Emergency Plan*
- P1020-2, *Laboratory Document Control*
- AHJ Interpretation No. 010, *LANL Policy for Operating Circuit Breakers on 120V – 480V Systems*, available from the Laboratory Electrical Safety website
- National Fire Protection Association [NFPA] 1, *Uniform Fire Code™, 2006*
- NFPA 72, *National Fire Alarm Code®*
- NNSA Policy Letter NAP-70.2, *Physical Protection*, Chapter V “Locks and Keys"
- *Operations and Maintenance [O&M] Manual* Criterion 720, “Fire Alarm Systems”
- PD340, *Conduct of Engineering for Facility Work*
- P341, *Facility Engineering Processes Manual*
- P1020-1, *Laboratory Records Management*
- DOE O 422.1, *Conduct of Operations*

2.15 Appendices

Appendix 2-A. *Sample Round Sheet*

No: P315 Conduct of Operations Manual
Attachment 2. Shift Routines and Operating Practices (Cont.) (Page 15 of 17)

Appendix 2-A. Sample Round Sheet (Page 1 of 3)

TA-XX-X SURVEILLANCE OPERATOR ROUNDSHEET							**Document No.:** _____ **Revision:** _____ **Approval Date:** _____ **Page 1 of 3**					
PERIOD COVERED: From 0001 4 May 2006 To 2400 4 May 2006							0200	0800	1400	2000	**	**
SHIFT SUPERVISOR REVIEW												
TIME ROUND COMMENCED												
ITEM	EQUIPMENT/ID #		UNIT	MIN	NORM	OPER LIMIT						
LOCATION: TA XX-XX PUMPHOUSE												
1	Process Air Compressor #1 Discharge Pressure PI-719		PSIG	95	115 to 130	165						
2	Process Air Compressor #1 Discharge Dew Point TI-719		°C	-10	-30 to -10	0.0						
3	Process Air Compressor Lube Oil Level	#1		Add	_____	Full						
		#2		Add	_____	Full						
4	Cooling Water Inlet Pressure PI-529		PSIG	25	30 to 35	42						
LOCATION: TA XX-X COOLING TOWERS												
5	Cooling Tower In Service	#1	Run/ Stby	____		____						
		#2	Run/ Stby	____		____						
		#3	Run/ Stby	____		____						
6	Cooling Tower Basin Level	#1	Feet	____		____						
		#2	Feet	____		____						
		#3	Feet	____		____						
7	Cooling Tower Basin Pump Discharge Pressure	#1	PSIG	25	30 to 35	50						
		#2	PSIG	25	30 to 35	50						
		#3	PSIG	25	30 to 35	50						
$ Denotes an Operational Limit derived from an Technical Safety Requirement, Technical Standard or Process Limit												

Note: The attached sample Round Sheet is compressed to illustrate the movement from area to area during rounds.

** Additional columns should be provided on round sheets to accommodate the trending objectives in Section 2.5.2 of this attachment.

No: P315 Conduct of Operations Manual
Attachment 2. Shift Routines and Operating Practices (Cont.) (Page 16 of 17)

Appendix 2-A. Sample Round Sheet (Cont.) (Page 2 of 3)

TA XX-X SURVEILLANCE OPERATOR ROUNDSHEET						Document No.: _____ Revision: _____ Approval Date: _____ Page 2 of 3					
PERIOD COVERED: From 0001 4 May 2006 To 2400 4 May 2006						0200	0800	1400	2000	**	**
SHIFT SUPERVISOR REVIEW											
TIME ROUND COMMENCED											
ITEM	EQUIPMENT/ID #	UNIT	MIN	NORM	OPER LIMIT						
LOCATION: TA X DIESEL GENERATOR											
8	Battery Charger	Amps	0.5	1.0 to 1.5	2.0						
9	Diesel Generator Start Selector Switch Position SS-156	Auto/ Manual	——	Auto	——						
10	Lube Oil Level		Add	———	Full						
11	Generator Breaker Position	Closed/ Open	——	Closed	——						
LOCATION: WASTE STORAGE TANK 1											
12	Chromate Water Inlet TI-221	°C	5	10 to 30	35 $						
13	Chromate Water Outlet TI-222	°C	5	10 to 50	55						
14	Chromate Water Inlet PI-221	PSIG	20	35 to 50	70						
15	Demister ΔP PI-375	In. H2O	0.2	0.5 to 1.5	2.0						
16	Purge Filter ΔP PI-490	In. H2O	0.1	1.0 to 5.0	5.2 $						
17	Purge Exhaust Flow PI-495	In. H2O	0.16	.25 to .75	1.0						
18	Sample Flow to H2 Monitor FI-139	cfh	1.5	1.75 to 2.25	2.5						
19	Outside Temperature	°C	———	N/A	——						
TIME ROUND COMPLETED											
$ Denotes an Operational Limit derived from an Technical Safety Requirement, Technical Standard or Process Limit											

Note: The attached sample Round Sheet is compressed to illustrate the movement from area to area during rounds.

** Additional columns should be provided on round sheets to accommodate the trending objectives in Section 2.5.2 of this attachment.

No: P315 Conduct of Operations Manual
Attachment 2. Shift Routines and Operating Practices (Cont.) (Page 17 of 17)

Appendix 2-A. Sample Round Sheet (Cont.) (Page 3 of 3)

TA XX-X SURVEILLANCE OPERATOR ROUNDSHEET			Document No.: _____ Revision: _____ Approval Date: _____ Page 3 of 3
NARRATIVE SECTION			
SHIFT #:			SHIFT HOURS:
Date	Time	Item # (if applicable)	
4 MAY 06	0700		ASSUMED POSITION DUTIES/s/I.M. Cool
	0830	7	STARTED #2 CCW PUMP. SECURED #1 CCW PUMP
	1400	3	ITEM 3 OUT OF SPECIFICATION. NOTIFIED OPERATIONS MANAGER. OUT OF
			SPECIFICATION READING DUE TO LOW OIL LEVEL
	1430		ADDED OIL TO #1 PROCESS AIR COMPRESSOR. CORRECTED PREVIOUS
			OUT OF SPECIFICATION READING
	1500		NIM ALARM AT RBOF
	1630		NIM ALARM AT RBOF SPURIOUS. SECURED FROM SECURITY LOCKDOWN
	1900		RELIEVED BY W.C. CLARK/s/I.M. Cool
SHIFT #:			SHIFT HOURS:
SHIFT #:			SHIFT HOURS:
SHIFT #:			SHIFT HOURS:

Change Control-4

No: P315 Conduct of Operations Manual
Attachment 3. Control Area Activities (Page 1 of 5)

3.0 CONTROL AREA ACTIVITIES

Control Areas (CAs) are defined by DOE-STD-1042-93, *Guide To Good Practices For Control Area Activities*, as "the physical area (e.g., room, booth, desk) where the facility or portions of the facility operations are monitored and controlled." An At-the-Controls (ATC) area is "a designated area where special access and controls are necessary." For example, an area adjacent to a control panel might be designated as an ATC area. The Facility Operations Director (FOD) or Responsible Line Manager (RLM) (or designee, as described in Section 9.2, *Conventions* under "supervisory titles") designates the areas that will be managed as CAs or ATC areas.

The purpose of this attachment is to establish guidelines and requirements for the performance of CA activities, and to ensure that CA activities are conducted in a business-like manner in a professional atmosphere that is conducive to safe and efficient operation.

The attachment also ensures that CA operators are not overburdened with administrative responsibilities and that other distractions, such as CA access, are minimized so that operators may properly monitor facility parameters.

Adequate equipment for making notifications is available at the Operations Center, Control Room, and/or other appropriate locations.

3.1 General

- Each FOD or RLM (or designee, as described in Section 9.2, *Conventions* under "supervisory titles") identifies the need for, and clearly defines the CAs and ATC areas within the facility. The CA and ATC area must be physically identified by visible means such as floor markings, signs, barrier ropes or chains.
- Designated CA personnel grant entry into the CA.
- Entry postings will provide notification of the entry requirements at the entrance to the CA.
- Personnel desiring entry must state the purpose and request permission for entry.
- The presence of personnel in the CA, other than assigned shift complement and other personnel as designated by facility policies, procedures or instructions, is limited to individuals with official business and a need to know.
- The senior operations staff individual controls specific limits for the number of personnel allowed in the CA at any time. The intent is to limit the number of personnel not assigned in the CA to an absolute minimum at all times, consistent with operational requirements. The senior operations individual present has the responsibility and authority to restrict access or remove nonessential personnel from the CA if, in that individual's opinion, the presence of those personnel jeopardizes the safe operation of the process.
- During periods of abnormal or emergency operations, the Operations Manager (OM) or senior person present should normally direct nonessential personnel to exit the CA. Only the OM or a designated alternate gives permission to enter.
- In addition, within the CAs, the ATC areas will be identified as restricted access areas. Note: Some ATC areas may not have an associated CA. Only assigned operations personnel may enter the ATC area without obtaining permission. Permission for others to enter the ATC area is obtained from the CA supervisor or designated operator/clerk.

3.2 Professional Behavior

- Display professional behavior in the CA at all times. Only activities essential to supporting operation and activities authorized by management are conducted in the CA.
- Conduct all CA activities in a disciplined, formal, businesslike, and professional manner. Keep the noise level in the CA at a minimum. Formality and professionalism in the conduct of operations is required. (Leaning on control consoles or panels and/or having one's back to the control board being monitored is not considered professional.)
- Potentially distracting activities (such as radio listening, game playing, reading of non job-related literature, and horseplay) is prohibited. Minimize non job-related discussions so as not to interfere with the conduct of the shift or monitoring of key parameters.
- Conduct facility business, such as work order or lockout approval, at a location and in such a manner that will not distract on-duty control personnel nor compromise the professional atmosphere of the CA.
- Personal phone calls are prohibited in the CA except as authorized by the FOD or RLM.
- Eating meals in the CA is not allowed. Exception: Where manpower or skills shortages do not allow for CA operators/supervisors lunch relief, one operating person at a time may eat their meal in the CA. The supervisor will control this activity. This exception does not supersede prohibitions imposed for other reasons, for example, health physics concerns.
- Water and beverages are allowed in the CA, but do not place cups and containers upon or adjacent to consoles, panels, or other control system or computer keyboards. Liquids should not be consumed in ATC areas. This exception does not supersede prohibitions imposed for other reasons, for example, health physics concerns.
- Do not wear hard hats/bump hats in CA unless specifically required for maintenance or other special conditions. (Experience has shown that a falling hard hat can inadvertently actuate or de-energize equipment.)

3.3 Monitoring the Main Control Panels

- Operators must be alert and attentive to control panel indications and alarms. Monitor control panel indications frequently, and take prompt action to determine the cause of and correct abnormalities. Place emphasis on closely monitoring and trending to detect problem situations early.
- Operator response to alarms must be timely and actions must be taken to address the cause of the alarm and clear alarming conditions. Do not disable alarms and enunciators without formal authorization.

  The proper response to an alarm is to verbally announce the alarm, if other operators are present, so that other operators are made aware of the alarming condition and can take appropriate action to correct the cause of the alarm.

  Expected alarms will be announced with a description of why it is expected, e.g., "High XYZ alarm due to calibration of XYZ instrument."

  – Attempt to verify the alarm condition by use of independent instrumentation.

  – Take appropriate action to correct the cause of the alarm. (Alarm Response Procedures [ARPs], Emergency Operating Procedures [EOPs], etc.).

  – If corrective actions are required, record the corrective action and results.

- Inform the OM.
- Make log entries as required.

- Limit the number of evolutions that are performed concurrently so that the operator's ability to detect and respond to abnormal conditions will not be compromised as the result of excessive control panel indications.
- Computerized or automated systems may be used to control processes. Develop procedures using manually controlled and operated backup equipment to include a loss of system control due to a single mode failure (i.e., loss of computerized or automated controls). Operators must be proficient in the use of manual/backup controls.

3.4 Control Area (CA) Operator Ancillary Duties

- Duties assigned to operators must not interfere with their ability to monitor facility parameters. Activities such as preparation of tagouts, reviews of operating procedures, Required Reading, review of maintenance work activities, etc., must not interfere with the operator's primary responsibilities.
- Minimize the administrative workload of operators responsible for monitoring and operating the control board. If one operator is involved in administrative tasks, other operators should assume, by formal relief procedures, the responsibility to monitor the process. Some administrative activities are better performed away from the ATC area by an operator who is not responsible for operating the control panel.

3.5 Operation of Control Area (CA) Equipment

- Only operations and support personnel specifically authorized by facility procedures, and as defined by the qualification process , must operate CA equipment. When trainees operate this equipment, they are supervised and controlled by the qualified operator, who normally would perform the operations.
- No operator must attempt any operational activity they do not feel qualified to perform.
- Personnel must demonstrate ownership of facility areas. This ownership includes not only maintaining systems and equipment operating within specified limits, but also maintenance of the material condition of the spaces for which the operator is responsible. This includes wiping up fluid leaks, initiating corrective action for deficient equipment, and other like activities.

3.6 Training

There is no specific mandatory training or qualification required to implement this attachment. It is recommended that all personnel implementing this document complete UTrain Course #24654, *OS-RTS ConOps, Attachment 3, Control Area Activities*. This training will enhance the employee's knowledge as required and as outlined in DOE O 422.1, *Conduct of Operations*.

3.7 Acronyms

ARP	Alarm Response Procedure
ATC	At-the-Controls
CA	Control Area
EOP	Emergency Operating Procedure
FOD	Facility Operations Director

OM	Operations Manager
RLM	Responsible Line Manager

3.8 References

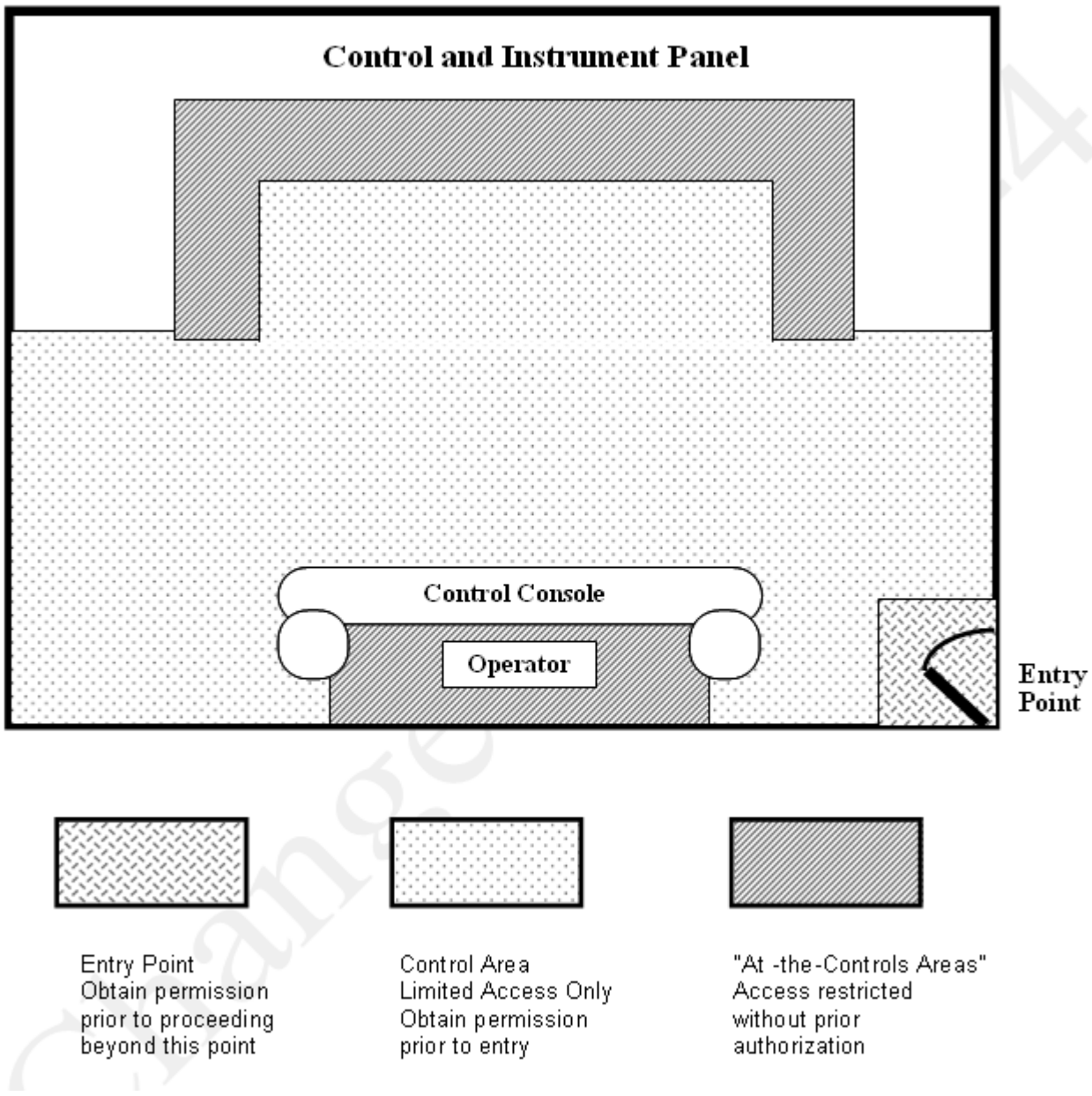
- DOE-STD-1042-93, *Guide To Good Practices For Control Area Activities*
- DOE O 422.1, *Conduct of Operations*

3.9 Appendices

Appendix 3-A. *Control Room Access Sketch*

No: P315 Conduct of Operations Manual
Attachment 3. Control Area Activities (Cont.) (Page 5 of 5)

Appendix 3-A. Control Room Access Sketch (Page 1 of 1)



No: P315 Conduct of Operations Manual
Attachment 4. Communications (Page 1 of 9)

4.0 COMMUNICATIONS

This attachment establishes the methods to ensure reliability and accuracy of information through both verbal and written means. A subsection also describes the restrictions on the use of wireless communication devices.

4.1 Conducting Written Communications

Written communication consists of formalized, controlled documents and informal written material. Examples of formal written communications include

- Procedures
- Integrated Work Documents (IWDs)
- Facility standing orders
- Shift orders
- Narrative logs
- Shift turnover checklists
- Data sheets
- Lockouts
- Work instructions
- Round sheets

Handling, reviewing, and approving formal written communication is processed in accordance with Laboratory and facility administrative procedures.

4.2 Conducting Verbal Communications

4.2.1 Processing Verbal Communications

Verbal communication is the most common form of communication and may range from the formal, such as performing the notifications required for an unusual event, to routine face-to-face communications.

Operating directions are verbal instructions given to an operator that involve the operation of a system or piece of equipment. These instructions must be brief and straight forward; otherwise written instructions must be used. Operating directions may be given face-to-face, by telephone, by radio, or through use of the Public Address (PA) system. When communications are not face-to-face, point-to-point communications are the preferred method for giving operating directions. Point-to-point communications use dedicated links between participants (e.g., telephones, etc.). When communicating verbally, the sender and receiver should use the phonetic alphabet (see Appendix 4-A, *Phonetic Alphabet*). If acronyms are used they should come from a standardized list. The Policy Office website contains the Laboratory Definition of Terms and Acronyms lists.

Operating directions are to be explicit, understandable, and include the following:

- who is giving the direction
- who is to perform the action

- what is to be done, and if time allows, why
- when it is to be done
- what procedure applies
- when to report back

All operating directions given verbally are to be acknowledged by the receiver. The acknowledgment is accomplished by verbatim repeat back, or paraphrasing the directions, followed by the sender indicating that the instructions were properly understood. The operator performing an operating directive reports back the completion of the activity, and if possible, the results. If an individual is assigned an action that the individual cannot or believes should not be completed as directed, the individual is to communicate those concerns to the sender. Resolution is necessary prior to proceeding. Supervision and/or management reviews those concerns and takes the appropriate actions. The person originating an operating direction is to observe any parameters available for confirmation that the activity is proceeding as intended.

4.2.2 Defining Attributes of Good Verbal Communications

Since verbal communication is the most common form of communication, the following attributes should be considered when performing verbal communications:

- Ensure that the identity of the two people is clearly understood by both.
- Use clear, precise terminology. Do not use slang terms. Avoid words that sound alike (e.g., avoid the use of "increase" and "decrease," instead use "raise" and "lower"). Use commonly agreed upon terms.
- Use both the noun name and number of equipment.
- Speak distinctly and deliberately.
- Acknowledge all communications.
- When issuing multiple actions, take care to structure the message so that the actions will not be confused or misunderstood.

During transients or lengthy evolutions during which facility conditions can change, conduct frequent briefings to ensure that all personnel are knowledgeable of facility status and planned activities. When receiving or giving directions or information verbally, write down the information for easy reference. Do not rely on memory for data, operating parameters, infrequently used equipment numbers, sequential actions and actions to be performed at a later time.

Example: (a) valve numbers

(b) number of turns to open a valve

(c) parameters during a facility transient

When communicating equipment numbers or other designators that include individual letters, the phonetic alphabet should be used in conjunction with the normally used letter to avoid confusion when necessary.

Example: "Start the B - Bravo - pump"

Note that “B” could be easily confused with “C” or “D.” When using commonly used acronyms, the phonetic alphabet is not required.

4.2.3 Performing Verbal Communications

To ensure accurate and timely verbal communications by telephone, the following communication practices are used. These practices are to be used both during normal and emergency operation communications.

RECEIVER: Answer telephone with your position, or preferably with your name and position and location (if needed).

> **Example:** "Tom Moore, Tank Farm Operator,"

CALLER: Begin the communication by stating your name and position, followed by the first communication statement.

> **Example:** "Tom, this is Bill Jones, Control Room Operator. Perform step 3.2 to line up to transfer from the 75K to 100K tank. Call the Control Room when the valve lineup is complete."

Note: After the identity of individuals is established, beginning of subsequent statements with name and position is not required.

Make a positive statement of the desired action. Specify the required timeframe for completion of the action. Do not leave the required time open-ended.

> **Example:** "Close the discharge valve on the No. 1 Cooling Water Pump immediately so that I can restart the pump. Call me back when the valve is closed."

The receiver of the information must repeat back the message.

> **Example:** "I will close the No. 1 Water Pump discharge valve right now. I'll call you back as soon as the valve is closed."

Following the repeat back of the message by the receiver, the sender must acknowledge that the receiver understands the information correctly.

> **Example:** "That is correct."

Face-to-face communications are to be completed in the same format as telephone communications with the following differences:

- Begin communication statements with the name of the person being addressed. Use of names at the beginning of statements is especially important during periods of high activity, such as transients and facility shutdowns. Titles and identification of the person providing the information is not necessary.
- If the communication is not interrupted by other activities, formal use of names is not required.

When contacting the control area by telephone to report an emergency, it is permissible to allow the phone to ring until answered (normally the phone should only be allowed to ring five times). When reporting an emergency always include the following:

- your name
- type of emergency
- facility area of emergency
- other pertinent information

4.3 Performing Public Address (PA) Communications

The following requirements apply to normal and emergency use of the PA system.

4.3.1 Conducting Normal Use of Public Address (PA) System

Facility operations personnel are to abide by the following restrictions during normal use of the PA system.

- The noise, volume, and distraction associated with the PA system require that its use be minimized.
- It is proper to use the PA system to establish communication with an individual or a location (for example, the Control Room) when such communication is important to the conduct of operations or to personnel safety. It is not proper use of the PA system for routine communication when telephones are available.
- When communication is established on the PA system, the instruction, or data is to be announced in a clear voice and concise manner that minimizes the amount of time the PA system is busy.
- Because the PA system is essential to operations, vital to personnel safety, and an integral part of emergency actions, use of the system is restricted to these purposes. Facility Safety Basis (SB) Documents should clearly designate the PA system as either credited or not credited as a safety system.
- Control room personnel should make PA system announcements prior to or at the time of significant activities such as changes in the ventilation system, or activities involving starting of equipment or changes of status where personnel safety is concerned.

Information concerning the status of the major equipment is announced using the PA system. Examples of such uses are as follows:

- startup or shutdown of major equipment
- unexpected startups or shutdowns of equipment
- diesel generator starts

The PA system may only be used by facility operations personnel to transmit directives or instructions to personnel when direct voice or telephone communication cannot be established. To the extent possible, preliminary direct communication should establish that the directive will be given over the PA system, what the directive will be, and the nature of the directive.

Note: If it is necessary to pass a directive over the PA system, the individual delivering the directive will require an acknowledgment from the individual to whom the directive was given. This acknowledgment is necessary to be certain that the directive was received.

The PA system is the normal means of quickly contacting operators or supervisory personnel when they are not near telephones or other direct communications devices such as "pagers" or walkie-talkies (when authorized).

4.3.2 Conducting Emergency Use of the Public Address (PA) System

Note: If the Facility SB Documents or the Building Emergency Plan (BEP) credit the PA system, then this sub-section is required; if it is not credited in either the SB Documents or the BEP, then this sub-section is recommended, but not required.

The PA system is used to announce emergency conditions, and should include directions for personnel to report to specific locations, as applicable. The control area should have the capability of overriding other users of the PA system for emergency announcements. The PA system is used to instantly pass information to site personnel in the event of emergency or unusual situations.

The PA system is used to announce the following types of situations:

- emergency conditions (e.g., fire, spill, or injury) are announced, including the direction of personnel to go to particular locations;
- unexpected events are announced and instructions for personal safety are given; and
- in the event of actuation of the Emergency Plan, the PA system is used to convey directions to site personnel.

4.4 Performing Radio and Wireless Communications

Personnel must observe restrictions on communications devices on Laboratory property and in Security Areas. P202-5, *Prohibited Articles*, includes requirements for two-way radios, cellular phones, and two-way pagers, among others. Additional requirements are stated in P217, *Controlled Articles*. Work areas where radios may interfere with equipment operation must be properly controlled (e.g., postings, work packages, etc.).

4.5 Conducting Normal Communications

Communications systems (e.g., radios, pagers, PA system, cell phones, land lines, etc.) are available to conduct normal operations. These systems are tested periodically to ensure that they are functioning properly.

4.6 Performing Emergency Communications

Note: If the Facility SB Documents or the BEP credit the PA system, then the PA system requirements of this sub-section apply; if not credited in either the SB or the BEP, then the PA system requirements of this sub-section are recommended, but not required.

Emergency communication systems are required to ensure that all individuals working in a facility can be promptly alerted to all facility emergencies. The emergency communication systems are tested periodically to ensure that they are functioning properly. Any faults found during testing are

repaired on a high priority basis. To ensure that the proper notifications are made, the control area has the authority to override all other users of the PA system.

Personnel working in areas where emergency communications cannot be heard must make their presence known to the Operations Manager (OM) so that in the event of an emergency alternate means of notification may be made. When alternate methods of communication for emergency conditions are required, they are typically identified in procedures and work documents or as part of the facility work planning and authorization process (e.g., IWD, plan of the day, plan of the week, etc.). If the facility has made provision for "area sweeps" or other formal means of notifying personnel in areas not reached by emergency communications, this notification need not be made. More information can be found in P1201-4, *LANL Emergency Procedures and Protective Actions*.

4.7 Conducting Briefings on Planned Evolutions

When non-routine procedures or complex evolutions are planned, management must conduct briefings on the evolution in advance. The briefing should include all personnel involved in the upcoming evolution or procedure in accordance with Attachment 12, *Operations Turnover*, Section 12.2.2, *Pre-Job Briefs (PJBs)*.

The purpose of the briefing is to ensure that all applicable personnel clearly understand the work to be performed, have an opportunity to ask questions or raise concerns, and have the information required to prevent personnel error due to misunderstandings or inadequate communications. Listed below are some generic items that should be discussed during the briefing:

- Emergency egress plan and assembly areas identified
- scope of the work to be performed, including physical or nonphysical boundaries
- expected automatic action or equipment/system response
- conservative action to be taken to place the facility in a known safe condition when unexpected conditions occur or expected actions do not occur
- types of communication to be used throughout the evolution and what action is to be taken if communications are lost
- who to contact when problems arise
- safety precautions and safety equipment needed
- known equipment problems, high radiation areas, high noise areas, etc.
- types of tools to be used to accomplish specific tasks
- procedure to be used during the evolution
- data to be recorded

Provide an opportunity for personnel to voluntarily self-identify physical and or medical limitations (including prescription and non-prescription medication) that could impair their ability to safely perform assigned tasks

Note: This discussion should offer the opportunity for individuals to make such disclosures privately.

The use of reverse briefings, where the actual workers lead the brief and discuss their activities, should be encouraged when appropriate.

Note: Industry operating experience has proven that even the most routine evolutions can rapidly degenerate into major mishaps due to poor communications. Briefings are a useful tool to help improve communications and teamwork.

4.8 Drill and Exercise Communications

It is recognized that during the performance of a drill or exercise, "drill" communications can actually hinder clear, concise transfers of information. Therefore, the following tools and guidelines should be used for communications during the performance of a drill or exercise:

4.8.1 Electronic Communications (PA systems, telephones, faxes, computers, radios, etc.)

When advising personnel with information relevant to the drill or exercise, announcements and notifications will be prefaced with the sentence "This is a drill."

4.8.2 Face to Face Communications

The initial communication with personnel involved in a drill or exercise will be prefaced with the sentence "This is a drill."

Subsequent communications will not require the use of "This is a drill." However, if this communication could be overheard by persons not involved in the drill or exercise, the sentence "This is a drill" should be used to prevent confusion for those not involved in the scenario.

If during the drill or exercise an actual condition occurs that requires communication to personnel involved, the announcement must be prefaced with "This is **not** a drill."

4.9 Training

There is no specific mandatory training or qualification required to implement this attachment. It is recommended that all personnel implementing this document complete UTrain Course #24655, *OS-RTS ConOps, Attachment 4, Communications*. This training will enhance the employee's knowledge as required and as outlined in DOE O 422.1, *Conduct of Operations*.

4.10 Acronyms

BEP	Building Emergency Plan
IWD	Integrated Work Document
OM	Operations Manager
PA	Public Address
SB	Safety Basis

4.11 References

- Policy Office website
- P202-5, *Prohibited Articles*
- P217, *Controlled Articles*
- P1201-4, *LANL Emergency Procedures and Protective Actions*

- DOE O 422.1, *Conduct of Operations*

4.12 Appendices

Appendix 4-A. *Phonetic Alphabet*

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Attachment 4. Communications (Cont.) (Page 9 of 9)

Appendix 4-A. Phonetic Alphabet (Page 1 of 1)

Use the phonetic alphabet when alpha-numeric information is being communicated to minimize misinterpretation.

A - Alpha	N - November
B - Bravo	O - Oscar
C - Charlie	P - Papa
D - Delta	Q - Quebec
E - Echo	R - Romeo
F - Foxtrot	S - Sierra
G - Golf	T - Tango
H - Hotel	U - Uniform
I - India	V - Victor
J - Juliet	W - Whiskey
K - Kilo	X - X-Ray
L - Lima	Y - Yankee
M - Mike	Z - Zulu

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Attachment 5. Control of On-Shift Training (Page 1 of 4)

5.0 CONTROL OF ON-SHIFT TRAINING

The purpose of this attachment is to provide requirements for control of on-shift training. This guideline requires that operation of equipment by trainees must be carefully supervised and controlled and that the trainee satisfactorily meets the training objectives and receives maximum benefit from the experience.

Discussion

On-shift training is commonly conducted using the instructional method of On-the-Job Training (OJT). This form of training has proven very effective in qualifying trainees. OJT addresses the steps necessary to successfully train an individual in the performance of a task, but does not specifically address the controls of the training process and their relationship to the operation of the facility. For information concerning the OJT process, refer to the Department of Energy (DOE) guideline, DOE-HDBK-1206-98, *Guide to Good Practices for On-the-Job Training* (hereafter referred to as OJT Guide to Good Practices). This attachment addresses the formal, disciplined controls that are required in the operating environment to ensure that on-shift training is conducted safely and efficiently.

On-shift training includes activities that a trainee performs in the operating environment under supervision, as well as training activities that are performed in the operating environment as part of the operator continuing training program. The primary purpose of on-shift training is to allow personnel to acquire first-hand experience by performing or observing operations, special processes, tests, inspections, and other work activities.

5.1 Identify Requirements for On-Shift Training

P781-1, *Conduct of Training,* discusses the requirements for conducting Job/Activity/Task-Specific training.

5.2 On-Shift Training Program Development

Each facility ensures that on-shift training programs are developed for its supervisors, operators, and trainees seeking qualification. P781-1, *Conduct of Training*, contains the administrative requirements for on-shift training.

5.3 Adherence to Programs

On-shift training is conducted in accordance with qualification programs that specifically identify items the trainee must accomplish on-shift. The knowledge requirements for each item are defined, as well as what actions the trainee must do (perform, simulate, or discuss). Both the Trainer/Evaluator (T/E) and the trainee must understand what is required for each item.

5.4 Trainer/Evaluator Qualification

Note: If the T/E is not currently qualified/certified, any vital equipment operation must be performed under the direction of a qualified/certified operator.

T/Es, who are qualified in both on-shift instructional techniques as specified in the site training requirements manual and currently or previously qualified in the duty area to be taught in accordance with facility training requirements, conduct on-shift training. The T/Es are specifically selected, taking into account communication skills, technical knowledge, and ability to provide trainees with hands-on experience. A thorough knowledge of the system or equipment is also essential to prevent system or process damage. If possible, the T/E should not perform the evaluation of an operator for whom he/she trained. If it can't be avoided the evaluation should take place at least 24 hours after the training.

5.5 Control of Trainees

Whenever a trainee operates equipment, the T/E observes the trainee to ensure the trainee does not make an error. Until the trainee has demonstrated proficiency in an operation, the trainee discusses the procedure steps, cautions, and notes with the T/E prior to operation of the system or equipment. The trainee will demonstrate actions to be performed by pointing to the control switch, valve, breaker, etc., that will be manipulated.

When trainees record entries on official documents (round sheets, logs, etc.), the Qualified Operator co-signs to verify that the recorded information is correct. The trainee and T/E discuss any out-of-specification readings and the consequences of allowing any observed trends to continue.

The T/E and/or the Qualified Operator closely monitor the trainee and remain in a position to intervene, if necessary, or assume control. T/E must not become complacent with trainees. Just because trainees have performed a task once does not mean they are aware of all the problems that can occur.

Trainees may be used to support operations work activities only when approved by the Operations Manager (OM) and with a qualified operator present. Trainee participation in production functions is limited to those duties for which they have been qualified.

Satisfactory completion of a single performance item does not necessarily qualify a trainee for performing that function. The potential interrelationship of any function with other systems and equipment requires that a trainee must be fully qualified for a position before being allowed to operate without a supervisor or trainer present.

The T/E and/or the Qualified Operator is responsible for any actions taken by the trainee.

The T/E must receive control room approval from the OM or the appropriate supervisor, if applicable, prior to beginning any job performance measures that involve actual operation of equipment. Prior to actually performing activities that affect production or facility safety, the evaluator informs examinee and the Control Room Supervisor (CRS)/OM of the planned task and checks for changed conditions (e.g., changes in radiological conditions, availability of system for training, etc.). Training activities must be coordinated through the work planning process (e.g., plan of the day, plan of the week, etc.).

5.6 Operator Qualification Program Approval

The OM or other person designated by the Facility Operations Director (FOD), or the Responsible Line Manager (RLM) approves the operator qualification program. Deployed training personnel will coordinate changes to the program.

5.7 Training Documentation

Completion of the trainee qualification program must be formally documented. A qualified instructor documents classroom requirements and written examination results. On-shift training and system checkouts must be conducted in accordance with P781-1, *Conduct of Training*, and documented by T/Es. Job performance evaluation results must be documented by the facility training coordinator. It is recommended that training (e.g. classroom, OJT, etc.) supporting a qualification is documented in a timely fashion following completion.

5.8 Suspension of Training

Trainee operation of equipment is immediately suspended during unanticipated or abnormal events, accident conditions, or whenever qualified operations personnel or the T/E believe suspension is necessary to ensure safe and reliable facility operation. During abnormal or accident conditions, trainees do not participate in facility operations unless specifically directed to do so by the qualified operations personnel responsible for the equipment.

5.9 Maximum Number of Trainees

A maximum limit for the trainee-to-instructor ratio ensures that the trainee is provided with effective instruction and that the instructor is not distracted by having too many trainees. The OM normally limits the number of trainees to no more than three trainees for each T/E. The RLM may specify changes to this ratio in accordance with P781-1, *Conduct of Training*.

When an increase in the trainee-to-instructor ratio for particular training evolution is approved, it must be specified on the qualification record for that evolution. Factors used to determine the maximum number include accessibility of equipment, visibility of instrumentation, space limitations, ambient noise, safety concerns, training effectiveness, and potential adverse effects on facility operation.

Operations positions requiring certification must be based on one-to-one instruction on that position/work station.

OMs/supervisors ensure that the required trainee-to-instructor ratio is maintained.

5.10 Updating On-Shift Training Requirements

Training procedures provide for periodic review and update of on-shift training program content, materials, and administration. Revisions may be required because of changes in a task, system configuration, records, or equipment. Reviews are conducted at least biennially (every two years).

5.11 Training

There is no specific mandatory training or qualification required to implement this attachment. It is recommended that all personnel implementing this document complete UTrain Course #24656, *OS-RTS ConOps, Attachment 5, Control of On-Shift Training*. This training will enhance the employee's knowledge as required and as outlined in DOE O 422.1, *Conduct of Operations*.

5.12 Acronyms

CRS	Control Room Supervisor
DOE	Department of Energy
FOD	Facility Operations Director

OJT	On-the-Job Training
OM	Operations Manager
RLM	Responsible Line Manager
T/E	Trainer/Evaluator

5.13 References

- DOE-HDBK-1206-98, *Guide to Good Practices for On-the-Job Training*
- P781-1, *Conduct of* Training
- DOE O 422.1, *Conduct of Operations*

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Attachment 6. Investigation of Abnormal Events (Page 1 of 1)

6.0 INVESTIGATION OF ABNORMAL EVENTS

Identifying, investigating, and analyzing abnormal events is an important component of process improvement and safety management. Abnormal events must be managed in accordance with the applicable Laboratory policies and procedures:

- P102-2, *Occupational Injury and Illnesses Reporting and Investigation*
- P141, *Price Anderson Amendments Act (PAAA) Worker Safety and Health (WSH), and Classified Information Security (CIS) Enforcement Procedure*
- P214, *Information Security Incident Management*
- P322-3, *Performance Improvement from Abnormal Events*
- P322-4, *Laboratory Performance Feedback and Improvement Process*
- QPA-PA-FSD-003, *Abnormal Events Handbook*

6.1 Training

There is no specific mandatory training or qualification required to implement this attachment. It is recommended that all personnel implementing this document complete UTrain Course #24657, *OS-RTS ConOps, Attachment 6, Investigating Abnormal Events*. This training will enhance the employee's knowledge as required and as outlined in DOE O 422.1, *Conduct of Operations*.

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Attachment 7. Notifications (Page 1 of 1)

7.0 NOTIFICATIONS

A defined and formal process must be used to report events requiring notification to the Department of Energy or external agencies. These notifications must be conducted in accordance with the applicable Laboratory policies and procedures:

- P102-2, *Occupational Injury and Illnesses Reporting and Investigation*
- P141, *Price Anderson Amendments Act (PAAA) Worker Safety and Health (WSH), and Classified Information Security (CIS) Enforcement Procedure*
- P214, *Information Security Incident Management*
- P322-3, *Performance Improvement from Abnormal Events*
- PD1200, *Emergency Management*

7.1 Training

There is no specific mandatory training or qualification required to implement this attachment. It is recommended that all personnel implementing this document complete UTrain Course #24658, *OS-RTS ConOps, Attachment 7, Notifications*. This training will enhance the employee's knowledge as required and as outlined in DOE O 422.1, *Conduct of Operations*.

No: P315 Conduct of Operations Manual
Attachment 8. Control of Equipment and System Status (Page 1 of 24)

8.0 CONTROL OF EQUIPMENT AND SYSTEM STATUS

8.1 Control of Equipment and System Status

This attachment provides direction for the control of equipment and system status to ensure that facility configuration control is maintained in accordance with procedural and design requirements and the operating shift personnel know the status of facility equipment and systems.

8.1.1 General

It is imperative that facility equipment and systems be properly controlled. Not only must the operating shift be aware of how equipment and systems will function for operational purposes, but in order to satisfy the design bases and the operational limits, the proper component, equipment, and system configurations must be established and maintained.

Each facility is required to control configuration changes resulting from maintenance, modifications, and testing activities. Changes in equipment and system configuration are communicated from shift to shift through the shift turnover process. Turnover checklists, equipment status boards, and system composite schematics or system alignment checklist**s** are used as aids for compiling and transmitting status information efficiently and accurately during the shift turnover process.

Each facility is required to establish a system to track deviations from the normal alignment (normal configuration). One system commonly used for this purpose is the status board. Status boards typically contain a graphic or schematic representation of the system, and/or a listing of system components. When status changes are made, the status board (schematic representation and/or listing of components) is promptly annotated to indicate the current status of equipment. An alternate system contains a file of system folders that include system alignment checklists with deviation sheets or other annotations of deviations by which status changes are documented. Each facility must identify by Standing Order, administrative procedure, or other suitable written description the system (including specific facility details) in use to maintain system status. Note that when using the status board method, alignment checks may be needed to establish initial conditions.

8.1.2 Identification of Equipment and Systems

The Facility Operations Director (FOD) is responsible for identifying equipment and systems that require formal status control in accordance with this attachment.

Document facility equipment and system operating conditions that require status control in accordance with this attachment on a form similar to Appendix 8-A, *Template for Identification of Equipment and System Operating Conditions Requiring Status Log*. This document must be approved by the FOD. Maintain the approved form as part of the system alignment status file.

All technical procedures (e.g., Operating Procedures [OPs], Abnormal Operating Procedures [AOPs], Alarm Response Procedures [ARPs], etc.) generated to support the status control for the equipment and systems identified in this section are developed, controlled, and used in accordance with Attachment 16 of this document.

8.1.3 Status Change Authorization and Reporting

8.1.3.a Authorities and Reporting

The Operations Manager (OM) is responsible for maintaining proper facility configuration. The OM maintains a broad overview of facility operations. The OM's perspective of status must necessarily be the focal point of operations.

Authorization of status changes to equipment and systems of lesser importance may be delegated by the OM to other cognizant operators. Delegation does not relieve the OM of the responsibility for maintaining an overview of facility operations. The OM periodically is advised of changes in status of equipment and systems delegated to other cognizant operators.

Facility operators must be aware of equipment and system status. The OM ensures that changes in status to equipment and systems are communicated to the facility operators. Typically, facility operators are in the line of information flow to and from the OM.

Report changes in the status of facility equipment and systems to the governing station (e.g., control area) or to the individual (or relief) who authorized the change. Obtaining the authorization for the performance of the procedure and reporting the completion of the procedure constitutes status change reporting.

The OM authorizes changes in status of safety-related equipment and systems. Such changes are reported to the control area.

8.1.3.b Status Control Process

Authorization by the OM is required before any change that affects system status outside of normal shift activities using approved procedures.

All personnel notify the OM or designee before performing tasks that will result in a change to normal configuration or when conditions are observed that are not in accordance with the established normal configuration.

Systems are considered in normal configuration unless an annotation has been made on the status board and/or system composite schematic or an annotation for that system is entered into the system folder (unless covered by procedure.) (Log entries should be made as appropriate).

The OM reviews components or equipment aligned in a configuration different than normal configuration to ensure that the condition does not impact safety requirements such as Safety Analysis Reports (SARs), Technical Safety Requirements (TSRs), technical specifications, etc.

8.1.4 Component and System Alignments

8.1.4.a General

Individual components for facility equipment and systems are properly aligned or checked for proper alignment before the initial placement of equipment or systems into operation. An initial alignment of valves, switches, and breakers establishes a baseline configuration upon which further operations may be based. Once the equipment or system is properly aligned and is operating in accordance with the operating procedures, frequent complete alignments of all individual components may not be necessary.

Use alignment checklists, or procedures which contain the same degree of control, to establish the initial correct component positions. The alignment checklists or procedures provide a component name that matches the nomenclature placed on the component, a component number, the required component position, and documentation for performance and verification. An example alignment checklist is shown on Appendix 8-B, *Template for System Alignment Checklist*.

Typical situations that may require equipment and systems to be aligned include startup from major outages, changes in operational mode, and special alignments for portions of systems affected by maintenance or lockout/tagout activities. Following maintenance or other shutdown situations, safety-related equipment is functionally tested, in accordance with TSR surveillance requirements, before the equipment or system is considered operable.

Control of component and system alignment may be temporarily relaxed with approval of the FOD. Approval is documented by a suitable means such as by Standing Order, Shift Order, or notation in the equipment and system status file. Upon restoration of system status control, an alignment must be performed on the system to ensure proper configuration.

Equipment and system alignments are only required for equipment and systems required to be operational.

8.1.4.b Alignment Checklists

General Instructions

- The scope of the alignment checklists will be determined by facility operations, concurred with by technical support, and approved by the facility operations.
- The alignment checklist defines the component configuration required to ensure operability of identified equipment and systems, as well as required instrumentation and support systems.
- Component listings for each system should be grouped by location to facilitate performance of the checklist. The checklist may be divided into sections to allow simultaneous completion of several sections. If a checklist is divided into sections, each section has a signature block for the operator completing that section of the checklist.
- Treat alignment checklists as procedures. Performers comply with the requirements of this document Attachment 10, *Independent Verification*, and Attachment 16, *Local Procedures*, Section 16.9, *Procedure Use*.
- Document those components that are not to be placed in the "REQUIRED POSITION" and are NOT under control of an approved document, procedure, work package, lockout, etc., by means of deviation sheets similar to Appendix 8-C, *Template for Component Deviation Sheet,* or by annotations in the lineup checklist. As a minimum, documentation should identify the deviated component(s) and basis/cause of deviation and OM approval of deviation. If using the system folder method of status control, documentation will also include eventual return to normal, and OM approval for return to normal.
- Alignment checklists are not considered complete until reviewed and signed by the OM.
- Place completed alignment checklists in the appropriate system alignment status file following approval by the OM. Completed checklists remain in the status file until superseded by a subsequent performance. Status files may be electronic.

Initial Full or Partial System/Component Alignments

- Complete alignment checklists as assigned by the OM. The OM may decide to perform a complete checklist or only a partial checklist.
- When only a portion of a system has been affected by the maintenance, modification, or test, the OM may specify that the system conditions be established in accordance with specific parts of a checklist. In those cases, the OM stamps or writes the word "PARTIAL" on the first page of the checklist, and marks “N/A” (not applicable) for those steps, or portions of the checklist that are not required to be performed.
- Personnel performing alignment checklists have the checklist with them when performing the duties of the positioner or independent verifier.
- The OM reviews and approves the completed alignment checklist.

System/Component Alignment Verification Checks

- A complete verification of alignment of equipment and systems should be performed as needed to ensure proper system alignment, as determined by operations management.
- Alignment checklists may be used to perform partial or full system/component alignment verification checks. During these checks compare the "AS FOUND POSITION" with the “REQUIRED POSITION” specified by the alignment checklist.
- If the "AS FOUND POSITION" and the "REQUIRED POSITION" are the same, then leave the “AS LEFT POSITION” column blank and enter initials in the “INITIALS” column. If the "AS FOUND POSITION" is different from the "REQUIRED POSITION" and this condition is unexpected (i.e., no existing deviation sheet or Do Not Operate [DNO] tag, etc.), notify the OM.
- The OM must assess the out of position condition for impact on system operability and consider the safety and environmental consequences prior to directing operator action. The component may not be repositioned without the OM's authorization. If repositioning is authorized, the operator must place the component in the "REQUIRED POSITION" and record this position in the "AS LEFT POSITION" column. Repositioning must be performed prior to performance of independent verification.
- Following the performance of alignment checklists, the OM
  - reviews completed checklists to identify components in other than required positions;
  - evaluates condition of the identified components and provides resolution, as required;
  - authorizes component repositioning as required;
  - if using the status board method of status control, causes status boards to be updated, and approves the completed lineup checklist; and
  - if using the system folder method of status control, initiates any necessary deviation sheets, and approves completed alignment checklist after all authorized component repositioning and necessary deviation sheets have been completed.

8.1.5 Equipment Locking for Administrative Control

Control locks may be used to provide special administrative controls for equipment that, if inadvertently operated, could cause an undesirable result such as damage to equipment or compromised quality of a product.

Note: For equipment locking for Hazardous Energy Control (HEC), see P101-3, *Lockout/Tagout for Hazardous Energy Control*. HEC (red) locks are not to be used for any purpose other than the control of hazardous energy in accordance with P101-3.

For locks installed for administrative control, the OM is considered the safety and environmental line manager and will maintain and control the keys in accordance with the key control requirements described in Attachment 2, *Shift Routines and Operating Practices*.

Control locks provide some security that a component will be operated only by qualified facility personnel performing required evolutions in a controlled fashion. Additionally, locks should alert the operator of the importance of the component and remind the operator that special controls over repositioning are to be maintained. All operations personnel must be trained or briefed regarding their responsibilities concerning the manipulation of administratively locked components.

If a component which is normally locked is found without a control lock or locked in the wrong position, notify the OM immediately. Place the process in a safe condition. The OM initiates investigation and corrective action to restore proper configuration of the component. Alignments on all other effected components should be completed prior to resuming operations.

The OM develops a list of equipment that requires control locks. Use a Control Lock Checklist similar to Appendix 8-D, *Template for Administrative Control Lock Checklist,* and include component Identification (ID) number, component name, component location, required position, documentation of performance and whether Independent Verification (IV) is required. Electronic checklists are permitted.

Update and evaluate the checklist as necessary to ensure all critical components are included. The OM evaluates and approves changes to the Control Lock Checklist before implementation.

Inspect the Control Lock Checklist equipment semi-annually (every six months) to verify that the locks are still installed properly, unless the associated locks are located in an inaccessible area (e.g., high radiation, requires scaffolding or fall protection, etc.). Those locks in an inaccessible area must be inspected either when accessing the location for other reasons (e.g. maintenance) or annually. The semi-annual inspection of administrative control locks should not be performed in conjunction with any review or inspection of HEC locks (see P101-3) as the inspection criteria are different. Document the inspection in the appropriate log. If, during the inspection, a lock is missing or other evidence exists that a component is in a position other than the position specified in the Control Lock Checklist, the performer reports the deviation to the OM who initiates the appropriate corrective action. Verification methods other than a physical check, such as the use of System Alignment Checklists, are allowed, when the method is documented and approved by the OM.

The lock placement provides a physical restraint on the operation of the equipment.

The OM authorizes removal of control locks and the repositioning of control locked equipment before manipulation. OM authorization is not required if the removal is performed in accordance

with an OM-approved procedure. Document the repositioning of locked equipment on log sheets similar to Appendix 8-E, *Template for Administrative Control Lock Log Sheet*. As a minimum, the log sheet documents the component ID, authorization by OM, new position, return to normal, and performer.

8.1.6 Operational Limits Compliance

Establish administrative controls (e.g., procedures, round sheets, etc.) to document compliance with requirements of operational limits. The OM documents, investigates and reports any noncompliance.

The OM must be aware of actions taken to comply with operational limit requirements and ensures that appropriate actions are taken to correct or mitigate any adverse consequences.

Make entries on logs, round sheets, turnover checklists, or other appropriate documentation to record the initial facility conditions that existed prior to actions that were taken in response to exceeding operational limits requirements.

Operating personnel must be knowledgeable of operational limits and actions for which they are responsible. The OM ensures that operations personnel are trained in the significance of and the general basis for the establishment of operational limits and actions to take if operational limits are exceeded.

OMs and other designated supervisory personnel must review and maintain cognizance of the operational limits and action statements for operations under their cognizance. Review existing Operational Limit Status Sheets (see Appendix 8-F, *Template for Operational Limit Status Sheet*) as part of the shift turnover process.

8.1.7 Equipment Deficiency Identification and Documentation

Notify the OM of all equipment deficiencies or system malfunctions, and log, investigate, initiate corrective action, and report such information through the line organization up to the OM as deemed necessary.

When a piece of equipment or a system is not fully functional, it is the responsibility of operations personnel to take prompt action to identify the deficiency and ensure corrective action is initiated. Obtain system engineer support for determining functionality, as necessary. Such deficiency corrections may include adjustments, replacements, or other actions within the duties of operations personnel.

In situations where operations personnel cannot complete corrective actions, operations personnel identify the defective component, log the deficiency, and notify the OM. Document deficiencies that result in the inoperability of equipment and systems required by established TSR limits on a sheet similar to Appendix 8-F, *Template for Operational Limit Status Sheet*. To aid in tracking, multiple non-compliances against a single system should be documented on a log similar to Appendix 8-G, *Template for Operational Limit Status Log*.

Identify equipment deficiencies by facility personnel through the use of a uniquely numbered and controlled tag. When found, operations personnel record equipment deficiencies by the use of logs, round sheets, and shift turnover checklists. Deficiencies falling under the guidelines of nonconformance reporting are controlled in accordance with P330-6, *Nonconformance Reporting*.

Identify equipment classified as Out Of Service (OOS) or inoperable on applicable equipment status boards.

8.1.8 Work Authorization and Documentation

The OM or designee gives initial written authorization on the document controlling the work and continuing authorization for all shift activities performed on facility areas under his/her cognizance. As a minimum, this indicates confirmation that equipment important to safety, equipment that affects operations, and equipment that changes control area indications or alarms are operable.

Documentation of the status of work in progress, in the form of log entries, turnover checklists, etc., is available in the control area or Operations Center for review by operations personnel.

8.1.9 Equipment Post-Maintenance Testing and Return to Service

Test equipment following maintenance to demonstrate that it is capable of performing its intended function. Conduct post-maintenance tests under conditions that represent normal operating parameters, such as flow, differential pressure, temperature, input signal values, and fluid type unless covered by specific approved procedures (e.g., relief valve testing or diesel over speed testing).

Conduct tests in accordance with written instructions or formal procedures. The instruction/procedure should measure performance and allow for documentation and review of test data for the equipment and/or system.

Testing of equipment following maintenance includes performance of all functions that may have been affected by the maintenance.

Testing of equipment following maintenance verifies that the maintenance performed corrected the original problem and no new problems were introduced. If the original problem was not corrected or new problems were introduced, then stop all testing, evaluate the situation, and notify supervision.

Specify any testing following maintenance on the maintenance work order or accompanying documentation. If a test fails, a thorough test evaluation should be performed by the group responsible for the test instructions and, if necessary, make a revision to the test. Re-evaluate maintenance work and new work instructions issued to correct the problem.

Enter requirements for returning equipment to service into the applicable work controlling document.

The OM, or designee, ensures that testing appropriately proves equipment operability. Prior to returning equipment to service, the OM ensures proper housekeeping and condition of the equipment and system, tags (Nonconformance Reports [NCRs], deficiencies, etc.) have been properly resolved, active lockouts/tagouts which would affect equipment or system operability have been cleared, alignments have been completed in accordance with this attachment, and surveillance tests have been completed as required.

Operations provide the final review of equipment/system return to service before equipment/system operation.

8.1.10 Alarm Status

The status of control area or local panel alarms must be readily available to operating personnel and included in the shift turnover process. Alarms expected during normal operations, such as those resulting from system startup or load changes, etc., are typically identified in procedures or work documents, or identified through the work planning process (e.g., plan of the day, plan of the week, etc.).

Information readily available to operating personnel in logs or on status boards should include alarms that are totally disabled, alarms with individual inputs disabled, alarms with temporarily changed set points, alarms that are normally illuminated during operation, and multiple input alarms that do not re-indicate (i.e., re-flash) when more than one input is activated.

The OM must ensure appropriate actions are taken to monitor equipment parameters for abnormal conditions that would be masked by deficient or non-reindicating (i.e., non-reflashing) visual or audible alarms.

Note: Alarms that will be illuminated or activated greater than one shift, or at shift change, should be considered “locked-in” for the purpose of tracking in the Alarm Matrix or electronic equivalent.

Impaired alarms (i.e., alarms which have one or more inputs disabled, have temporarily changed set points, have multiple input alarms and are "locked-in" due to one or more input conditions, etc.) must be tracked using an Alarm Matrix (Appendix 8-H, *Template for Alarm Matrix*). At a minimum, the Alarm Matrix will uniquely identify alarm by number and/or name, will provide a reason for the alarm condition, and will specify any additional monitoring or corrective actions required.

Impaired alarms must be identified by an Alarm Status Tag (Appendix 8-I) or other unique identifier. Status tag should identify alarm, work request number (if required), and the installer’s initials. At a minimum, status tags should be placed on impaired alarms prior to the end of the shift on which alarm became impaired.

When an impaired alarm condition is corrected, it must be indicated on the Alarm Matrix and the Status Tags must be removed.

Nuisance alarms should be corrected as soon as possible.

Note: Prior to pushing a "test" button, ensure that the function of the button is alarm test or light test and does not cause actual component system realignment unless the effects are known and acceptable for the status of the facility.

Perform testing as needed to demonstrate operability.

8.1.11 Temporary Modification Control

Temporary modifications to configuration items of facility equipment, components, and systems must be controlled in accordance with AP-341-504, *Temporary Modification Control*, and its supporting documents.

8.1.12 Distribution and Control of Equipment and System Documents

Make appropriate operations personnel aware of all changes to identified documents through the use of either the Required Reading Program or Shift Orders.

The OM ensures that a controlled file of appropriate engineering drawings (e.g., single-line and Piping and Instrumentation Diagrams [P&IDs]), specifications, and vendor technical manuals are available to operations personnel at all times to ensure operations personnel receive and use the latest revisions of these documents.

The document distribution includes all operations related activities such as procedures review groups, maintenance, engineering, facility safety analysis groups, and testing groups. The control and distribution of the documents must be accomplished in accordance with P1020-2, *Laboratory Document Control*.

8.1.13 Out-of-Service Equipment and Systems

Equipment and/or systems that are not operating and are not available for operation are defined as OOS. Equipment may be declared OOS for planned events, such as maintenance or modification, or unplanned events, such as equipment failure. In either case the status of the equipment is to be indentified and tracked in accordance with the requirements of this attachment. Additionally, OOS equipment should be tagged to prevent inadvertent operation. An accepted method is the use of a caution tag and, if additional control is required, the addition of control locks.

Execution of defined surveillance requirements and In-Service Inspections (ISIs) are used to evaluate operability of credited OOS equipment before return to service. For other equipment, the operability or functionality of OOS equipment before return to service, use of the process described in AP-341-516, *Operability Determination*, should be considered.

8.2 Caution Tags Use and Control

This attachment provides requirements for the use and control of caution tags (Appendix 8-J, *Example Caution Tag*) in all Los Alamos National Laboratory (LANL) facilities. Additionally, this attachment provides instructions and sets requirements for tag application, control, traceability, and tracking.

8.2.1 General

The OM or designee must approve the installation and removal of all caution tags applied within the facility.

The OM may request an accounting of tags installed in the facility.

8.2.2 Instructions for Caution Tag Use, Application, and Control

8.2.2.a Caution Tag Use

A caution tag is used to convey information about the status of equipment and to prevent equipment damage and inadvertent use. It may also be used in conjunction with administrative locks.

Caution Tags are NOT to be used to protect personnel from equipment hazards. Red locks are to be used for that purpose. Refer to P101-3, *Lockout/Tagout for Hazardous Energy Control*. The OM or designee determines when caution tags provide the appropriate level of control, and assures that caution tags are not used instead of more appropriate administrative controls or lockout/tagout.

A caution tag is also used as a precautionary measure to provide temporary special instructions or to indicate that unusual caution must be exercised to operate equipment. These instructions are not to violate existing procedures, the safety basis, or other existing requirements.

When Tagout systems are used, personnel must be trained or briefed in the limitations of tags:

- Tags are essentially warning devices and do not provide physical restraint on those devices as are provided by a lock.
- When a Tag is attached, it is not to be removed without authorization of the person responsible for it, it must not be bypassed, ignored, or otherwise defeated.
- Tags must be legible and understandable by all personnel.
- Tags and their means of attachment should be able to withstand the environmental conditions encountered in the workplace.
- Tags may evoke a false sense of security and their meaning needs to be understood.
- Tags must be securely attached so they cannot be inadvertently or accidentally detached during use.

8.2.2.b Caution Tag Application

Caution Tags must be applied directly to the article that requires ID.

Caution Tags must not be applied in a manner that obscures visibility of alarms, instrumentation, or controls.

Caution Tags must not be applied to Distributive Control System (DCS) screens or any other type of monitors in a manner that would inhibit direct visual observation of the information on the screen.

Caution Tags may be held in place with a cable tie or other suitable fastener.

8.2.3 Caution Tag Numbering

Each tag must have a unique number assigned to it before the tag is installed and be easily distinguishable from other tags.

The unique number must have the following minimum format:

XX-####

Where:

XX = The current calendar year

= The sequential number (This number resets to "0001" at the beginning of a new calendar year)

The unique number must be written in the space provided with indelible ink.

The Caution Tag must be filled out completely and all pertinent information recorded in the spaces provided.

The front of the Caution Tag must include the OM or designee signature and a contact number.

8.2.4 Recording

Each numbered tag that is applied must be immediately recorded in the appropriate Caution Tag Log (Appendix 8-K).

Electronic Caution Tag logs may be used if authorized by OM or designee.

Caution Tag Logs must be maintained in a central location easily accessible by personnel.

Each Caution Tag Log must be filled out completely and legibly.

- Assign the next sequential number from the Log to a tag and install the tag
- Record the following on the Caution Tag Log:
  - Caution Tag #
  - Description/Location
  - Reason for tag
  - Initials of person installing tag
  - Date tag installed

8.2.5 Caution Tag Replacement

If a tag requires replacement while it is installed, then the OM must perform the following:

- Make an entry in the Caution Tag Log noting the reason for tag replacement, Date the tag was replaced, and the installer's initials.
- Obtain a replacement tag, duplicate all information from the Caution Tag Log or old tag onto the new tag, including the original date and install it in accordance with Section 8.2.2.b of this attachment.

8.2.6 Caution Tag Removal

Caution Tags must only be removed when the condition that required the tag has been corrected.

When conditions are acceptable to remove the tag, it must be removed and destroyed.

Make an entry in the log that includes the initials of person removing tag and the date the tag was removed.

Once the tag is removed ensure that equipment or system status is updated as appropriate in status logs, status boards, etc.

8.2.7 Inspections

Regularly scheduled inspections must be conducted by the OM for all installed tags and for all logs in each active facility. The inspection must encompass a physical inspection of all installed tags and an inspection of each log. The inspection must be documented and submitted to the FOD.

The reviewer should make a log entry to indicate, at a minimum, the identity of the reviewer and the date completed.

8.2.7.a Inspection Frequency

Semi-annual inspections are recommended unless otherwise specified by the FOD.

The FOD must determine the frequency of inspections for inactive or surplus facilities.

Random inspections may be performed as directed by the OM.

8.2.7.b Inspection Criteria

Inspections should verify that the tags are still needed and that actions are in progress to correct deficiencies. At a minimum, tags and logs must be inspected for the following:

- Verification that all active tags logged into each log are installed on their respective alarm or component. If a tag is missing, then the tag must be replaced if the conditions still warrant the tag, or the log must be revised. Investigate the cause and include the findings in the report to the FOD.
- Verification that all installed tags are legible, in good condition, and are not applied in a manner that obscures visibility of alarms, enunciator, instrumentation, or controls.
- Verification that each log in use is in compliance with this attachment.
- Verification that there are no unauthorized tags installed. If an installed tag is not listed in the log, then investigate the cause and include the findings in the report to the FOD.

8.3 Training

There is no specific mandatory training or qualification required to implement this attachment. It is recommended that all personnel implementing this document complete UTrain Course #24660, *OS-RTS ConOps, Attachment 8, Control of Equipment and System Status*. This training will enhance the employee's knowledge as required and as outlined in DOE O 422.1, *Conduct of Operations*.

8.4 Records

The following are considered records generated by this attachment and must be managed in accordance with P1020-1, *Laboratory Records Management*, and any local procedures:

- System Alignment Checklist
- Component Deviation Sheet
- Control Lock Checklist
- Control Lock Log Sheet
- Operational Limit Status Sheet
- Operational Limit Status Log
- Alarm Matrix
- Caution Tag Log

8.5 Acronyms

DCS	Distributive Control System
DNO	Do Not Operate
HEC	Hazardous Energy Control
ID	Identification
ISI	In-Service Inspection
IV	Independent Verification
LANL	Los Alamos National Laboratory
N/A	Not Applicable
NCR	Nonconformance Report
OM	Operations Manager
OOS	Out of Service
P&ID	Piping and Instrumentation Diagram
SAR	Safety Analysis Report
TSR	Technical Safety Requirement

8.6 References

- P101-3, *Lockout/Tagout for Hazardous Energy Control*
- P330-6, *Nonconformance Reporting*
- AP-341-504, *Temporary Modification Control*
- AP-341-516, *Operability Determination*
- P1020-2, *Laboratory Document Control*
- DOE O 422.1, *Conduct of Operations*
- P1020-1, *Laboratory Records Management*

8.7 Appendices

Appendix 8-A.	*Template for Identification of Equipment and System Operating Conditions Requiring Status Log*
Appendix 8-B.	*Template for System Alignment Checklist*
Appendix 8-C.	*Template for Component Deviation Sheet*
Appendix 8-D.	*Template for Administrative Control Lock Checklist*
Appendix 8-E.	*Template for Administrative Control Lock Log Sheet*
Appendix 8-F.	*Template for Operational Limit Status Sheet*
Appendix 8-G.	*Template for Operational Limit Status Log*
Appendix 8-H.	*Template for Alarm Matrix*
Appendix 8-I.	*Template for Alarm Status Tag*
Appendix 8-J.	*Example Caution Tag*
Appendix 8-K.	*Caution Tag Log Template*

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Attachment 8. Control of Equipment and System Status (Cont.) (Page 14 of 24)

Appendix 8-A. Template for Identification of Equipment and System Operating Conditions Requiring Status Log (Page 1 of 1)

Equipment/System	Operating Condition Which Requires Status Control

Approval:

_____ _____

Facility Operations Director Signature/Name **Date/Time**

Control-4

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Attachment 8. Control of Equipment and System Status (Cont.) (Page 15 of 24)

Appendix 8-B. Template for System Alignment Checklist (Page 1 of 1)

Approval: System:	Location	Equip. ID Number	As-Found Position	Required Position	As Left Position	Init.	Independent Verification
Facility Operations Director Signature/Name Date/Time							
Approval:							
_____ _____ _____							
Facility Operations Director Signature/Name Date/Time							
Approval:							
_____ _____ _____							

FOD Name Print: Signature: Date: / /

Control-4

No: P315 Conduct of Operations Manual
Attachment 8. Control of Equipment and System Status (Cont.) (Page 16 of 24)

Appendix 8-C. Template for Component Deviation Sheet (Page 1 of 1)

Component Deviation Sheet

Part I				
System Title:				
Reviewed and Approved Prior to Implementation				
Description of Deviation -- (include equipment affected, "as-left" position, "required" position, reason such as work plan, etc.)				
Part II				
Approval for Return to Normal				
Operations Manager signature:		Date:	Time:	
Component	Number	As-Found Position	Required Position	As-Left Position

Change Control-4

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Attachment 8. Control of Equipment and System Status (Cont.) (Page 17 of 24)

Appendix 8-D. Template for Administrative Control Lock Checklist (Page 1 of 1)

Administrative Control Lock Checklist

Facility: Page _____ of _____

Component ID # (1)	Component Desc./Name (2)	Component Location (3)	Required Position (4)	Positioner Initials (5)	Verifier Initials (6)	Lock # (7)

Reviewed By:

Manager Signature: Date:

Approved By:

Operations Manager Signature: Date:

Change Control

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Attachment 8. Control of Equipment and System Status (Cont.) (Page 18 of 24)

Appendix 8-E. Template for Administrative Control Lock Log Sheet (Page 1 of 1)

Administrative Control Lock Log Sheet							
System:							
Component No.	Application Authorization (OM)	New Position	Positioned By	Application Date/Time	Restored By	Removal Date/Time	Removal Authorization (OM)

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Attachment 8. Control of Equipment and System Status (Cont.) (Page 19 of 24)

Appendix 8-F. Template for Operational Limit Status Sheet (Page 1 of 1)

Operational Limit Status Sheet

(1) Limit # : - -
(2) Work Request # :
(3) NCR # :

Section I - Initiation

(4) Inoperable Equipment :
(5) Limit Not Met :
Time/Date:

(6) Limit Title :

(7) Applicability :

(8) Required Action :

Required Completion : Time/Date : / Actual Completion : Time/Date : /

Required Action :

Required Completion : Time/Date : / Actual Completion : Time/Date : /

Required Action :

Required Completion : Time/Date : / Actual Completion : Time/Date : /

(9) Effect on Equipment/Safety System Function :

(10) Redundant Safety Equipment Verified Operable/Required Contingency :

(11) Operations Manager review

Signature : Date : Time :

Section II - Restoration

(12) Corrective Action Taken :

(13) Operability Determined : Procedure Number Section(s)

☐SAT ☐UNSAT

(14) Operability Testing Complete : Date : Time :
Limit Compliance Restored

(15) Operations Manager Acceptance

Signature : _____ Date : _____ Time : _____

Change Control-4

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Attachment 8. Control of Equipment and System Status (Cont.) (Page 20 of 24)

Appendix 8-G. Template for Operational Limit Status Log (Page 1 of 1)

20___ Operational Limit Status Log - Area _____

Page :

Status Sheet No.	Date	Limit Reference and Condition Initiating Entry	Terminated Date/Initial

Change Control

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Attachment 8. Control of Equipment and System Status (Cont.) (Page 21 of 24)

Appendix 8-H. Template for Alarm Matrix (Page 1 of 1)

Alarm Matrix								
Alarm Status Tag #	Alarm Title / Alarm Number	Date/Time Alarm First Received	Reason for Alarm	Additional Monitoring Required*	Work Request or Procedure Number	OM Initials to Post	Date Tag Removed	OM Initials to Remove

* As determined by the Operations Manager (OM) or designee

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Attachment 8. Control of Equipment and System Status (Cont.) (Page 22 of 24)

Appendix 8-I. Template for Alarm Status Tag (Page 1 of 1)

Date: _____/_____/_____ **Number:**_____

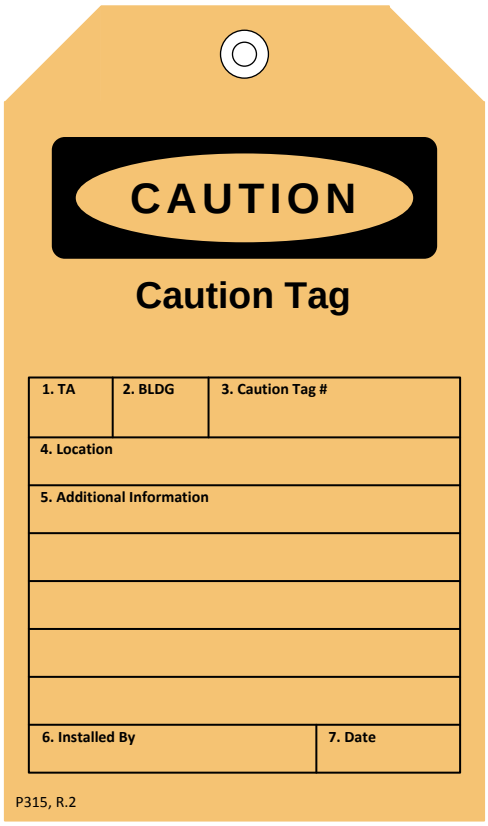
Work Request #:_____

Installer:_____ **ALARM TAG**

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Attachment 8. Control of Equipment and System Status (Cont.) (Page 23 of 24)

Appendix 8-J. Example Caution Tag (Page 1 of 1)





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Attachment 8. Control of Equipment and System Status (Cont.) (Page 24 of 24)

Appendix 8-K. Caution Tag Log Template (Page 1 of 1)

Tag Number	Description / Location	Installed by (Initials)	Date Installed	Removed by (Initials)	Date Removed	Reason for tag

Reviewed by: _____ Date _____

Reviewed by: _____ Date _____

Reviewed by: _____ Date _____

Reviewed by: _____ Date _____

Reviewed by: _____ Date _____

Reviewed by: _____ Date _____

Reviewed by: _____ Date _____

Reviewed by: _____ Date _____

Reviewed by: _____ Date _____

Change Control-4

No: P315 Conduct of Operations Manual
Attachment 9. Lockouts and Tagouts (Page 1 of 1)

9.0 LOCKOUTS AND TAGOUTS

Lockout/tagout provides control of energetic systems for protection of personnel, equipment, and processes.

Lockouts and tagouts are conducted in accordance with P101-3, *Lockout/Tagout for Hazardous Energy Control.*

The log keeping requirements for the lockout/tagout program, including approved electronic systems, are defined in P101-3.

9.1 Training

There is no specific mandatory training or qualification required to implement this attachment. It is recommended that all personnel implementing this document complete UTrain Course #24661, *OS-RTS ConOps, Attachment 9, Lockout/Tagout*. This training will enhance the employee's knowledge as required and as outlined in DOE O 422.1, *Conduct of Operations*.

No: P315 Conduct of Operations Manual
Attachment 10. Independent Verification (Page 1 of 16)

10.0 INDEPENDENT VERIFICATION

The purpose of this attachment is to provide uniform requirements for the Los Alamos National Laboratory (LANL) Independent Verification (IV) program. This program provides the requirements for achieving a high degree of reliability in ensuring correct facility operation and correct positioning of components such as valves, switches, and circuit breakers. IV recognizes the human element of component operation; that is, any individual, no matter how proficient and conscientious, can make a mistake. This concept should be stressed in an IV program so that the individual's confidence in the ability of his/her peers will not cause a relaxation of attentiveness with respect to verification tasks. Personnel should understand the importance of the IV program and address this task with a high level of personal integrity and discipline.

IV is the act of checking an operation, the status of equipment, a calculation, or the position of a component to ensure that it conforms to established criteria by two qualified persons, separated by time and distance, to provide an extra measure of safety and reliability. IV only checks for conformance with the criteria; it does not alter the status of equipment or the position of components (see DOE-STD-1036-93, Chg. 1, *Guide to Good Practices for Independent Verification*).

IV will be performed in those cases where a reasonable potential exists for component mispositioning or the consequence of error is great. The application of the program is dependent upon the safety and operations considerations of each process, system or activity.

Because the possibility of mispositioning may be quite remote, or because the effect of a mispositioning may not be significant to safe and reliable operation, not all components require IV. Therefore, it is important to identify those components that must be independently verified. Systems or components that require IV must be documented by each facility.

Systems or components that are critical to ensuring safe and reliable operation must be identified by the Facility Operations Director (FOD) and must receive IV of their position.

10.1 Components Requiring Independent Verification (IV)

10.1.1 General Guidelines Independent Verification (IV)

The Operations Manager (OM) prepares and maintains a facility-specific list, similar to the one shown in Appendix 10-A, *Sample Operations Manager Independent Verification List*, of systems and components requiring IV. Consider the criteria listed in Sections 10.1.2 and 10.1.3 of this attachment.

10.1.2 Components in Safety-Related Systems

The FOD must designate which components in Safety Basis safety-related systems and other systems that require IV. Where doubt exists, an accepted safety analysis method (e.g., fault-tree analysis, probability risk analysis) and/or expert opinion (e.g., engineering evaluation, Emergency Preparedness) must be used to determine if a component should be included in the list of systems and components.

The need for IV of specific components in safety related systems may be evaluated if any of the following conditions apply:

- Significant radiation exposure would be received by the person(s) performing the IV and alternate means for IV which do not involve radiation exposure (e.g., observing remote position indicators, process parameters, etc.) are available.
- Mispositioning of a component would not affect system performance. For example, if an engineering analysis has shown that mispositioned vent or drain valves do not affect system performance, they may not require IV.
- The mispositioning of a component would be immediately known to an operator. For example, resetting a steam supply trip valve might not require IV if an alarm in the control room were available to alert personnel to an improperly reset valve. However, such alarms should be independent from the valve position lights associated with main control board valve operation switches. Valve position lights alone should not warrant exemption from IV requirements, because these lights may not alert personnel to a mispositioned valve. Mispositionings have occurred when main control board indication was available.

10.1.3 Components in Systems Not Related to Safety

Certain non-safety-related components, if mispositioned, could lead to challenges to safety systems or inadvertent radioactive or toxic material release. The FOD must identify those non-safety-related components and systems that require IV.

In addition, OMs should consider IV for non-safety related components that, if mispositioned, could lead to unplanned shutdowns, component loss or extraordinary cost (e.g., high dollar value, or irreplaceable part/component or rare element of negative consequence to critical mission completion, etc.). The cost of the loss of production may justify the expenditure of the time taken to perform IV versus not performing IV.

10.2 Occasions Requiring Independent Verification (IV)

10.2.1 General Guidelines

Components receive IV when the equipment they serve must be available and a possibility exists that the components may have been mispositioned.

10.2.2 Removing Equipment from Service

Systems/Equipment are removed from service utilizing the appropriate procedure for shutdown of the systems/equipment. If additional system realignment is necessary to support establishment of a lockout/tagout, realign the system utilizing IV, as appropriate. A lockout/tagout, if needed, should be installed.

To ensure that only the specific items of process equipment intended to be removed from service are affected, verifications of equipment isolation should be performed. For example, when isolating a pump, verification that the redundant pump was not inadvertently affected should be performed. This might be accomplished by checking for correct alignment of components on the redundant equipment using the system alignment checklist, or when using a lockout/tagout, checking that all locks have been placed on the correct components.

Following completion of maintenance activities and after the lockout/tagout has been removed, return the systems/equipment to a normal shutdown status in accordance with this attachment.

10.2.3 Returning Equipment to Service Following Maintenance or Testing

Following maintenance or testing activities, realign the systems/equipment to the normal shutdown configuration, using the system alignment checklist and IV, as appropriate.

The OM or designee should select for verification, on a case-by-case basis, additional components inside the isolation boundary that could have been mispositioned during maintenance. Components to be considered are those that have been worked on and should include instrument isolation valves, bypass valves, switches, and system isolation valves located within the work boundary.

Failure to properly restore systems following surveillance testing has resulted in mispositionings. Selected components should be independently verified during or after surveillance tests. Surveillance tests are normally performed in strict adherence to detailed procedures that specifically address each operating component. Components not addressed by the test procedure would not likely be mispositioned as a result of the test, and IV would be necessary only for components that had been positioned during tests.

Systems/Equipment are restored to service utilizing the appropriate procedure(s) for startup and operation of the systems/equipment.

10.2.4 Equipment and System Lineups

During extended shutdowns or when major maintenance is performed, it may be impractical to restore equipment and systems to their normal operating alignment immediately after maintenance is completed. Therefore, most facilities delay restoration of equipment and systems not needed for shutdown activities until shortly before startup. All equipment and systems whose status is questionable are then checked at that time.

When system lineups are performed, IV is performed for those components of the affected system. The system lineups to be performed are documented (i.e., startup prerequisite list, facility schedule, etc.) and approved by the OM.

10.2.5 Periodic Checks During Facility Operation

In order to verify that all associated equipment is fully functional, facilities must, as appropriate, perform routine periodic verifications of certain critical components during normal operations. These checks are normally performed outside the guidance of this attachment, and may or may not involve the use of an IV.

If a mispositioning is discovered during the performance of a periodic check, then the component position would be corrected after review, investigation, and/or approval by the OM and an IV of this action would be expected.

10.3 Verification Techniques

10.3.1 General Verification Techniques

Each facility must ensure that personnel are trained in the appropriate techniques for verifying the positions of all facility components requiring IV. IV techniques (Appendix 10-B) provide an explanation of what individuals should do when verifying the position of the more commonly installed components. Because of the large variety of components in use in the various facilities, it is not feasible to provide position verification instructions for all installed components. Instructions for these components must be provided in facility-specific training or procedures.

Self-checking techniques (Appendix 10-C) provide a list of expectations related to individuals performing actions and independently verifying those actions. These expectations should be clearly understood by all personnel involved in the IV program and included in IV training.

The methods for IV of process system components (which includes generic component listing and method of verification) are defined in Appendix 10-B. The methods in Appendix 10-B should normally be used; however, design differences in components or components not covered by Appendix 10-B should be addressed in facility-specific training.

Each facility, using its most experienced personnel, manufacturers' recommendations, and Appendix 10-B as a basis, develops additional instructions, if required. These instructions will help to ensure that individuals use approved methods when verifying component positions and provide uniform performance of IV.

10.3.2 Valve Position Verification Techniques

Equipment should not be positioned during the performance of the IV. If the potential exists that the component position was changed during the IV, stop and notify the supervisor. It will be necessary to repeat the entire process again to ensure the component is positioned and properly independently verified.

Pay particular attention to the type of valve to be verified. Some of the individual techniques may not be appropriate for a particular type, make, or model of valve due to the physical construction of the valve (Appendix 10-B).

Do not use observation of the relative height of a valve stem as the sole determinant of a valve's position.

Special consideration is necessary during the IV of throttled valves:

- Do not verify throttled valves by closing and reopening the valve a prescribed number of turns because this practice has the potential to create valve mispositionings. Instead, position indicators, scribe marks, or other officially recognized and designated indicators should normally be used to determine throttled valve positions.
- When operation of a throttled valve is necessary to determine its position, the Independent Verifier may base the verification on observing the initial positioning of the valve. Repositioning the valve for IV would effectively nullify the initial positioning, and would therefore serve no purpose.
- Some throttled valves and ventilation dampers in facility systems have been positioned during system flow balance testing and these valves and dampers control vital system

operating parameters. These valves and dampers are not to be manipulated, but may be visually verified to be in the correct position by using facility-specific identification methods (e.g., colored tie wraps, crimped seals, etc.).

Complete the equipment and system lineups for all locked throttled valves and dampers completed by ensuring the component is in its required position and the locking device is properly installed.

10.3.3 Position Indicator Verification Techniques

Direct local position checks, where appropriate and safe to employ, must be used for verification. Some equipment failures have caused valve position indicating lights on control room indicating panels to be incorrect, and some of these failures were undetected for a significant length of time. Since the failure may be in the sensor or transmitter, IV should be performed locally (at the component).

Position indicators are subject to equipment failures that could result in display of the incorrect status of a component. When position indicators are used for IV, personnel use one local (at the component) position indicator and one remote position indicator, if available.

When remote position indicators are tested on a periodic basis in accordance with approved procedures, remote position indicators may be used for IV.

The use of remote position indicators is acceptable for both verifications when surveillance testing proves the remote indicators are accurate. However, if possible, one check should be performed locally at the component to avoid common failure mode problems.

When remote position indication is being used to verify the position of a component, verify control power or motor power to stop erroneous remote position indication due to loss of supply power.

10.3.4 Verification Using Process Parameters

In some situations a component position may be verified by observing process parameters such as pressure, flow, or voltage. The observation of process parameters, combined with a physical check of a component's position, may constitute an IV.

Exercise care when observing process parameters because alternate flow paths or other factors could cause them to be misleading indicators of component position. For example, voltage on a bus would prove that a particular supply breaker was shut only when there was no alternate power supply. Additionally, flow and pressure do not necessarily indicate that a valve is fully open.

For the reasons stated above, process parameters should normally be avoided as a means for IV and must not be used as the only indication of a component's position. Facility procedures must specify where and when process parameters are acceptable as indicators of component position.

10.3.5 Surveillance Testing as a Substitute for Independent Verification (IV)

In some cases surveillance testing may be substituted for normal verification techniques. A notable example would be a full-flow test to prove the correct positioning of flow controlling valves. However, surveillance tests frequently will not serve to verify the position of all components that are important to subsequent system operation. For example, running a pump in recirculation would not prove that all main flow-path valves were properly positioned or that support functions such as external cooling or backup oil pumps are aligned properly.

Do not use surveillance testing as IV unless it can be shown that the test conclusively proves the position of the components in question. The OM approves the applicability of surveillance testing to satisfy IV requirements before performance of the test.

10.3.6 Concurrent Dual Verification

The OM must approve the use of concurrent dual verification (i.e., verification performed at the same time as the original adjustment or reading). Concurrent dual verification will be used sparingly and the parameters of the verification documented in a procedure or Integrated Work Document (IWD). When using concurrent dual verification, independence is maintained to the maximum extent possible. (As an example, for a throttled valve: the operator shuts the valve and the verifier confirms the valve is shut. The operator opens the valve the specified number of turns while the verifier counts silently. The operator and verifier do not influence each other.) Upon completion of the verification of the adjustment or reading, the operator and the verifier communicate and agree that the adjustment or reading is correct.

10.4 Guidelines for Personnel Performing Independent Verification (IV)

- Positioning of system components, unless specifically approved in written procedures, is limited to operators as defined in this attachment.
- There must be no doubt as to the determination of the actual position of a component. Both the positioner and verifier determine the actual position (e.g., open, shut, throttled, test position, or racked out) of the component based upon experience, training, and if needed, vendor information for specific devices encountered. The cognizant system engineer should be consulted any time technical help is needed. Personnel contact management to resolve any uncertainty.
- Conduct IVs in a manner such that each check constitutes an actual identification of the component and determination of both its required and actual positions.
- Unless otherwise specified in this attachment (e.g., throttled valves), individuals performing the initial action and those performing the IVs (verifier) must be physically separated in location and time in order to ensure independence.
- The individual performing the IV normally must not rely upon the observed actions of the individual performing the initial alignment and installation to determine the correct component identification, position, or condition. Verifier independence must be maintained to ensure the integrity of the IV by minimizing interactions between individuals. However, when operation of a throttled valve is necessary to determine its position, the Independent Verifier may base the verification on observing the initial positioning of the valve. Repositioning the valve for IV would effectively nullify the initial positioning, and would therefore serve no purpose.

- Unless otherwise specified in this attachment (e.g., throttled valves), when IV of component/condition is required and special circumstances require the two individuals performing the task to work together (e.g., a high temperature environment requiring the "buddy system"), the act of performing the IV must be completely separate and independent of the initial alignment, installation, or verification.
- If the actual position of a component cannot be verified due to unfamiliarity with the device, then the independent verifier seeks assistance from the OM and/or appropriate manager or supervisor to resolve the uncertainty.
- If a component cannot be located after spending a reasonable amount of time looking for it, then seek help from management. In order to maintain complete independence, the individual looking for the component must not seek assistance from the individual who initially positioned the component.
- Consider the process specifications relating to the required open or closed positions of certain components on all component manipulation. If the act of verifying the position of a component violates the designated position of the component required by the process specifications for the facility operating condition, then positive control of the operability of the component must be maintained at all times during the component manipulation. Review process specification requirements for applicability (e.g., entering a limiting condition of operation) prior to component manipulation.
- If excessive radiation exposures would result, IV may be waived with the approval of the FOD (documented in the OM's operating log). In excessive radiation exposure situations, an alternate means of IV (such as observing process parameters) should be considered. Actual situations should be evaluated on a case-by-case basis by the OM for those components not previously exempted on the system procedure or checklist.
- If the component is not in the required position, then the independent verifier must not initial that step nor reposition the component. The independent verifier stops and notifies the OM of the discrepancy and awaits further instructions from the OM. The OM determines the proper corrective action and documents it on the appropriate procedure or operating log.
- If the independent verifier discovers a lockout on a component, then the independent verifier must not manipulate the component. The position stated on the tag is considered the actual component position, and the lockout number noted on the controlled document and the controlled document is initialed. Further guidance must be obtained from the OM. Additionally, the actual physical position of the component is verified (if possible) without manipulation of the component.
- If the actual position of a component cannot be verified due to component design (solenoid valves, for example) the system engineer or OM should be consulted. Completion of Form 2121, *Request for Alternate Implementation (Formality of Operations)* may be required as defined in P315-2, *Formality of Operations Change Control.*

10.5 Additional Independent Verification (IV) Guidance

IV of technical and administrative processes and programs may be specified. IV may be applied to a variety of processes and documents, including procedures, calculations, implementation of regulatory requirements, and training.

10.6 Training

There is no specific mandatory training or qualification required to implement this attachment. It is recommended that all personnel implementing this document complete UTrain Course #24662, *OS-RTS ConOps, Attachment 10, Independent Verification*. This training will enhance the employee's knowledge as required and as outlined in DOE O 422.1, *Conduct of Operations*.

10.7 Records

The following are considered records generated by this attachment and must be managed in accordance with P1020-1, *Laboratory Records Management*, and any local procedures:

- Operations Manager Independent Verification List

10.8 Acronyms

FOD	Facility Operations Director
ID	Identification
IV	Independent Verification
IWD	Integrated Work Document
LANL	Los Alamos National Laboratory
MCC	Motor Control Center
OM	Operations Manager

10.9 References

- DOE-STD-1036-93, Chg. 1, *Guide to Good Practices for Independent Verification*
- P315-2, *Formality of Operations Change Control*
- DOE O 422.1, *Conduct of Operations*
- P1020-1, *Laboratory Records Management*
- P101-3, *Lockout/Tagout for Hazardous Energy Control*

10.10 Appendices

Appendix 10-A. *Sample Operations Manager Independent Verification List*
Appendix 10-B. *Independent Verification Techniques*
Appendix 10-C. *Self-Checking Techniques*

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Attachment 10. Independent Verification (Cont.) (Page 9 of 16)

Appendix 10-A. Sample Operations Manager Independent Verification List (Page 1 of 1)

Equipment/Systems Requiring Independent Verification (IV)

The following systems/components in the _____ facility require independent verification:

NOTE: Independent verification (IV) for Lockout/Tagout is controlled by P 101-3, *Lockout/Tagout for Hazardous Energy Control*.

- Emergency Diesel Generators & associated breakers
- Instrument Air System
- Glove Box Exhaust System
- Stack radioactive release monitoring system
- Nuclear Incident Monitors
- Fire protection systems
- Emergency Lighting
- Safe Shutdown System

Reviewed: _____
Engineering Manager

Approved: _____
Operations Manager

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Appendix 10-B. Independent Verification Techniques (Page 1 of 6)

Independent verification techniques for typical components are described in the following sections:

- Valves, Manual Unlocked ---- 1.0
- Valves, Manual Locked ---- 2.0
- Valves, Manual Throttled ---- 3.0
- Valves, Motor Operated ---- 4.0
- Valves, Air Operated ---- 5.0
- Summary of verification techniques to determine valve position ---- 6.0
- Blank Flanges/Spectacle Flanges/Spool Pieces ---- 7.0
- Circuit Breakers (480V or less only) ---- 8.0
- Circuit Breakers 4160V ---- 9.0
- Direct Current Circuit Breakers ---- 10.0
- Fuse Installation ---- 11.0
- Lead Termination ---- 12.0
- Fuse Removal ---- 13.0
- Lifting Leads ---- 14.0

1.0 Valves, Manually Operated (Unlocked)

1.1 To verify open, manipulate in the closed direction only as necessary to remove any slack from the operating mechanism and verify valve stem movement. Return valve to original position subject to the normal precautions on back-seating valves.

1.2 To verify closed, manipulate in the closed direction only as necessary to verify the valve is fully closed, and not just binding or difficult to operate. Care should be exercised to avoid over torquing the valve operator and damaging the valve seat. Certain valves can “stick” when fully opened, giving the appearance of being closed when they are actually fully open. The Facility should provide operators with appropriate information (procedures, Standing Orders, training, operator aids, etc.) regarding these unique circumstances.

2.0 Valves, Manually Operated (Administrative Lock Program)

Note: Steps 2.1 through 2.3 apply to those valves which are locked for administrative control and not for those locked for Hazardous Energy Control in accordance with P101-3, *Lockout/Tagout for Hazardous Energy Control*.

2.1 The independent verifier verifies that the component Identification (ID) and name are the same as specified on the equipment, then independently verifies the component position and installs the lock.

2.2 Ensure that the locking device is mounted securely to prevent the movement of the valve and that the padlock is in a locked position.

2.3 Undue slack in the locking device that permits excessive movement must be immediately reported to the Operations Manager.

3.0 Valves, Manually Operated (Throttled)

3.1 The initial position of a throttled valve normally is determined by observing position indicator's scribe marks or other officially recognized and designated indicators. Then secure the valve in position in accordance with the approved facility-specific method. The independent verifier observes the positioning of the valve and the installation of device used to secure the valve in position. No valve movement must be attempted by the independent verifier.

3.2 Verify throttled valves as being throttled by verifying that the facility-specific device used to secure the valve in position is intact.

3.3 When operation of a throttled valve is necessary to determine its position, the independent verifier may base the verification on observing the initial positioning of the valve. Having both persons independently open and close the valve would nullify the initial positioning.

4.0 Valves, Motor Operated

Valve position verified by one of the following:

1) Local Position Indication

- by a dial indicator driven off a gear in the valve stem assembly (butterfly valves)
- observation of stem position (on certain valves, but not as sole means)

2) Verification of Motor Operated Valve Position (Summary)

- by remote indication lights open or closed, both lights illuminated indicate an intermediate position
- by local dial indicator

5.0 Valves, Air Operated

Verification is achieved by one of the following:

1) Position Indication (Remote)

– indicator lights, open, closed

2) Position Verification (Local)

– mechanical position indicator on the valve stem, open or closed

6.0 Summary of Verification Techniques to determine valve position.

Verification techniques fall into two broad categories. These are direct verification or indirect verification.

1) Direct Verification includes:

- manipulating the valve in the closed direction only to verify both closed and open position
- observation of the valve stem to aid in the determination of valve position
- observation of mechanical position indicator activated by valve stem travel

2) Indirect Verification includes:

- observation of remote position indicators (lights)
- use of process parameters
- observation of a mechanical position indicator actuated by gears off a motor driver (e.g., Limit Torque)

7.0 Blank Flanges/Spectacle Flanges/Spool Pieces

Verification is achieved by observing that the required fixture, as described below, is properly installed:

1) The placement of Blank Flange in a line to ensure positive isolation is acceptable

2) Spectacle Flange is a double flange, blank at one end and the other with an opening equal to the pipeline diameter. Verification must be made that flange is properly positioned.

3) A Spool Piece is a section of piping with flanges at both ends.

- It may be installed to permit temporary operation of a system.
- It is verified by checking that it is properly bolted in place.

8.0 Circuit Breakers (480V or less only)

(Load Center Circuit Breakers - Draw-out type air magnetic)

Verification is achieved by observing one or more of the following:

1) open or closed as shown by indicating lights on panel

2) open or closed as shown by indicator on breaker itself

3) racked out to test or disconnect position

4) racked in,

5) completely removed from cubicle

6) locking device properly installed on locking hasp (locks breaker open).

9.0 4160V Circuit Breakers

Verification may be achieved by observing one or more of the following:

1) Local Indication

- open or closed as shown by indicating light(s) on panel
- open or closed as shown by indicator on breaker itself.

2) Inside Cabinet for "Racked In" (off floor)

- breaker fully inserted
- control power available

3) Inside Cabinet for "Racked Out" (on the floor)

- breaker fully withdrawn
- control power off

4) Inside Cabinet for "Racked Out" (Test Position)

- breaker racked to test

10.0 DC Circuit Breakers

(This is generally a switch on the front of a breaker cubicle)

Verification may include determining:

1) switch position ON, OFF

2) locking device is properly installed

11.0 Fuse Installation

The verifier ensures that the fuse is installed in the proper location by verifying it is installed in the correct:

- Facility (some facilities have two steam facilities for example)

- Building
- Fuse Enclosure: Motor Control Center (MCC), Load Center, Panel, etc.
- Fuse Holder
- Correct rating for application as defined by facility drawings (e.g., schematics, electrical, etc.)

12.0 Lead Termination

The verifier ensures that the Lifted Lead which was terminated, was terminated in the proper location by verifying it is installed in the correct

- Facility
- Building
- Terminal Block Enclosure: MCC, Load Center, panel, etc.
- Terminal Block Number
- Terminal
- Lead Number(s)

13.0 Fuse Removal

To verify that the correct fuse has been removed, the verifiers ensure the fuse location agrees with the required:

- Facility
- Building
- Fuse Enclosure: MCC, Load Center, Panel, etc.
- Fuse Holder

Ensure the fuse removed is properly identified and stored.

14.0 Lifting Leads

To verify that the Lifted Lead is the correct one, the verifiers ensure the lead location agrees with the required:

- Facility
- Building
- Lead Enclosure: MCC, Load Center, Panel, etc.
- Lead Number

Determine that the Lifted Lead is the correct one by matching the required Lead number to the actual Lifted Lead.

Ensure that the Lifted Lead is properly identified and taped.

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Appendix 10-C. Self-Checking Techniques (Page 1 of 1)

The following self-checking techniques should be practiced to ensure an ingrained work ethic where individuals positively identify the correct unit, train, and/or component, and review the intended action and expected response before performing a task:

- Stop - Read the procedure carefully. Understand all steps from start to finish before proceeding. Take time to pause and consider the intended action.
- Locate - Identify the correct component/train/unit by visual, audible, and tactile senses.
- Sense - Touch, or in the case of energized electrical wires or circuits, observe the component/train/unit, but do not operate.
- Verify - Reconfirm the component's identity.
- Anticipate - Consider the expected results from the actions about to be taken (e.g., indications, alarms, noise, heat, vibration, etc.). Consider what actions to take if the expected responses are not received.
- Perform – Manipulate the component in question (e.g., lift the electrical wire, place the jumper, cycle the valve, etc.) and place in the desired position.
- Observe - Ensure that the action taken has resulted in the expected response. Be ready to react to unexpected results.

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Attachment 11.Log Keeping (Page 1 of 5)

11.0 LOG KEEPING

This attachment provides the requirements for establishing and maintaining operating logs for all key operations positions in order to fully record the data necessary to provide an accurate history of facility operations. As used in this context, logs are defined as a narrative sequence of events or functions performed by a specific shift position, as opposed to operator round sheets.

11.1 General

The requirements of this attachment provide guidance for properly and consistently documenting the sequence of events or functions performed at a specific key position using an operating log. Operating logs provide a system for ensuring that pertinent information is passed from one shift to the next, allows the history of a key position to be reviewed to aid in event reconstruction, and supports trending analysis.

Logs may be in the form of conventional paper logs or an electronic equivalent. Electronic logs must incorporate the same change and annotation requirements of a paper log.

Operating logs must be maintained by all key positions (including positions which are manned on a part time basis) to ensure that pertinent information is passed from operator to operator. The narrative section of the round sheet(s) may serve as the operating log.

On-coming operators review and become familiar with operating log entries made during the previous 48 hours or since their last shift, whichever is less. Operating logs must be maintained available to support operator review.

The Operations Manager (OM) defines key positions within the facility.

The operating log entries should be made in such a manner that they provide sufficient detail to be understood by personnel who were not present during the shift. Entries should adequately describe the situation or event, its significance and cause, and any corrective or follow-up actions taken or required.

Entries must contain only facts and pertinent data. Speculation, conjecture, opinion, and unrelated information are not acceptable. When complete facts are not known, entries are required to indicate whether or not the event is being investigated.

Narrative entries made in all operating logs must be easily read and understood, and be reproducible with a standard photocopy machine.

When using paper logs, make all entries using indelible black or blue ink.

Avoid excessive use of acronyms.

Do not keep a separate "rough" log.

Logs are not to be rewritten to make late entries appear timely.

11.2 Operating Log Control

Clearly identify (titled) logs using the key position's title that shows who will make entries in it (e.g., Radioactive Liquid Waste [RLW] Control Room Operators Log).

Sequentially number all log pages.

Identify the beginning and ending dates (the ending date must be entered when the log is filled) of logs.

At the end of each shift, the person assigned to the key position associated with the operating log reviews logs for completeness, accuracy, legibility, and authenticity in accordance with Section 11.3 of this attachment.

11.3 Operating Log Entry Control

Each oncoming shift should start their entries on a new unmarked page. For facilities which make few log entries per shift and for the narrative section of Round Sheets, it is permissible to continue the entries on the same page, providing a clear distinction is made between shifts.

Entries made during the shift must be consecutive and chronological with the time entered in the left margin and no lines left blank.

Promptly record information regarding activities or events for each key position throughout the shift in order to ensure the accuracy of the entry, as delaying the recording of activities or events often leads to incomplete or inaccurate entries.

Only assigned watchstanders (i.e., qualified operations personnel assigned to the position for a given shift) for key positions, personnel in training and under the direct supervision of the assigned watchstander are authorized to make entries in operating logs for that position. (Exception: Others may be designated to record information in emergency/casualty situations.)

Anyone requesting a log entry may do so with the approval of the assigned watchstander. Such entries are signed by the person making the entry. The assigned watchstander also signs beneath the entry to signify permission was granted to make the entry but not necessarily agreement with the entry.

Corrections: When a correction to an existing entry is required, draw a single line through the incorrect entry. Do not use correction fluid, do not erase information, and do not scribble out or otherwise mask the incorrect entry. Enter the correct information, the date the change is made, and the initials of the person making the correction. Make all corrected entries as near as possible to the lined-out entry.

Late Entries: If an entry is to be made that is not in chronological sequence, enter the time the late entry is made followed by "Late Entry." Write the entry narrative to include the time the entry described occurred. The person making the entry places his/her initials at the end of the late entry.

- Example: 1621 Late Entry - The #2 tunnel sump overflowed at 1538. - (ABC)

11.4 Information To Be Recorded

Each facility provides guidance to its operating personnel, who will define the type and scope of information unique to each key position's operating log. This may be described in standing orders.

Personnel making entries in operating logs need to fully document all data necessary to provide an accurate shift history. All entries must include the time the event or statement is entered. This is to aid in event reconstruction when necessary.

To prevent confusion between day and night shifts, use 24-hour time (e.g., 0823 for 8:23 a.m., and 1956 for 7:56 p.m., etc.).

The last entry by the off-going shift consists of the time and date followed by "Relieved by (printed name)" followed by the off-going operator's/supervisor's signature. If facility operations are not continuous, the "Relieved by" statement is not required. However, a statement in the log "Process shut down for this position" (or similar appropriate statement, such as "Position duties secured") plus the time, date, and signature is entered in the operating log. When the process is restarted or the shift is resumed for this key position, normal log keeping as described in this attachment is resumed.

The first entry by the oncoming shift personnel will be the time and date, followed by "Assumed position duties" (or similar statement), followed by his/her signature.

Any unused portion of a page, such as after the last entry by the off-going shift, must have a diagonal line drawn across the page after the last signature with the words "NO FURTHER ENTRIES THIS PAGE" written on the line.

Entries in operating logs should also include specific qualifying information. For example, when recording temperatures, specify Fahrenheit (°F) or Celsius (C).

The following types of information must be included in operating logs:

- Facility mode or condition changes.
- Criticalities and criticality information.
- Abnormal facility configurations.
- Status changes to safety related and other major facility equipment.
- Occurrence of any reportable events.
- Initiation and completion of surveillance tests.
- Shift reliefs.
- Entering and exiting operational limit actions.
- Out-of-specification chemistry or process results.
- Emergencies, abnormal or unexpected events and operating conditions that occur during each shift must be fully documented. Entries will include as much significant information as possible. However, log keeping will not take precedence over controlling and monitoring the facility. When conditions permit, make a late entry to update the log. Examples of the type of information that is recorded include actions taken to correct the conditions, and any notifications to supervision and/or other organizations.
- Security incidents and personnel accidents or injuries.

The following are examples of other types of information that should be included in operating logs:

- Changes in the status of major processes in each area during the shift, including abnormal or unusual system lineups or operating parameters, and the startup or completion of operations/jobs.
- Changes in the status of the area, process, or monitoring/detection equipment (e.g., radiation detection equipment, constant air monitor, hydrogen monitors, heating and ventilation systems, etc.).
- Alarms activated, locked out, bypassed, or off normal settings (if not separately recorded in other logs; e.g., alarm status logs). Unusual variations or fluctuations, malfunctions, suspect readings, and repaired/replaced equipment should also be recorded.
- Major equipment or system problems encountered during the shift, along with action taken to report or correct the problem and any results of those actions. This could include out-of-specification chemistry results, problems with evaporators, pumps, generators, motors, etc., and outages or restrictions on power, steam, chemical, air, or water system.
- Progress of work efforts within facility areas. The OM may specify the scope of work efforts to be recorded. This includes documenting any new, completed, or scheduled work for Maintenance, Construction, Quality Assurance, etc. Also provide information on testing activities (e.g., functional testing of particular system or equipment, emergency tests, routine production tests, test performed in accordance with a Test Authorization, etc.) that are started, ongoing or completed.
- Special procedures that are required to support operations during the shift.
- Significant changes in radiological conditions/levels are recorded in operating logs. Entries must include the areas, system, or equipment affected, the results of any surveys, and any actions taken or underway to decontaminate or barricade the affected areas.
- Drills, exercises, tours or other events that could impact normal facility operations or could involve, directly or indirectly, facility operations personnel.

11.5 Document Relief During the Shift

Document relief for lunch, breaks, meetings, etc. occurring during a shift. Any time operators/supervisors are relieved of responsibility for a key shift position, the time of relief is recorded in the operating log followed by "Relieved by (printed name)" followed by the signature of the operator/supervisor that has been relieved.

The relieving operator/supervisor's first entry is the time, followed by "Assumed position duties" (or similar statement), followed by his/her signature.

Likewise, when the relieving operator/supervisor returns responsibility for a key position to the primary operators/supervisors, the same information is recorded.

11.6 Operating Logbook Reviews

The OM reviews the log of the senior individual on shift (e.g., OM, senior control area operator, or other applicable operating log), daily (except weekends, holidays, and other absences when the review is completed on the next work day). This review is documented by initialing and dating the log.

Logs kept by operators/supervisors are reviewed at least once each shift by the next level of supervision. Support personnel (designated as key positions per facility management) logs are reviewed routinely as designated by facility management. These reviews should ensure that entries are accurate and adequate, and that no adverse trends are developing. All reviews are documented by initialing in the log margin nearest the last entry reviewed.

For positions staffed on a part-time basis, relief operators, or personnel newly staffing a position, the review of the position log is as directed by the OM.

Logs kept by operators outside the control area should be reviewed by the appropriate supervision responsible for the area to ensure entries are accurate and adequate.

11.7 Training

There is no specific mandatory training or qualification required to implement this attachment. It is recommended that all personnel implementing this document complete UTrain Course #24663, *OS-RTS ConOps, Attachment 11, Log Keeping*. This training will enhance the employee's knowledge as required and as outlined in DOE O 422.1, *Conduct of Operations*.

11.8 Records

The following are considered records generated by this attachment and must be managed in accordance with P1020-1, *Laboratory Records Management*, and any local procedures:

- Operations Logs

11.9 Acronyms

C	Celsius
F	Fahrenheit
OM	Operations Manager
RLW	Radioactive Liquid Waste

11.10 References

- DOE O 422.1, *Conduct of Operations*
- P1020-1, *Laboratory Records Management*

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Attachment 12. Operations Turnover (Page 1 of 14)

12.0 OPERATIONS TURNOVER

12.1 Shift Turnover

The Los Alamos National Laboratory (LANL or the Laboratory) shift turnover process is established to ensure that relief personnel are provided the knowledge required to accomplish their shift assignment responsibilities. This attachment describes the controls necessary for conducting an orderly and accurate transfer of information regarding the facility's overall status at shift turnover.

Shift turnover is a critical period during which it is essential that the oncoming shift or relief personnel are provided with a complete and accurate transfer of information regarding the facility's overall status.

The requirements in this attachment have been generated to provide shift personnel with a standard format for documenting shift turnovers using the Facility Turnover Checklist Template (Appendix 12-A). Facility-level implementation may be an electronic- or paper-based system.

12.1.1 Shift Turnover Responsibilities

Test information must be a part of the shift turnover whenever testing is in progress.

Individual operator turnovers should take place at their normal shift station.

All turnovers are conducted in a professional manner.

Only qualified personnel assume responsibilities for shift turnover/relief.

Personnel should not assume operational duties unless they are physically and mentally fit to do so and until they and the off-going personnel have a high degree of confidence that an appropriate information transfer has taken place.

During the turnover period, the off-going shift must remain responsible for the assigned area.

The facility allots an appropriate amount of time (normally 30 minutes) dependent upon the shift position, to allow for document review, the walk down of control boards, and to discuss important items specified on the turnover checklist.

The oncoming shift personnel must report to their respective supervisors/managers when they have assumed the responsibility for the shift, or report if there is a problem in turnover.

In the event of abnormal operating conditions at turnover, the off-going shift must retain responsibility until the facility can be placed in a stable, safe status. At such time that facility conditions are stable, the off-going supervision or operator explains all items noted on the turnover checklist, and the on-coming supervision or operator asks any pertinent questions.

When critical work is in progress, turnover must generally occur at the work location. This applies to operators and support personnel alike. This requirement does not apply when conditions such As Low As Reasonably Achievable (ALARA) principles preclude turnover at the work location.

12.1.2 Document Review

Before shift turnover, the off-going shift reviews those process activities and documents specified in the off-going shift section of the turnover checklist, and enters their initials/signatures in the spaces provided to indicate completion.

Before assuming responsibility for their shift position, the on-coming shift reviews all process activities and documents specified on the on-coming shift section of the turnover checklist, and enters their signature in the space provided, acknowledging that they have read and understand. The review is as intensive as necessary for on-coming personnel to understand important history, present status, and planned events.

On-coming shifts review and become familiar with operating log entries made during the previous 48 hours or since their last shift, whichever is less.

Each Operations Manager (OM) checklist includes a documented review of the applicable status documents for that position (e.g., operating logs, system status logs, lockout logs, etc.).

Note: The purpose of the operating log review is to ensure that the operators and managers are aware of current facility conditions and changes that have occurred since their last shift.

12.1.3 Walkdowns

Note: The purpose of a walkdown is to determine a facility's current status through observation of the system control indicators (e.g., Distributive Control System, status board, alarm panels), and to verify that equipment is tagged/locked as indicated by the appropriate logbooks.

Control area walkdowns must be made by on-coming personnel accompanied by off-going personnel to allow for discussion and exchange of information.

Manager walkdowns of the facility must be made before, during, or shortly after shift turnover.

On-coming OMs/Supervisors must perform a walkdown of the control area.

Operators responsible for support systems conduct a walkdown of all equipment in their area of responsibility shortly after their shift begins and report any abnormalities to their manager immediately.

Walkdowns of appropriate control panels must be conducted by each oncoming operator.

12.1.4 Discussion and Exchange of Information

Note: Sufficient time must be allotted at turnover to allow the off-going shift to discuss and explain any important items that affect facility operations and safety with the on-coming shift/relief personnel.

On-coming and off-going shift personnel conduct a discussion, which includes, but is not limited to, the following items:

- safety equipment/critical equipment status
- status of individual systems
- equipment in operation at turnover

- inoperable or tagged equipment, including instrumentation and alarms
- surveillance or equipment work in-progress at turnover
- reportable events
- special procedures or temporary procedure changes generated during the shift

On-coming personnel ask questions at this time to satisfy the need for a complete understanding of their responsibilities.

Note: The off-going operator is relieved only when the on-coming personnel verbally accept responsibility of the shift position and in writing as documented in the appropriate operating log.

When both the on-coming and off-going shifts are satisfied that the oncoming personnel are aware of facility conditions, the on-coming personnel verbally states that they are assuming responsibility for the shift position. An entry to that effect must be made in the appropriate log.

During facility testing, the off-going worker reports his/her relief and the status of current testing to the OM.

12.1.5 Shift Turnover Checklist Use

Note: Requirements for Supervisors and Key Positions in non-continuous operations are addressed in Section 12.1.7 of this attachment.

Each facility develops and maintains turnover checklists that are specific to the control areas and work stations that have been identified by the Responsible Line Manager (RLM) or Facility Operations Director (FOD) as requiring operations turnover formality.

As a minimum, supervisory and key positions designated by the RLM or FOD, as applicable, must have a turnover checklist to be used in the turnover process.

A facility-specific turnover checklist is present and in use during the turnover period.

All entries documented on shift turnover checklists are made using permanent black or blue ink. In those cases where no information is needed, then the spaces are marked "None." In most cases, sections should not be left blank.

When a correction is to be made to an existing entry, it must be made as follows:

- Draw a single line through the incorrect entry.
- Enter the correct information.
- Enter the date the change is made.
- Enter the initials of the person making the correction.
- Make all new entries as near as possible to the lined-out entry. Do not use correction fluid or highlighters, do not erase information, and do not scribble out or otherwise mask the incorrect entry.

When completed, shift turnover checklist are reviewed for completeness, accuracy and legibility, and authenticated (signed and dated) by the person that completes it.

The information used for shift turnover checklists consists of the following (as applicable):

- off-going shift review responsibilities checklist
- critical equipment status
- process status
- controlled key status
- work in-progress/scheduled/and completed
- special procedure/temporary procedure status
- new/continuing abnormal operating conditions
- changes in radiological conditions or Radiological Control Technician (RCT) and Industrial Hygiene (IH) activities
- on-coming shift review responsibilities checklist
- safety and environmental problems
- operational limits in effect
- required chemistry or process sample times
- changes in radiological or hazardous material conditions

12.1.6 Reliefs Occurring During the Shift

Reliefs occurring during the shift as a result of meetings, lunch breaks, etc., must have a turnover that ensures the on-coming person is at least as knowledgeable of the facility conditions as he would have been had the complete shift turnover process been conducted.

Document and log reviews, control board walkdowns, and discussion may or may not be necessary depending upon the on-coming person's familiarity with the current facility conditions. It is the responsibility of both the person being relieved and the on-coming relief person to determine the amount of turnover necessary for relief.

Document reliefs occurring during the shift in the applicable operating log.

12.1.7 Non-continuous Operations

The Turnover Checklist and Shift Turnover requirements may be revised for non-continuous operations.

As a minimum, the FOD should specify the Shift Turnover requirements for all key positions that are not continuously operated.

Consideration should be given to the following when tailoring these requirements

- new or emergent conditions
- long delays (weekends, vacations, etc.) between manning of the positions
- the number of personnel who operate the equipment
- unique conditions involving facility operations

12.2 Shift Briefings

This attachment outlines the basic process and defines the responsibilities for performing shift briefings.

A detailed shift briefing is essential to ensure that the operating organization fully understands the status of the facility, which activities are in progress, and which activities are to start during the shift. Successful operating organizations routinely conduct structured, well organized shift briefings. This also includes organizations that do not have routine, around-the-clock shift work.

Good shift briefings are dependent on a variety of details such as

- required attendees for the briefing, as defined by the FOD or RLM
- amount and detail of information provided at the briefing
- how the information is collected and by whom
- the formality and consistency of the briefing
- management support

For those organizations that are not on rotating shift work, the shift briefing and Plan of the Day (POD) meeting may be one and the same. In any event, the requirements of this attachment will be followed to the extent that they apply.

12.2.1 The Plan of the Day (POD)

The POD is used to schedule, authorize, and control activities in the facility. It is an important forum for resolving conflicts in scheduling work, and providing for discussion about planned activities in order to understand and resolve interfaces, interferences, and impacts of concurrent/sequential work activities. Participants typically include representatives of organizations needing to coordinate activates and resources, for example, facility operations, support groups such as Radiation Protection, and programs that interact with facility systems or rely on their availability. Personnel requesting non-routinely conducted activities to be placed on the POD schedule should attend the POD meeting to provide information about the activities.

Each facility should plan and schedule work activities with about a 3-month horizon, refine the planning about a week in advance, and translate detail into the POD schedule. The POD schedule lists operations, maintenance, tests, surveillances, Decontamination and Decommissioning (D&D) and other activities authorized by the FOD. In order to maximize effectiveness of the POD for accurate planning, items should not be scheduled on the POD schedule until they are ready to be performed. The POD meeting should be held each workday unless scheduled less frequently by the FOD, or held at the frequency specified in the facility Authorization Basis (AB). The FOD or designee approves the POD schedule. Specific requirements are as follows:

- The POD must cover all periods of operation in the facilities and areas it serves.
- The POD must cover at least a 24-hour period in detail, and should provide for a 7-day period for planning. A POD and a Plan of the Week may be used to satisfy this, or a POD covering seven days may be used.
- The POD schedule should indicate which items require a Pre-Job Brief (PJB).

POD meetings are conducted to schedule and coordinate activities for the next day, or for some other period if held less frequently than daily, and to discuss upcoming work for about seven days. The meeting agenda should include the following items as applicable:

- Discussion by the manager conducting the POD meeting of facility status (facility availability for work, suspensions affecting work, major activities ongoing, etc.).
- Discussion of the non-routinely conducted items scheduled on the POD.
- Discussion of planned and/or potential interfaces, interferences, and impacts of concurrent sequential work activities, focusing on understanding and de-conflicting concurrent sequential activities in the same or nearby work areas, concurrent/sequential activities on a particular system, etc.
- Discussion of need for security escorts, or escorts for training.
- Discussion by attendees on items within their area of responsibility as necessary to achieve coordination and improved productivity.
- Discussion of upcoming activities which will impact scheduling of work, and resolution of potential conflicts.

The OM must approve additions and other changes to the POD and maintain the master copy of the POD schedule. The OM must be notified if scheduled POD activities cannot be conducted, and the OM should notify functional managers to shift personnel to other assignments if appropriate.

12.2.2 Pre- Job Briefs (PJBs)

PJBs must be conducted in accordance with Section 3.2.3, *Part 3 – Validation and Work Release Information*, of P300, *Integrated Work Management*, using Form 2103, *Integrated Work Document (IWD) Part 3, Validation and Work Release*. The RLM or designee must, at a minimum, discuss the issues listed on the form and have all workers sign to acknowledge that they have been briefed, allowed to ask questions, and that any questions asked were answered to their satisfaction.

12.2.3 Attendance

It is extremely important that the shift briefing be attended by the appropriate representatives; each work station and support group should be represented.

The OM should be present to "conduct" the briefing. The briefing may be conducted after the OM has accepted responsibility for the shift.

Representatives from each of the support organizations will also attend the briefing. The following organizations should be represented (as applicable):

- Maintenance
- LANS craft personnel
- Security
- RCT/IH
- Quality Assurance/Quality Control (QA/QC)

- Startup
- Technical Support (system engineers, Subject Matter Experts [SMEs], etc.)
- Work Control
- Other organizations or support groups necessary to support shift activities

The shift briefing is an important part of the facility status communications program. As such, it should be routinely attended and participated in by senior managers from both the operations and support organizations, up to and including OMs.

Senior management (FODs, as well as support organization department-level managers) should attend periodically (e.g., three to five times per month).

12.2.4 Information to Be Presented

The amount and detail of information provided at the shift briefing is critical to the success of the briefing.

Prior to the shift briefing, operations and members of each support organization should meet their "off-going" counterparts to get a detailed briefing of the status of activities in accordance with Section 12.1.

For operations, the briefing should be conducted using turnover checklists.

Support groups also should use turnover checklists for consistency. The minimum information required should include:

- status of any ongoing activities
- new activities to be started
- need for operator support during the shift
- ability or inability to support planned shift activities
- any other information of interest to the operators or other support groups

12.2.5 Conducting the Shift Briefing

Normally, the shift briefing should be conducted in three phases, as described below. It is important that operators and support organizations attend all three phases. Other interested personnel and senior managers should attend the third phase of the meeting, as a minimum.

Phase 1

Each operator (or work station) should provide a complete status report. This status briefing should be of sufficient detail that every other operator and support group understands the impact of ongoing and anticipated activities, and what they must do to support them. Any deficiencies or out-of-service equipment which requires timely corrective action will be identified to the appropriate organization. Any safety or environmental issues should also be identified at this time.

Phase 2

Each support organization should provide the status of activities for which they are responsible. Sufficient detail should be provided to ensure each operator and affected support organization clearly understands the impact of the work and any support requirements. Lengthy briefings such as startup "pre-test" briefings, which may only affect selected operators or organizations, should not be given at this time. Rather, a brief description of the test and its anticipated support requirements and impact to other activities should be given. Detailed "pre-test" or other briefings should be given just prior to the start of the activity and should only include those operators and organizations affected by the activity.

Each support organization should pay close attention to the information presented to ensure they understand what is expected with regard to their own organization involvement and support of the proposed shift activities.

Phase 3

The OM (or senior operation representative on shift) should conclude the briefing by setting the goals and priorities for the shift. They should be based on all the information provided in Phases 1 and 2 of the briefing and the current shift schedule.

The OM should call upon affected support organizations to make sure they understand and are capable of supporting the shift priorities and goals.

Inconsistencies or support difficulties should be identified and resolved at this time.

At the conclusion of the briefing, the OM should provide any new training or "lessons learned" of immediate concern to the operators. Related Conduct of Operations principles should be included in this discussion, as applicable. The discussion material is provided by the OM as part of ongoing shift training. Relevant safety-related messages should also be provided at this time.

12.3 Training

There is no specific mandatory training or qualification required to implement this attachment. It is recommended that all personnel implementing this document complete UTrain Course #24664, *OS-RTS ConOps, Attachment 12, Operations Turnover*. This training will enhance the employee's knowledge as required and as outlined in DOE O 422.1, *Conduct of Operations*.

12.4 Records

The following is considered a record generated by this attachment and must be managed in accordance with P1020-1, *Laboratory Records Management*, and any local procedures:

- Facility Turnover Checklist

12.5 Acronyms

AB	Authorization Basis
ALARA	As Low As Reasonably Achievable
CAM	Continuous Air Monitor
D&D	Decontamination and Decommissioning

FOD	Facility Operations Director
IH	Industrial Hygiene
LANL	Los Alamos National Laboratory
LCO	Limiting Condition for Operations
OM	Operations Manager
PJB	Pre-Job Brief
POD	Plan of the Day
QA/QC	Quality Assurance/Quality Control
RCT	Radiological Control Technician
RLM	Responsible Line Manager
SME	Subject Matter Expert

12.6 References

- P300, *Integrated Work Management*
- DOE O 422.1, *Conduct of Operations*
- P1020-1, *Laboratory Records Management*

12.7 Appendix

Appendix 12-A. *Template for Facility Turnover Checklist*

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Attachment 12. Operations Turnover (Cont.) (Page 10 of 14)

Appendix 12-A. Template for Facility Turnover Checklist (Page 1 of 5)

FACILITY TURNOVER CHECKLIST Page 1 of 2				
SHIFT:	0630-1900	OR (circle one)	1830-0700	DATE : (at start of shift)
Sections 1-8 are to be completed by the off-going personnel just prior to turnover. :				
SECTION #1 -- REVIEWS				
INITIALS A. Facility Lockout Logbook _____ B. Lockouts installed/removed during the past shift _____ C. Shift / Standing Orders _____ D. Control Room Status Boards and Alarm Summary _____ Other : _____				
SECTION #2 -- SAFETY/ENVIRONMENT/IMPORTANT CONCERNS FOR FOLLOW-UP				
SECTION #3 -- FACILITY CRITICAL EQUIPMENT STATUS				
(ON = Online	STBY = Standby	Ready to Operate	OOS = Out of Service)	
REMARKS				
A. Supply Fans :	1	2		
B. Exhaust Fans :	1	2	3	
C. Stripper (P1) :				
D. Stripper (P2) :				
E. Stripper (SS) :				
F. Stripper (Purge) :				
G. DCS :				
H. Fire Alarms Bypassed :				
In Process Status:				
Other				
SECTION #4 -- WORK/TESTING COMPLETED (List all major tests, maintenance work, etc., completed during the shift)				

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Attachment 12. Operations Turnover (Cont.) (Page 11 of 14)

Appendix 12-A. Template for Facility Turnover Checklist (Cont.) (Page 2 of 5)

FACILITY TURNOVER CHECKLIST

Page 2 of 2

SECTION #5 -- WORK/TESTING IN PROGRESS or DUE TO START
(List all work to be turned over to the on-coming shift)

SECTION #6 -- ISSUE MANAGEMENT REPORTS GENERATED

SECTION #7 -- NEW OR CONTINUING ABNORMAL OPERATING CONDITIONS

SECTION #8 -- CHANGES IN RADIOLOGICAL CONDITIONS or IH/IS ISSUES

SECTION #9 -- ON-COMING Manager/Designee DOCUMENT REVIEW
(To be completed by the on-coming Manager/Designee prior to assuming the shift)

A. Turnover Checklist & Operating Log
B. Lockouts installed/removed during the past shift
C. Shift / Standing Orders
D. Control Room Status Boards and Alarm Summary
Other :

Manager/Designee _____ Z# DATE :_ _____

SECTION #10 -- FORMAL SHIFT TURNOVER OF ALL RESPONSIBILITIES

OFF-GOING SHIFT (same person as section #1-8): I have fully turned over my responsibilities to the on-coming shift. I have completed all documentation and the process is in satisfactory condition (or as noted within this checklist) for turnover.

SIGNATURE : _____ Z# _____ DATE : _____

ON-COMING SHIFT (same person as section #9): By signoff below I acknowledge the completion of all turnover review items and properly assume full responsibility for control of the shift facility.

SIGNATURE : _____ Z# _____ DATE : _____

APPROVAL :
Operations Manager : _____ Z# _____ DATE : _____

Appendix 12-A. Template for Facility Turnover Checklist (Cont.) (Page 3 of 5)

Instructions for Using Example Turnover Checklist

Note: The Checklist may be modified to reflect facility-specific attributes.

Section #1—Reviews

Off-going shift personnel sign the checklist after a review of the entire completed checklist and any other applicable documents listed.

- Review of lockouts installed/removed during the past shift.
- Review of Shift and Standing Orders.
- Review of Control Room Status Boards and Alarm Summary.

Examples of document types necessary to obtain relevant shift turnover checklist information include, but are not limited to

- operating logs
- lock/tag logs (out of service, locked out, etc.)
- equipment logs (out of service, locked out, and Limiting Condition for Operations [LCO] Logs, etc.)
- temporary modification logs
- interlock/bypass logs
- run books (control area, process equipment, diesel/engines, etc.)
- building service equipment logs
- nonconformance reports
- shift and standing orders
- required reading

Provide a space for off-going personnel to enter their initials that they have reviewed each item prior to completion of the turnover checklist.

Section #2—Safety/Environment/Important Concerns for Follow-Up

The off-going shift enters in this section any safety, environmental or other important concerns that require follow-up.

Examples of these concerns include, but are not limited to, the following:

- unusual or unexplained variations in performance
- emergent waste (hazardous, toxic, etc.) management issues
- new safety incident reports that may affect assignments in the area
- any personnel or equipment safety problems or concerns that have occurred or that still exist

Appendix 12-A. Template for Facility Turnover Checklist (Cont.) (Page 4 of 5)

Section #3—Facility Critical Equipment Status

Note: In this section, the turnover checklist would contain critical devices and equipment for the overall facility. Work station turnover checklists would contain critical devices and equipment applicable to the work station. Critical equipment listed on local status boards may be omitted from turnover checklist providing status board is reviewed during turnover.

Enter in this section the status of critical devices in each area that are used to monitor a process and/or provide other safety related information. Examples include the following:

- Major equipment such as compressors, motors, pumps, valves, tank levels, steam system, etc.
- radiation detection equipment alarming or malfunctioning
- Continuous Air Monitors (CAMs) alarming or malfunctioning
- heating and ventilation system problems existing
- hydrogen and/or oxygen monitors alarming or malfunctioning
- public address system problems existing (emergency signals)
- loading or unloading in progress
- support systems status
- status of strippers, mass spectrometer, etc.
- glovebox activity levels
- any other information considered important to the oncoming operator

Sections #4 and #5—Work/Testing Completed, In Progress, or Due To Start

Enter in Section 4 a listing of all major work activities which were completed during the off-going shift. Include in this list all major tests, procedures, maintenance activities, etc.

Enter in Section 5 a listing of work activities which are planned for the on-coming shift. For each activity, indicate if work is in progress or scheduled to start during the oncoming shift.

Section #6—Special Procedures

In this section, list the latest status of any special procedures in use in the on-coming shift relief area. Examples may include

- special operating procedures
- procedure changes
- issue management reports

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Attachment 12. Operations Turnover (Cont.) (Page 14 of 14)

Appendix 12-A. Template for Facility Turnover Checklist (Cont.) (Page 5 of 5)

Section #7—New or Continuing Abnormal Operating Conditions

Note: Abnormal conditions noted on local status boards do not have to be included on checklist provided the status board is reviewed during turnover.

Note: Any new or continuing abnormal conditions from the previous shift(s), and any actions taken or planned.

Section #8—Changes in Radiological Conditions or Industrial Hygiene Issues

As applicable, enter the latest status of any significant changes in radioactive or hazardous material levels since the previous shift. Include the areas affected, the results of any Radiological Control Technician (RCT) or Industrial Hygiene (IH) surveys, and any other actions taken or activities that are underway to decontaminate or barricade the areas.

Section #9—On-Coming Manager/Designee Review Responsibilities

Note: This section will serve as a guide to ensure that all required review/sign-offs have been documented.

Examples of document types that may be listed in this section include, but are not limited to:

- round sheets
- lock/tag logs (e.g., out of service, locked out)
- equipment logs (e.g., out of service, locked out, LCO Logs, etc.)
- temporary modification logs
- interlock/bypass logs
- run books (control area, process equipment, diesel generators, etc.)
- nonconformance reports
- required reading
- shift and standing orders

The on-coming Manager/Designee signs to denote that a review is complete.

Section #10—Formal Shift Turnover of All Responsibilities

Off-going shift personnel signs the checklist turning over responsibilities to the on-coming shift documenting the process is in satisfactory condition for turnover.

On-coming shift personnel sign acknowledging the completion of all turnover review items and properly assume full responsibility for control of the shift facility or work station.

No: P315 Conduct of Operations Manual
Attachment 13. Control of Interrelated Processes (Page 1 of 3)

13.0 CONTROL OF INTERRELATED PROCESSES

This attachment describes the approach for ensuring that interrelated processes are understood, monitored, and controlled to avoid adverse impacts on operations.

Interrelated processes are defined by DOE O 422.1, *Conduct of Operations*, as "processes or activities that can affect operations, but are under the control of persons other than the affected operators, such as shared support systems or special testing." The processes may be facility-maintained systems that support research and operations needs, or operations activities that can impact facility systems or activities. Interrelated processes can be routine, such as providing chilled water or ventilation, or one-time, such as a special test or maintenance activity. Examples of interrelated processes include the following:

- Planned testing or operations that will activate alarms requiring response from personnel performing unrelated work in the area
- Discharges to waste systems, particularly involving unusual volumes or constituents
- Material movements that could challenge Technical Safety Requirement (TSR) limits
- Maintenance activities that affect availability of equipment or protective systems
- Programmatic activities affecting utility or support system demands such as electricity or compressed gas

Interrelated processes must be recognized and managed to ensure that affected personnel understand the interactions and limits of these processes and their roles in communications and response.

The Facility Operations Director (FOD) and Responsible Line Manager (RLM) must identify their systems and activities that either depend upon or could impact processes that they do not manage. After initial identification of routine operations meeting these criteria, continued evaluation is required as changes occur or as new activities are scheduled, including one-time events.

The FOD and RLM define the parameters of acceptable performance for these interrelated processes and develop the programs for ensuring these parameters are communicated, monitored, and maintained.

Controlling interrelated processes has three major elements: defined responsibilities, training, and communication.

13.1 Defined Responsibilities

The FOD and RLM must clearly define and communicate the responsibilities for ensuring that interrelated process are controlled. Both facility and program personnel may be assigned. Defined responsibilities may include the following:

- monitoring
- surveillances
- response to adverse trends or abnormal conditions
- notifications

13.2 Process Training Requirements

Personnel responsible for interrelated processes must be provided the training necessary to understand the interactions affecting these processes and to perform the appropriate actions related to their control. Training topics may include the following:

- system dependencies and interactions with related processes
- basic concepts of chemistry and physics related to the assigned systems, for example, pH, pressure differential, conductivity, chemical interactions, or potential energy
- limits established for specific processes, including TSR- and permit-related parameters
- methods for monitoring gauges and readouts and performing surveillances
- procedures for reviewing and interpreting data to identify trends
- appropriate responses to alarms and abnormal conditions
- communications protocols

A formal analysis of training needs and development of the requisite qualification standards are based on the requirements of P781-1, *Conduct of Training*.

13.3 Process Communication Requirements

The FOD and RLM must establish lines of communication between their personnel responsible for interrelated processes. Communication processes should support the following goals:

- Activities that can impact related processes are effectively coordinated with the owners of those processes
- Adverse trends and abnormal conditions are effectively and promptly communicated to affected organizations
- Personnel from different organizations cooperate effectively in responding to abnormal and emergency situations.

The Plan of the Day process (see Attachment 12, Section 12.2.1) can be an effective tool for communications between owners of interrelated processes.

13.4 Training

There is no specific mandatory training or qualification required to implement this attachment. It is recommended that all personnel implementing this document complete UTrain Course #24665, *OS-RTS ConOps, Attachment 13, Control of Interrelated Processes*. This training will enhance the employee's knowledge as required and as outlined in DOE O 422.1, *Conduct of Operations*.

13.5 Acronyms

FOD	Facility Operations Director
RLM	Responsible Line Manager
TSR	Technical Safety Requirement

13.6 References

- DOE O 422.1, *Conduct of Operations*

- P781-1, *Conduct of Training*

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Attachment 14. Required Reading (Page 1 of 5)

14.0 REQUIRED READING

Note: Required reading by itself is not a measurable learning method and must not be included in an initial formal training program that results in qualification or certification.

The purpose of this attachment is to ensure that designated individuals are given the opportunity to read, understand, and be kept informed of important information that will enhance their ability to effectively perform their job assignment. This purpose will be achieved by implementing a system of formal instructions and requirements as detailed in this attachment. The Required Reading Program (RRP) is required for all operations personnel and those organizations that provide direct support (i.e., direct communication) to operation organizations. Other support and service organizations may implement an RRP to enhance business performance. This may also include information contained in video and audio media, as well as written materials.

14.1 Content

The required reading material may include, but not be limited to, the following:

- Los Alamos National Laboratory (LANL) Lessons Learned Bulletin
- applicable occurrence reports
- critique reports
- new procedures and/or revisions, as applicable
- Safety Newsletters
- appropriate facility/equipment configuration and design changes
- changes to the Design Basis Authorization documentation for the facility
- related industry and Laboratory operating experience information
- videos of tests, incidents, tasks, etc., that would prove beneficial
- any other pertinent information, such as current facility activities, so designated by management to be included as required reading

Only information that needs documentation indicating an individual has read and understood the material should be included in the RRP. Care must be exercised to prevent subversion of the system by including information which can be disseminated by less formal means. It is the responsibility of the reader to question his/her immediate supervisor when subject matter is not understood. An individual will only be held accountable for material specially designated for that selected individual to read.

Any and all personnel may recommend material to be included in the RRP.

Note: Electronic systems for administering the RRP are an acceptable alternative to a paper-based system, provided the functionality meets or exceeds the requirements of this attachment.

If an electronic system is utilized to distribute and track the completion of required reading, Sections 14.2 and 14.3 can be accomplished electronically.

14.2 Log Sheet

A Required Reading Log Sheet (Appendix 14-A) is maintained that, at a minimum, details the following for each discrete piece of required reading material:

- unique, sequential Required Reading Identification (ID) number
- unique document ID number (if available)
- title and/or description of specific material
- designated readers, by full name
- date material was provided
- required date for required reading to have been completed
- individuals' signature/initials after completing and understanding the material provided
- actual date completed by designated reader
- name of issuing supervisor/manager

Note: Required Reading completion dates should be based on the nature and urgency of the information. Certain documents may be designated for "immediate reading." These should be read before assuming the shift or work station. Completion of "immediate reading" should be documented and retained in accordance with Section 14.3.

Each Required Reading Log Sheet should be sequentially maintained in a binder and kept in a central location for each distinct facility or support organization.

14.3 Process

Recommended material is forwarded to either the Operations Manager (OM) or Responsible Line Managers (RLMs) and designated by the OM/RLM to be screened for inclusion in the RRP.

Once approved, the document is registered on the Required Reading Log Sheet (Appendix 14-A), the Required Reading File Index (Appendix 14-B), and then filed in the Required Reading Active File by the Required Reading Coordinator.

- Registration of the document on the Required Reading Log Sheet requires that the issuing supervisor/manager complete the necessary document ID items in black or blue ink or typewritten.
- Registration of the document in the Required Reading File Index database requires that the issuing supervisor/manager input document ID, title and/or description, and date material was provided from Required Reading Log Sheets.
- The Required Reading Active File must be readily available to those individuals required to read the prescribed documents. The Required Reading Active File should be strategically located to ensure accessibility and timely completion.
- The issuing organization/facility may have more than one Required Reading Active File and there may be multiple copies of the document to ensure timely completion by all designated readers.

Each individual whose name appears on the Required Reading Log Sheet as a designated reader signs and enters the date completed on the Required Reading Log Sheet. This section indicates that the designated reader has acknowledged and understood the required reading material. If any question about the required reading material should arise, then it must be resolved before completing this step.

Routinely (at least once per week) the Required Reading Coordinator reviews the Required Reading Log Sheets to ensure timely completion by all designated readers. This review is not required to be documented.

When all designated readers for a specific document have signed and dated the Log Sheet, then the required reading material is removed from the Required Reading Active File and placed in sequential order by Required Reading ID number in the Required Reading Inactive File by the issuing supervisor/manager with its associated Required Reading Log Sheets attached. This file should be maintained as a reference.

The issuing supervisor/manager then enters the "Date Completed" for that specific Required Reading File material in the Required Reading File Index database.

14.4 Training

There is no specific mandatory training or qualification required to implement this attachment. It is recommended that all personnel implementing this document complete UTrain Course #24666, *OS-RTS ConOps, Attachment 14, Required Reading*. This training will enhance the employee's knowledge as required and as outlined in DOE O 422.1, *Conduct of Operations*.

14.5 Records

The following are considered records generated by this attachment and must be managed in accordance with P1020-1, *Laboratory Records Management*, and any local procedures:

- Required Reading Log Sheet
- Required Reading File Index

14.6 Acronyms

ID	Identification
LANL	Los Alamos National Laboratory
OM	Operations Manager
RLM	Responsible Line Manager
RRP	Required Reading Program

14.7 References

- DOE O 422.1, *Conduct of Operations*
- P1020-1, *Laboratory Records Management*

14.8 Appendices

Appendix 14-A. *Template for Required Reading Log Sheet*
Appendix 14-B. *Template for Required Reading File Index*

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Attachment 14. Required Reading (Cont.) (Page 4 of 5)

Appendix 14-A. Template for Required Reading Log Sheet (Page 1 of 1)

Required Reading Log Sheet

Work Group:	Issuing Supervisor:	Identification No.:
Required Reading Document (No. and Title or Description)	**Date Entered into RR*:**	
	To be read by:	

Personnel	Signature	Date

* RR – Required Reading

Change Control

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Attachment 14. Required Reading (Cont.) (Page 5 of 5)

Appendix 14-B. Template for Required Reading File Index (Page 1 of 1)

Template for Required Reading File Index

Organization/Facility _____

REQUIRED READING NUMBER	DOCUMENT IDENTIFICATION	ISSUE DATE	REQUIRED COMPLETION DATE	DATE COMPLETED

Uncontrolled When Printed

No: P315 Conduct of Operations Manual
Attachment 15. Timely Orders to Operators (Page 1 of 6)

15.0 TIMELY ORDERS TO OPERATORS

The purpose of this attachment is to provide requirements for the administration of timely orders.

Note: Information and policies intended as permanent should be incorporated in administrative procedures or as addenda to this document.

Note: The Timely Orders program must not be used to change operating procedures because the changes noted in the operator orders might be missed by a procedure user.

Do not use timely orders in lieu of approved operating procedures.

Do not use timely orders as a means to circumvent necessary procedure changes.

15.1 Shift Orders

Operations Managers (OMs) and other managers who have a need, approve shift orders to communicate short-term information and administrative instructions to shift personnel. Information such as special operations, performance of specific evolutions or tests, work priorities, policy information, increased frequency in monitoring certain parameters, classification of administrative instructions, etc. should be conveyed in shift orders. The Facility Operations Director (FOD), OM, or the Responsible Line Manager (RLM), or their respective designees, review and approve shift orders.

Shift orders should be brief, normally one or two pages in length, and provide the OM the means to communicate instructions and information of short-term nature that is considered to be of importance to the manager's personnel.

Shift orders should be clearly written and dated and include the following identifying information:

- document title—"Shift Orders”
- facility or organization identification
- period (time/date) covered by the order (i.e., from—to)
- reference to any new or revised standing orders

Appendix 15-A, *Template for Shift Orders*, should be used as a template for shift order form format.

Subheadings may be used for dividing shift orders into specific categories for easy reference, when feasible. Each organization should develop subheadings specific to its group.

Shift orders are normally effective from 1600 to 1600, except weekends, which cover the 72-hour period from 1600 Friday to 1600 Monday, or where the coverage extends beyond the 72-hour period (e.g., 120-hour period due to the Thanksgiving holiday falling on a weekend).

Shift orders should be replaced or updated daily.

If information in the Shift Orders will be retained for a number of days, the entries can be time-dated to ensure they are appropriately removed.

When shift orders cannot be followed or completed as written, make changes or deviations only after approval by the issuing authority or designated alternate.

Each issuing authority should develop a list for distribution of shift orders that ensures availability of the information to all affected personnel.

The OM designates the location to maintain the master copy of Shift Orders.

Shift Orders may be generated, transmitted, and maintained electronically.

Appropriate personnel review the shift orders as early in the shift as possible. The OM reviews the shift orders at shift turnover. Other work groups may review the shift orders at work group meetings held early in the shift. Document the review by completing the "Reviewed With/By" section of the Shift Order Template (see Appendix 15-A).

Expired shift orders should be retained in accordance with the Records section of this attachment.

Shift orders that are postponed or remain effective past their expiration date should have daily review or update.

15.2 Standing Orders

OMs, and other managers who have a need, approve standing orders to communicate long-term information and administrative instructions to shift personnel. Special instructions such as minimum shift manning requirements for all facility conditions may be included in standing orders. The FOD, OM, or the RLM, or their respective designees, review and approve standing orders.

Standing orders that could potentially impact safety basis requirements (e.g., surveillances, in-service inspections, etc.) must be reviewed by Safety Basis and an Unreviewed Safety Question/Unreviewed Safety Issue (USQ/USI) review performed as appropriate.

Standing orders provide the OM the means to communicate instructions and information of a long-term nature that is considered to be of importance to the manager's personnel.

Standing Orders may be developed and maintained electronically.

Standing orders should include the following identifying information:

- document title—"Standing Orders"
- facility or organization identification
- approval date
- issuing authority signature

Appendix 15-B, *Template for Standing Orders*, should be used as a template for standing order format.

Note: A system of uniquely numbering the Standing Order subheadings will facilitate the tracking of revisions to the Orders and the personnel review of the Orders.

Subheadings may be used for dividing standing orders into specific categories for easy reference, when feasible. Each organization should develop subheadings specific to its group.

Standing orders should be maintained in the same location as the shift orders.

When standing orders cannot be followed or completed as written, make changes or deviations only after approval by the issuing authority or designated alternate.

The OM determines the distribution list for Standing Orders.

Personnel designated by the OM should remain current on the content of assigned standing orders through a documented refresher training whenever the content changes or on an annual basis, at a minimum. The refresher training may consist of re-reading the standing order and may be administered through the Required Reading program.

The OM reviews the standing orders active file on a quarterly basis to ensure that only applicable and current orders remain effective. This review should be documented.

Consider standing orders active until superseded. Place superseded standing orders in an inactive file and retain in accordance with the Records section of this attachment. Standing orders which are outdated or no longer applicable must be handled the same as superseded standing orders.

15.3 Training

There is no specific mandatory training or qualification required to implement this attachment. It is recommended that all personnel implementing this document complete UTrain Course #24667, *OS-RTS ConOps, Attachment 15, Timely Orders to Operators*. This training will enhance the employee's knowledge as required and as outlined in DOE O 422.1, *Conduct of Operations*.

15.4 Records

The following are considered records generated by this attachment and must be managed in accordance with P1020-1, *Laboratory Records Management*, and any local procedures:

- Shift Orders
- Standing Orders

15.5 Acronyms

FOD	Facility Operations Director
OM	Operations Manager
RLM	Responsible Line Manager
USI	Unreviewed Safety Issue
USQ	Unreviewed Safety Question

15.6 References

- DOE O 422.1, *Conduct of Operations*
- P1020-1, *Laboratory Records Management*

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Attachment 15. Timely Orders to Operators (Cont.) (Page 4 of 6)

15.7 Appendices

Appendix 15-A. *Template for Shift Orders*
Appendix 15-B. *Template for Standing Orders*

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Attachment 15. Timely Orders to Operators (Cont.) (Page 5 of 6)

Appendix 15-A. Template for Shift Orders (Page 1 of 1)

Shift Order

(Facility)

		Period Covered	
_____	_____	_____	_____
Order Number	USQ/USI No.	From (Date and Time)	To (Date and Time)

Purpose:

Instructions:

_____ _____ _____ _____
Approved By Date Responsible Manager Date

Distribution:

No: P315 Conduct of Operations Manual
Attachment 15. Timely Orders to Operators (Cont.) (Page 6 of 6)

Appendix 15-B. Template for Standing Orders (Page 1 of 1)

Standing Order

(Facility)

		Period Covered	
_____	_____	_____	_____
Order Number	USQ/USI No.	From (Date and Time)	To (Date and Time)

Purpose:

Instructions:

_____ _____ _____ _____
Approved By Date Responsible Manager Date

Distribution:

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Attachment 16. Local Procedures (Page 1 of 51)

16.0 TECHNICAL PROCEDURES

16.1 Purpose

This attachment describes the fundamental elements of a program for developing, maintaining, and using technical procedures for activities at Los Alamos National Laboratory (LANL or the Laboratory). It addresses the requirements of paragraph 2.p, *Technical Procedures*, of Department of Energy DOE O 422.1, *Conduct of Operations*, and complements PD311, *Requirements System and Hierarchy*, and P300, *Integrated Work Management*.

An effective program for managing technical procedures promotes document quality and consistency, which are key components of worker success. The purpose of this attachment is to assist local organizations in implementing a procedure program that accomplishes these goals.

The guidelines are written to be flexible so that they encompass a range of technical activities, from nuclear operations to facility processes. It is expected that implementation will vary from organization to organization in order to accommodate the diversity of activities and environments at the Laboratory. The attachment may be implemented as written, or it may be used as guidance for evaluating existing programs or developing new programs tailored to the individual organization's needs. Facility-specific programs must meet the intent of this attachment; exceptions must be approved by the Associate Director for Nuclear and High-Hazard Operations (ADNHHO) using the exception/variance process described in Section 7.0 of this document. The implementation of the requirements of this attachment will be assessed through the periodic assessment process described in Section 3.3, *Periodic Assessment*, in the body of this document.

The guidelines in this attachment may, as noted, be applied to Research and Development (R&D) activities, but it is important to understand the specific ways it is intended to be used when appropriate. SD601, *Conduct of Research and Development*, is the guiding requirement document for conduct of R&D, and explicitly supports the application of Integrated Work management to R&D. In addition, SD601 notes that other institutional or local requirements appropriate to the individual work activity may also apply: For example, if R&D involves explosives, hoists, lasers, or pressure vessels, relevant procedures will apply. Similarly, R&D work done in a facility (for example a nuclear or radiological facility) must be executed in a way that complies with the facility requirements including the applicable controls and formality of operations. It is not, therefore, the intent that Technical Procedures as described in this attachment would supersede the planning, analysis, etc. of R&D as described in SD601; instead, where appropriate (as described below), they *may* be used to prescribe operational technical procedures that are intended to ensure that the necessary envelope is maintained during the execution steps taken to conduct the R&D.

For example, for research on fundamental properties of plutonium conducted in a glovebox in a nuclear/high hazard facility, a Technical Procedure following the guidelines in this attachment would NOT be used to define the scientific goals and functional steps of the R&D activity—but one MAY be developed to define the operational execution steps and controls for the sequence of events that would be performed in the glovebox to realize the steps in the R&D activity. Similarly P300, *Integrated Work Management*, notes “During the hazard analysis for either moderate or high hazard/complex work, teams should *consider whether* the R&D involves or can affect the facility or facility operations beyond the bounds of existing analyses or agreements/controls.” In such cases, when appropriate to the operational and hazard environment (as described below) a Technical Procedure following the guidelines in this attachment may be developed to define the

steps and controls for the sequence of events that would directly affect the facility or facility operations; again, this Technical Procedure would NOT prescribe the overall planning of the R&D activity, which would follow SD601.

Note: Technical Procedure as used here is intended to mean only those specific procedures developed for P315, *Conduct of Operations*, under this attachment, and not to the general use of the term "technical procedure" as it may be used in a variety of other applications.

Note: Instructions for Records Management and Document Control are addressed in the requirements of P1020-2, *Laboratory Document Control*, and P1020-1, *Laboratory Records Management*, respectively.

Note: References to documents, organizations, and functional titles must be interpreted as equivalent to succeeding designations.

16.2 Scope and Applicability

16.2.1 Scope

This attachment applies to technical procedures in the Local Documents group as defined in PD311, *Requirements System and Hierarchy*, Table 1, "Hierarchy of Requirements System Documents." Local Documents are work procedures that do not apply to the institution as a whole, but are limited in applicability, for example, to a specific organization or type of work.

All operational and facility technical procedures at the Laboratory (including technical procedures that control the operational or facility environment and constraints for R&D activities) are subject to the requirements of this attachment. It should be noted that the intent is not to require that all R&D plans be rewritten as technical procedures to meet Attachment 16 requirements, but rather to provide those involved with R&D guidance to apply good judgment in determining when it is appropriate to use technical procedures in addition to (or instead of) Integrated Work Documents (IWDs), even if they are not listed as specific exclusions in Section 16.2.3. In addition, Section 16.2.2 clarifies that, for many activities, IWDs will suffice, in which case an IWD will be completed following P300, *Integrated Work Management* rather than a technical procedure following this attachment. All questions related to the proper application of this attachment versus SD601, *Conduct of Research and Development* (as integrated with P300) must be resolved by those responsible for SD601.

This attachment must be used to develop procedures for all anticipated operations, evolutions, tests, and abnormal or emergency situations involving the equipment and/or systems designated as requiring formal status control (see Section 8.1.2, *Identification of Equipment and Systems*).

Note: Although not required and outside the scope of Conduct of Operations, the principles of this attachment may be applied to other Local Document types. The development of a unified approach to document processing is encouraged.

16.2.2 Relationship to Integrated Work Documents (IWDs)

This attachment complements P300, *Integrated Work Management*.

Note: Classified information must not be entered into the Job Hazard Analysis (JHA) tool. IWDs with classified information must be written according to P300 requirements, but must be generated separate from the JHA tool.

All work at the Laboratory is subject to P300, including the development of IWDs where so indicated. Those IWDs may, in cases where appropriate, have aspects that are constrained to, or otherwise take into account, operational and facility controls. Other activities (specifically, operational and facility activities) or processes may more appropriately follow in their entirety a Technical Procedure developed following this attachment, which will be an “IWD-equivalent” procedure.

The Responsible Line Manager (RLM) for an activity determines if elements of an activity (or an activity as a whole) will be subject solely to P300 or should follow a Technical Procedure as described in this attachment, by evaluating the activity against the P300 Hazard Grading Matrix, as required by P300 and also below in Section 16.5.1.f. If the activity is moderate hazard or high-hazard/complex, the RLM, in consultation with the Facility Operations Director (FOD), may do either of the following:

a. Exit this document and develop an IWD in compliance with P300, or
b. Develop a procedure according to this attachment, ensuring compliance with P300. This creates an "IWD-equivalent" procedure.

Note: Many Laboratory organizations use IWDs for some work packages and IWD-equivalents for others. IWDs are often preferred for one-time work packages or short-term activities, whereas IWD-equivalents are more commonly prepared for processes that are repeated, complex, or long-term. A series of related procedures, e.g., facility-, function-, and task-level, may apply to a single process.

An IWD-equivalent procedure may function as the activity-specific information (Part 1) of an IWD provided it meets the seven requirements of P300. In addition to the activity-specific procedure, all other requirements of P300 must be met as well including, but not limited to, the JHA, facility-specific information, work release processes, and feedback requirements. To meet the Parts 2, 3, and 4 requirements, Form 2101, *Integrated Work Document (IWD) Part 2, FOD Requirements and Approval for Entry and Area Hazards and Controls-Non-Tenant Activity Form*, or Form 2102, *Integrated Work Document (IWD) Part 2, FOD Requirements and Approval for Entry and Area Hazards and Controls-Tenant Activity Form*, Form 2103, *Integrated Work Document (IWD) Part 3, Validation and Work Release*, and Form 2104, *Integrated Work Document (IWD) Part 4, Feedback/Post Job Reviews* from P300 must be used, unless the IWD-equivalent procedure includes the functional equivalents of these forms. In this case, the procedure may function as the full IWD.

The basis for the determination of hazard class for moderate and high-hazard/complex activities should be documented and included in the Document History File (DHF).

16.2.3 Exclusions

Although many types of procedures and other documents are critical to the safe operation of a facility and execution of individual work activities, not all of these are within the scope of this attachment. Some types of procedures and other documents have their own drivers that provide sufficient requirements for the development, format and content, control, and use such that application of this attachment is redundant. Therefore, these types of procedures and other documents may be formally excluded from the requirements of this attachment.

To be excluded from this attachment, Operations Support–Readiness and Technical Support (OS-RTS) must evaluate and concur.

The types of procedures and other documents that OS-RTS has reviewed and, where justified, excluded are identified in Appendix 16-J, *Excluded Procedure and Document Types*.

Requests for exclusion from the requirements of this attachment must be made to the Operations Support (OS) Division Leader. After evaluation by OS-RTS, the OS Division Leader will provide a written response with the results of the evaluation.

16.3 Overview

An effective, comprehensive document development and maintenance program promotes safe and efficient operations by ensuring that work is performed to the most current, reliable, and approved methodologies. The program ensures that documents are systematically developed, reviewed, and approved for use. The progress of a document from initiation to cancellation conforms to a defined process, and related records are preserved in a DHF.

16.4 Definitions and Terms

The following list defines terms as they are used in this document. Whenever possible, local implementation procedures should use this terminology. Where local terms vary, the functions must be consistent with the definitions presented here.

Acronyms are listed in Section 16.12.

Note: The positions listed below are functional titles rather than organizational position titles, and they describe functional responsibilities. The RLM may select a qualified individual to fill any of these roles. One person may be assigned to more than one function, and assignment may vary from document to document.

ROLES AND FUNCTIONS

Document Control—The designated document control authority within the Issuing Organization.

Issuing Organization—The organization that accepts ownership of the procedure's development, maintenance, and cancellation.

Originator—Individual who identifies the need for a new or revised procedure and initiates the formal request to proceed.

Records Management--The designated records management authority within the Issuing Organization.

Responsible Line Manager— Line manager (not the FOD) having the responsibility, authority, and accountability to plan, validate, coordinate, approve, execute, and close out R&D/Programmatic work activities. The RLM is specifically responsible and accountable for the safe execution of work associated with R&D/Programmatic procedures. The RLM will coordinate activities with the FOD to ensure the facility safety envelopes are maintained, collocated hazards have been addressed, and facility availability has been maximized.

Actions assigned to the RLM may be performed by a representative. Where designated representatives are authorized to perform tasks on behalf of the RLM, the RLM will determine the method used to make that designation. In all cases, the RLM remains accountable for the designee's action.

Reviewer—An individual who evaluates a procedure for accuracy and quality in the areas related to the reviewer's expertise.

Subject Matter Expert (SME)—Any individual recognized for technical expertise in a particular subject area or discipline.

Preparer—The worker responsible for preparing the procedure and for coordinating SME review and comment resolution.

Facility Operations Director (FOD)---The manager responsible and accountable for facility-related maintenance; operations; Environment, Safety, and Health (ES&H); waste services; and engineering. The FOD establishes and maintains the facility safety and security envelopes and serves as the RLM for facility-related work in accordance with P300, *Integrated Work Management*. The FOD reviews procedures for other work within the facility to ensure the activity/facility interface is appropriately addressed. The FOD is responsible for releasing all work governed under P300.

As used in this attachment, responsibilities and authorities assigned to the FOD may be assigned to a representative. Where designated representatives are authorized to perform tasks on behalf of the FOD, the FOD will determine the method used to make that designation. In all cases, the FOD remains accountable for the designee's action.

PROCESS

Approval Date—The date on which an approval authority signifies acceptance that the procedure development process has been satisfactorily completed.

Document Action Request (DAR—A form used to document and track the initiation, modification, or cancellation of a procedure. (See Appendix 16-A, *Document Action Request*)

Note: Local equivalents may be paper or electronic, but must be functionally comparable.

Document History File (DHF—Records that document the development, review, concurrence, and approval of a procedure in accordance with this attachment.

Document Status—An indication of the use or limitations in the use of a document. See the definition of Document Status in Section 9.1 of P1020-2, *Laboratory Document Control*, for a listing of common document statuses.

Effective Date—The earliest date that any element of a procedure is authorized for use.

Expiration Date—The date on which a procedure is no longer authorized for use.

Immediate Procedure Change (IPC—A change to an issued procedure made to address urgent operational needs that require expedited processing. Sometimes referred to as a Field Change.

Implementation Plan—The timeline for a phased implementation of procedure requirements.

Major Revision—Substantive modifications to a procedure that change the actual performance of the activity. Examples include changes in the hazard analysis or controls, the content or order of steps, the assignment of functional responsibilities, or the values of process parameters.

Note: Changes in the order of performance that correct obvious administrative errors may be processed as minor revisions with OM approval.

Minor Revision—Nonsubstantive modifications to a procedure that change format, correct grammatical errors, update references or organizational names, or clarify without changing original intent. Minor revisions enhance usability but do not change the actual performance of the activity. Minor Revisions

- must not increase risk,
- must not alter implementation of a source requirement,
- must not alter the purpose or scope,
- must not eliminate any required reviews or approvals, or
- must not alter the operating, technical, design, process, regulatory, or quality requirements.

Minor revisions are limited to the following:

- Correction of typographical, spelling, punctuation, or grammatical errors providing the meaning or intent does not change.
- Changes to acronyms, definitions, references.
- Updates to position titles, individual names, organizational names, and contact information to reflect current responsibilities, changes to identified position titles with similar qualifications.
- Addition of clarifying text or notes to provide additional information or improve the procedure's readability (e.g., procedure readability such as adding descriptive language or example, deleting extraneous text, removing redundant text) as long as the work process is not technically changed. Steps cannot be added or deleted, the sequence cannot changed, and the intent of the step cannot be changed.

Periodic Review Date—The date that a currently active procedure requires review to ensure that that it is still required and that it accurately implements current technical and administrative requirements and guidelines. It should be understood that this is not an expiration date.

Validation—A field review, usually performed as a walkdown or simulation, to confirm that a procedure can be used as written in the environment where the task is to be performed.

Verification—A table-top review performed to ensure that a procedure is technically accurate and meets editorial standards.

PROCEDURE CATEGORIES

Note: Exclusions from the scope of technical procedures may be required for procedures created in support of major DOE mandated programs, provided the process used to support their development and use has been reviewed and meets a minimum set of requirements to ensure

that Conduct of Operations concerns have been addressed. Those processes that have been exempted are listed in Appendix 16-J, *Excluded Procedure and Document Types*.

Technical Procedures—

Technical procedures are a formalized approach or set of instructions required to execute a specific work activity, which includes operation of equipment or systems, controls the design basis and configuration of the facility and its equipment or systems, and the management of the facility within its safety, security, and environmental envelope. Therefore, scope of technical procedures could include, but is not limited to:

- Administrative procedures that define the specific steps used to comply with requirements to maintain the facility safety, security, and environmental envelope. This includes process (e.g., safety management programs, administrative controls, etc.) defined in the facility safety basis document and institutional requirements documents. An example would be the development of procedures used in the facility, which could fail to force critical, mandatory reviews (e.g., classification, safety basis, etc.). Another example would be the administrative process for performing surveillances in support of the safety basis, which may detail the performance periodicity standards and the actions to take for a missed surveillance.
- Technical procedures that detail the specific steps required to complete a work activity, which includes steps to avoid, mitigate, or respond to hazards associated with the work activity or work environment. This would include any Emergency Response Procedures (ERPs) (e.g., Alarm Response Procedures [ARPs], Emergency Operating Procedures [EOPs], etc.). The IWD described in P300 incorporates this same concept and, in fact, allows for the use of procedures if they include specific elements. In many DOE and commercial facilities, procedures would be developed for ongoing or repetitive work activities, while the IWD would typically be used for work activities performed only once or very infrequently.

Emergency and Alarm Response Procedures—Describe the steps to be taken in response to abnormal conditions. Specific types include the following:

Alarm Response Procedures (ARPs)—Direct the response of personnel to visible and audible alarms.

Abnormal Operating Procedures (AOPs)—Provide instructions for responding to events that affect several systems, threaten the safety envelope, or require action to mitigate damage.

Emergency Operating Procedures (EOPs)—Provide instructions for responding to events that result in operation outside the safety envelope.

Emergency Response Procedures (ERPs)—Provide instructions for responding to an emergency in progress. ERPs include steps or reference other procedures that define the response to additional casualties that could result from the initial event.

PROCEDURE USE

Note: Procedures may have both Use Every Time (UET) and Reference sections. For example, the body of the procedure could be Reference and the checklists could be UET.

Usage Level-A usage designation for a procedure or procedure section that defines the management expectations for its use. See Section 16.4.1, *Usage Levels*, for more information.

Reader-worker—A method of executing procedure steps where one worker reads the step from the procedure while another worker executes the action. This method is used in situations where the worker performing the action needs his/her hands available, such as when working off of a ladder.

Emergency Response—A method of executing selected procedure steps from memory in an Emergency and Alarm Response procedure. This is only used for designated steps and requires the worker to return to the procedure and execute the procedure as written after the emergency has been stabilized.

Fill-Out-Steps (or checklist)—A procedure writing technique where steps require a sign-off or initial to document completion of the step. This procedure writing technique may be incorporated into the body of the procedure or as an appendix to the procedure with a step within the procedure body directing its completion.

Critical Steps—Those procedure steps that directly impact, either positively or negatively, some safety, environmental, equipment, or operational limit or commitment. Examples include but are not limited to steps that support a Technical Safety Requirement (TSR); an environmental permit; an equipment technical limit; a location entry requirement; and a procedure 'hold point."

Miscellaneous Term and Definitions

Immediate Actions-When an abnormal event requires actions to be taken as quickly as possible, such as shutting down the ventilation system to prevent exhausting potentially hazardous material to the environment, these actions are called "immediate actions" and may be required to be memorized (see Section 16.9.5.a, *Preparing for Use of Abnormal, Emergency and Alarm Response Procedures*).

Multiple Equipment Trains—Identical systems designed to be used independently or concurrently. For example, facility HEPA filtration and exhaust fan sub-systems.

Working Copy—As defined in P1020-2, *Laboratory Document Control*, a working copy is a copy of a procedure that has been verified by the user as being the most current and approved version. Working copies are frequently used by field personnel, and field personnel must verify through the Document-Control Coordinator (DCC) or approved Electronic Document Management System (EDMS) that the working copy is the most current, approved version before its use. Working copies are also referred to as "convenience copies."

16.4.1 Usage Levels

The management expectations, called "usage expectations," for using procedures, sections, or attachments vary depending upon a variety of characteristics, including complexity of the work activity, frequency of execution, and potential for negative impact of improper execution. To determine the appropriate usage level, "determination criteria" has been established.

Use Every Time (UET):

If one or more of the following determination criterion are true, then the correct usage level for the procedure, section, or attachment is UET:

- has potential high consequence of error
- is complex

- is infrequently performed
- has stringent quality or regulatory documentation requirements
- is used to capture data
- is used as a record
- requires placekeeping or sign-off (see Section 5.13, *Placekeeping and Sign-off Steps*, of FSD-315-16-001, *Technical Procedure Writer's Manual*)

The following are the usage expectations for UET procedures, sections, or attachments. All are to be applied.

- The procedure revision, including IPCs, must be confirmed to be the latest approved version prior to execution of the procedure.
- The procedure must be at the jobsite and open to the page containing the step being performed.
- The procedure must be executed as written and in the sequence written, unless the procedure allows otherwise (see Section 5.3, *Non-sequence Steps*, of FSD-315-16-001).
- The completed procedure must be reviewed by the worker to confirm that all steps were executed and appropriately documented.

Reference:

If none of the determination criterion for the UET usage level is true, then the correct usage level for the procedure, section, or attachment is Reference.

All of the following usage expectations for Reference procedures, sections, or attachments must be applied.

- The procedure revision, including IPCs, must be confirmed to be the latest approved version prior to execution of the procedure.

  Note: For purposes of this attachment, "readily available" means a copy can be obtained within 15 minutes.
- The procedure must be readily available to workers at the jobsite.
- The procedure must be executed as written and in the sequence written, unless the procedure allows otherwise (see Section 5.3, *Non-sequence Steps*, of FSD-315-16-001).
- The individual step may be executed from memory, but frequent confirmation is recommended.
- The completed procedure must be reviewed by the worker to confirm that all steps were executed and appropriately documented.

Mixed Usage Levels:

For some procedures it may be appropriate to have "mixed" usage levels." For example, the procedure instructions could be one usage level while the attachment used to collect data or submit as a record is a higher usage level. The "determination criteria" must be used when determining the usage level to apply to a procedure section and/or attachment.

In this situation, the individual sections and/or attachments are marked with the corresponding usage level (see Section 4.1, *Page Headers, Footers, and Numbering*, of FSD-315-16-001), and the associated "usage expectations" are applied to each section and/or attachment.

16.5 Procedure Development

Note: Throughout the procedure development process, participants should remain aware of potential classification issues related to the forms, documents, and media generated. Classified working papers and drafts must be marked and controlled in accordance with Laboratory requirements. Guidance can be obtained from the organization's Security Specialist or Classification (SAFE-1).

The procedure development process provides a controlled and documented methodology that ensures a well-researched, accurate, and usable tool for workers.

16.5.1 Initiation

16.5.1.a Identification of Need

The Originator identifies the need for a new procedure or other procedure action (modification, deactivation, or cancellation). Triggers may include new or changed processes, facilities, or requirements; new information; an event; or an assessment.

16.5.1.b Action Request

Note: The Originator may also be the RLM.

Note: When completing the Document Action Request (DAR), the Originator should avoid placing classified information in any of the fields, with attention to content in the Title and Description fields. If the DAR is potentially classified, it must receive the requisite reviews and be marked and handled as indicated.

The Originator records the following information on a DAR:

- Originator's name, Z number, organization, and date. If the Originator is deployed or subcontracted, the organization should be the name of the entity for whom the action is being requested. (Example: The Originator is from a core safety organization but is requesting a revision to a procedure owned by the group that he/she is supporting).
- Type of action requested (e.g., new, revised, deactivated, or cancelled).
- For new procedures, document and revision number blocks are left blank. The Originator may optionally fill in the title block. Note: Subsequent changes should be initialed by the RLM.
- For existing procedures, the number, title, and revision number of the affected procedure. For Major or Minor Revisions, the Revision No. field should be the next sequential identifier. For Deactivations and Cancellations, the revision identifier of the current version is entered.
- Description of the requested action. This should include a summary of the proposed content or changes, and an explanation of why it is needed.

The Originator forwards the DAR to the RLM.

16.5.1.c Response to Request

Note: This step allows the RLM to evaluate the need for the proposed procedure and to control the allocation of time and effort resources.

Note: The RLM (or the FOD when serving as an RLM) can authorize initiation of the procedure scoping (Section 16.5.2) at any time, to be performed in parallel with the remaining actions in Section 16.5.1. Scoping activities may include process development, including procedure development, walkdowns and simulations of the task being described, but without the actual use of hazardous materials or equipment for which hazards have not been fully analyzed nor controls developed.

The RLM denies or approves the request, recording the decision on Section 2 of the DAR.

a. If denied, the RLM records the reason for the decision, initials the DAR, and returns it to the Originator. If additional pages are used, the Comment field may simply reference them (e.g., "see attached pages"). The process is terminated.
b. If approved, the RLM enters his/her name and Z number, and signs and dates the DAR, indicating acceptance of responsibility for the procedure and authorizing continued processing.

The RLM indicates the action type (e.g., major or minor revision) on the DAR.

If the action type is a revision, the RLM may indicate that the Periodic Review is to be fulfilled concurrent with the revision.

16.5.1.d Document Type Determination (New Documents only)

Note: This attachment focuses on the two procedure categories described in Section 4, Definitions and Terms, specifically, technical procedures and alarm response and emergency procedures. Most organizations will have a number of designated procedure types that fall under these categories.

Note: If the activity to be documented fits the hazard grading criteria of P300, *Integrated Work Management,* it must be an IWD or IWD equivalent as allowed by P300. If functioning as Part 1 or more of an IWD, the technical procedure must meet the requirements of P300 and this attachment.

For new procedures, the RLM or representative determines the document type, a decision that influences content and periodic review requirements.

16.5.1.e Document Identifiers

For new procedures, the RLM contacts Document Control to obtain a unique document identifier, and enters the designation on the DAR.

The RLM may record a title or may alter the working title entered by the Originator. Changes should be initialed and dated.

For revised procedures, the RLM ensures that the number and title fields are appropriately completed.

16.5.1.f Hazard Grading and Analysis

Note: Individual entries into the Work Management System (WMS) are assigned a WMS Entry Number to serve as the unique identifier within WMS.

As noted in Section 16.2.2, *Relationship to Integrated Work Documents (IWDs)*, of this attachment, all LANL work activities are subject to the requirements of P300, *Integrated Work Management*. In accordance with Section 3.1, *Integrated Work Management (IWM) Requirements*, of P300, the RLM must enter the activity for which a technical procedure will be developed into the Work Management System (WMS). For the initial development of a technical procedure, the RLM must identify the activity and complete the Primary Hazard Screen (PHS) questions in the "Stage 1: Identify Activity" portion of the WMS. For a major revision to a technical procedure, the RLM must update the responses to the PHS questions appropriately.

The RLM ensures that the activity or process being described is graded for hazard level according to P300, Attachment B, *Hazard Grading Table*; the P121, *Radiation Protection*, radiological hazard grading table; or the explosive hazard classes of DOE-STD-1212-2012, *Explosives Safety*. The result is documented on the DAR and in the WMS. Related records are retained in the DHF.

If the activity is classified as Moderate Hazard or High Hazard/Complex, the procedure must meet the attributes for an IWD as described in P300, including a documented hazard analysis. The RLM can choose to exit this attachment and develop an IWD according to P300, or may develop an IWD-equivalent using this attachment. (See Section 16.2.2, *Relationship to Integrated Work Documents*, for more information.) If the procedure will be an IWD-equivalent, the RLM indicates on the DAR whether it will serve as Part 1 only, or if it should be developed to be a full IWD. If it will not be an IWD equivalent, he/she may check "N/A."

16.5.1.g Validation Determination

Note: IWD-equivalents must meet the validation requirements of P300, *Integrated Work Management*.

Note: The results of this validation process may require re-invoking the Review and Comment Resolution process (see Section 16.5.3) and/or entry into the Unreviewed Safety Question/Unreviewed Safety Issue (USQ/USI) process (see Section 16.5.3.f).

For new or revised procedures, the RLM determines the validation requirements and records the decisions on the DAR. Decisions include need, scope, and method. The results should be documented on Appendix 16-F, *Procedure Validation Checklist*, or a local equivalent.

Need. Validation is required for all new technical procedures and recommended for major revisions to technical procedures. Considerations include complexity, hazard level, mission significance, quality requirements, human factors, or compliance impacts. If the RLM elects to waive validation for a technical procedure, the justification should be entered in the "Comment" box.

Scope. New procedures should be validated in entirety. For Revisions, the RLM determines whether to validate the entire procedure or only those sections affected by the changes.

Method. The RLM designates the method for performing the validation. Validation should include the intended user as well as the support groups (RadCon, IH/Safety, etc.) that will be involved in the performance of the procedure.

a. Walkdown. A walkdown is a field review performed with a user, at the actual work site, with the procedure in hand. The procedure is enacted in the field, but components are not manipulated or operated. Each step is reviewed to ensure it is correct and usable as written.

b. Simulation. If a simulator or mock-up is available, the validation can be accomplished by practicing the steps in that environment.

c. Tabletop. This validation is an analytical review independent from the work site and not involving actual performance. This type of review relies heavily on the knowledge and experience of the validators. Tabletop validation may be sufficient for minor changes, low-consequence activities, simple processes, or highly experienced workers, or may be the most viable option when safety or exposure considerations preclude field reviews or when the work site is unavailable or the work conditions do not yet exist, as with emergency procedures.

16.5.1.h Usage Determination

The RLM specifies the usage level of the procedure using the criteria of Section 16.4.1, *Usage Levels*. Assigning the correct usage level is fundamental to ensuring safe performance and successful outcome of the activity, for which the RLM remains accountable.

In nuclear facilities, another RLM, independent of the operation, must concur with the usage level determination. In non-nuclear facilities, this concurrence is only a recommendation. The concurring RLM may engage other organizations (e.g., Engineering, Radiation Protection, etc.) to aid in making this decision and must sign the DAR to document their concurrence.

The usage requirements for the assigned usage level should be clearly communicated to the user. Methods include user training, making usage requirements integral to the organization's definition of document type or marking the requirements directly on the procedure, either on the cover page, or in each page's header or footer information.

16.5.1.i Reviewer Assignments

The RLM documents the required reviews on the DAR. Appendix 16-I, *Team Members/Review Disciplines*, must be used to determine organizations that are to review the draft procedure. At a minimum, the RLM must have the organization(s) responsible for each hazard associated with the procedure (see Section 16.5.1.f) perform a technical review. It is the responsibility of the reviewing organization to determine if they have input.

Assigning a review on the DAR is a commitment to obtain and resolve comments from the reviewer and to have supporting documentation. The RLM may also assign optional reviews; these can be managed according to the Issuing Organization's local policy or as specified by the RLM. If optional reviews are entered on the DAR, they should be clearly designated as such.

To record required reviews on the DAR, the RLM fills in the "Discipline" column with the name of the organization or function whose review is needed, e.g., "Group ABC-4" or "electrical safety."

If the RLM knows the name of the specific person to perform the review, he/she may enter that information in the "Name" column at this time. Alternatively, the name may be entered when the review is completed. The signature and date columns are not used at this time.

Extra pages may be attached as needed.

In nuclear facilities, another RLM, independent of the operation, must concur with the reviewer determination to ensure that all appropriate organizations have input to the new or revised procedure. In non-nuclear facilities, this concurrence is only a recommendation. The concurring RLM must sign the DAR to document their concurrence.

16.5.1.j Selection of Preparer

The Preparer is an individual knowledgeable in the subject area with experience in the development of procedures. The Preparer may be the RLM or a person selected by the RLM.

16.5.1.k Document History File

For new procedures and for each revision to a procedure, a DHF is established and maintained. Records related to the generation of the version are collected in the DHF during the procedure development phase.

The DHF is the repository for official forms and references related to the procedure. At a minimum, the DHF contains

- the DAR
- a copy of the completed, approved procedure
- review and comment resolution records for required reviews
- validation documents, when validation is required
- hazard analyses, when required
- background for critical steps as appropriate

Additional recommended content includes

- other forms and documents generated during development
- references to technical bases used. The relationship of these sources to the procedure content should be as specific as possible.
- explanations to aid future preparers maintain the intent and integrity of the content
- corrective actions addressed

16.5.2 Document Preparation

16.5.2.a Identify Related Documents

Assigned SMEs conduct a search to identify existing documents that (a) address or (b) impact the intended content of the proposed procedure. For revisions, the DHF for previous versions is consulted.

a. If the search identifies a document that duplicates all or portions of the scope, the Issuing Organization should investigate incorporating the needed content into a revision of that document. If the identified need warrants a new procedure, the Preparer ensures that the new procedure is effectively coordinated with existing documents to minimize overlaps and prevent conflicts.

b. The document search should identify related documents or requirements that impact the new procedure's content or that the new procedure should reference. The search should include Laboratory directives, external requirements referenced in Appendix G of the Prime Contract, and corrective actions in the Laboratory Performance Feedback and Improvement Tracking System (PFITS) database.

16.5.2.b Document Drafting

Note: A template for an Operating Procedure is available on the OS-RTS website and is designed to work with FSD-315-16-001, *Technical Procedure Writer's Manual*. Until a template is provided for the other types of technical procedures (e.g., administrative, Emergency Procedures, Alarm Response Procedures, etc.), the FOD may modify the template to create other types of technical procedures as required.

The Preparer drafts the procedure content according to the guidance provided in Appendix 16-B, *Procedure Format and Content Requirements*, FSD-315-16-001, and using the template provided on the OS-RTS website.

The Preparer and/or RLM must engage the organization(s) responsible for each hazard associated with the procedure (see Section 16.5.1.f). Additionally, Appendix 16-I, *Team Members/Review Organizations*, provides a breakdown of operational concerns and their associated responsible organization(s).

The FOD must designate ARPs to be developed as part of the designation of equipment and systems requiring status control as required by Attachment 8, Section 8.1.2.

If the procedure is an IWD or equivalent, the appropriate hazard analyses must be performed and documented in accordance with P300 prior to completing the procedure.

16.5.2.c Verification

The completed document is verified for technical accuracy and to ensure it meets editorial standards. The Procedure Verification Checklist (Appendix 16-E) may be used to guide and document the evaluation.

16.5.3 Review and Comment Resolution

Note: Potentially classified procedures should be reviewed by a Derivative Classifier prior to distribution. For all reviews, including the Training Determination and Safety Basis reviews, the RLM ensures that reviewers have the appropriate clearance level.

Note: A typical turn-around time for a procedure review is two weeks, but the RLM must consider other contributing factors (e.g., the complexity of the procedure, current work load, facility/mission schedule, etc.) when determining the due date for review comments. It is expected that the RLM will make all reasonable efforts to gather review comments, but if comments are not provided by the due date it is acceptable to consider the lack of response as “no comments.”

The Preparer routes the procedure, clearly marked as a draft, to the reviewers identified on the DAR by the RLM. The distribution includes any necessary background information and a due date for receipt of comments. The Preparer should specify acceptable formats for comments (e.g., electronic or hardcopy, direct mark-up, or separate pages).

Appendix 16-D, *Document Review and Concurrence*, may be used for documentation.

16.5.3.a Technical Content Reviews

Reviewers evaluate the procedure content related to their area of expertise for accuracy, clarity, and compliance with established requirements. The reviewer should include justification with each comment, referencing source documents when possible. Comments are returned to the Preparer in an approved format.

If the reviewer has no comments, that assessment must also be documented and returned to the Preparer. The Review and Concurrence (Appendix 16-D) may be used, or another method approved by the Issuing Organization.

All responses – comments or "no comment" – are retained in the DHF.

16.5.3.b Comment Resolution

The Preparer, with assistance from the RLM and SMEs as needed, negotiates resolution of each reviewer comment. The Preparer documents the disposition of each comment and provides this documentation to the reviewer. The reviewer indicates concurrence by signature or other method approved by the Issuing Organization and returns the concurrence to the Preparer for inclusion in the DHF.

When comments are resolved, the Required Reviews section of the DAR is completed. Reviewer names are filled in as needed. Reviewers may sign and date the DAR, or a notation may be made that those records are on file in the DHF.

16.5.3.c Post-Comment Revision

The Preparer incorporates accepted comments into the procedure.

The RLM assesses whether the changes merit repeat reviews and documents the decision on the DAR. If indicated, the Preparer re-enters the SME Review process.

16.5.3.d Validation

If the procedure requires validation, it is evaluated as indicated by the RLM (see Section 16.5.1.g). The validators should use Appendix 16-F, *Procedure Validation Checklist*, or a local equivalent.

The validation is documented and maintained in the DHF.

The Preparer updates the procedure as indicated by the validation outcome.

16.5.3.e Training

Both new and revised procedures must be evaluated by an appropriate Training Specialist for the user training and qualification that will be required. When the procedure will require formal training or qualification, it must be reviewed by the appropriate training specialist, who determines the needed level of training based upon the Systematic Approach to Training (SAT) and in compliance with the requirements of P781-1, *Conduct of Training*.

If the procedure addresses formal compliance training or affects workers outside of the Issuing Organization's Division, P781-1 requires that the procedure be validated by the Service Innovation–Institutional Training Services (SI-ITS) group, and submitted to the Service Innovation Division Leader for approval, prior to implementation.

If no determination is needed, the appropriate box ("N/A") on the DAR is checked.

When a Training Determination is completed, the applicable box on the DAR is checked, and the name of the person who performed the determination is filled in.

Training is responsible for the records related to the Training Determination.

16.5.3.f Review by Safety Basis Personnel

Note: A procedure must not be issued until safety basis personnel have completed their review of the procedure and any resultant issues are resolved.

For procedures that may impact safety basis, the final draft procedure must be routed to the appropriate Safety Basis personnel for assessment against the authorization basis. The Safety Basis personnel advise the Preparer on any changes or actions needed to remain within the approved facility safety documentation. The procedure must not be issued until the safety basis organization concurs that all issues are addressed.

If a USQ or USI is prepared, the number is recorded on the DAR.

When the review phase is completed, the Preparer forwards the procedure and the DAR for approval.

16.5.4 Approval

If the procedure is an IWD-equivalent, the FOD or FOD representative approval signature is required on the related P300, *Integrated Work Management,* forms or the facility-specific equivalents.

The RLM reviews the final procedure and accompanying records.

If disapproved, the RLM returns the file to the Preparer with an explanation of the decision and the actions needed.

Note: The FOD/FOD representative and RLM signatures are a declaration that the procedure is accepted for use, but are not equivalent to a work release.

If approved, the RLM continues with the following actions.

a. The RLM determines if a formal implementation plan is warranted and, if so, develops one, with concurrence from affected managers.

b. The RLM specifies on the DAR and/or Approval page whether the procedure can be released for immediate use or must be held pending other actions. If "Release" is selected, the procedure is both approved and effective as of the signature date. If "Hold" is selected, the procedure content is approved, but is not effective until the conditions in the Details box are satisfied. Examples are a designated effective date, actions that must be completed, approvals that must be obtained, or the need for an additional validation (see Section 16.5.4.a). Although effective, a procedure may not be used until the work is released following the applicable work authorization process.

The RLM signs and dates the DAR and/or the Approval page.

16.5.4.a Additional Validation

When the RLM deems that additional validation of the procedure is warranted, he/she may request that a “first time use” validation be performed. This validation is an actual performance of the procedure at the job site. It does not constitute a validation as described in Section 16.5.1.g of this attachment. The results should be documented on Appendix 16-F, *Procedure Validation Checklist*, or a local equivalent.

A hazard analysis must be performed and documented, evaluating the associated risks and defining the controls to compensate for them. FOD approval and restrictions must be documented on the approval page of the procedure.

Care should be taken that the user is attentive to the task, is familiar with the hazard analysis results, and knows the actions to take if a procedure deficiency is noted. The RLM may assign an additional observer to assist the user-validator.

16.5.4.b Derivative Classifier Review

The RLM is responsible for determining the appropriate Derivative Classifier reviews for Local Documents (see PD311, *Requirements System and Hierarchy*). A potentially classified procedure must be reviewed for classification before it is transmitted electronically or provided to uncleared personnel. The procedure must be appropriately marked with the classification determination.

16.5.5 Issue

16.5.5.a Submission to Document Control

The completed procedure and related documentation are submitted to Document Control. Document Control performs a quality check to ensure all of the required forms and information are in the DHF.

16.5.5.b Distribution

Document Control processes the procedure for publication in the appropriate media (e.g., electronic or paper) and establishes any required controls. Controlled copies of procedures (e.g., electronic or paper) must be maintained at control areas for operator reference and at appropriate areas outside the control area for operator use. Controlled copies of alarm and

annunciator response procedures must be maintained and readily accessible to operators for alarm response.

16.6 Changes and Revisions – Process

Once issued, a procedure must be changed or revised only in accordance with an approved procedure.

"Change" refers to an IPC that is marked directly on an issued procedure. An IPC number is assigned, but the procedure revision number is not affected. "Revision" constitutes a new, renumbered, re-issued edition of the procedure. Revisions are designated as minor or major, a distinction that affects the review and validation requirements.

16.6.1 Immediate Procedure Changes

Note: The use of IPCs should be infrequent. If a series of IPCs have been proposed for a procedure, the RLM should consider expediting the review process according to Section 16.6.2.b.

Note: For IPCs, the RLM role may be formally delegated to the on-shift manager, such as the Operations Manager (OM), or Person-In-Charge (PIC).

Note: Content that is safety-basis related cannot be changed without required Safety Basis reviews. Unique markings, such as a dollar sign or asterisk, can help identify such content.

An IPC should be limited to changes required to continue work in progress, support temporary modifications, or for critical activities, as identified by the RLM. The RLM (or designee) evaluates a proposed change to verify the need and to assess whether it is major or minor. In general, more rigor in change control is expected when consequence of error is higher.

16.6.1.a IPC Numbering

IPC numbering must be sequential and specific to the affected revision number. The revision number does not change (e.g., SOP 123.R2, IPC-1). The next sequential number should be readily available to potential originators. This may be accomplished by an IPC Log, a Master Document List, or other controlled and accessible record of IPC numbers.

16.6.1.b IPC Initiation

The Originator marks the procedure to be changed as follows:

- Draw a single line through content to be deleted or changed.
- Enter the proposed content legibly, ensuring that reproduced copies will be clear. If additional pages are needed, attach them as insertable pages. Mark the added pages with the appropriate procedure header information and number them to indicate the insertion point (e.g., following page 13, an inserted page would be 13A). Clearly mark the procedure at the specific location where the additional pages should be inserted.
- Place a vertical line (revision bar) in the margin, running the length of all changes. The IPC revision bar should be separate and distinct from any existing revision bars within the procedure.
- Enter the IPC number next to each revision bar.
- Record the IPC number (e.g., IPC-1, IPC-2) next to the revision number on the title page.

The Originator completes Section 1 of the Immediate Procedure Change Cover (Appendix 16-G) or equivalent and forwards the Cover Sheet, marked-up procedure, and any additional pages to the RLM.

16.6.1.c IPC Review

The RLM reviews the IPC and obtains SME review and validation as deemed necessary. This ensures the need, technical accuracy, and completeness of the proposed procedure modification. The RLM must use Appendix 16-I, *Team Members/Review Disciplines*, to determine the organizations that are to review the IPC changes. At a minimum, the RLM must invite the organization(s) responsible for each hazard within the scope of the IPC change.

If the changes may be safety-basis related, Safety Basis must review and concur with the changes.

16.6.1.d IPC Approval

If the procedure is an IWD-equivalent, the FOD or FOD representative must approve a major revision by signature, as required by the P300, *Integrated Work Management* section on *Changes*.

If the RLM approves of the proposed change, he/she completes Section 3 of the Cover Sheet, entering the effective date and indicating the duration of the IPC. If the IPC will be incorporated into the next procedure revision, the checkbox for "Permanent" is marked. If it is for short-term use, the RLM marks "Limited Use" and enters the expiration date, and time if applicable. Further explanation may be entered in the Comments field. If an IPC Log is being used, the duration may be noted in it.

The RLM signs and dates final approval on the IPC Cover Sheet (Appendix 16-G).

As needed, the RLM obtains a Derivative Classifier review of the procedure and IPC Cover Sheet.

16.6.1.e IPC Implementation

Note: For permanent IPCs, the RLM must obtain a review by a Training Specialist to determine long-term training requirements and impact to other training courses and qualifications. This can be achieved through the IPC Roll-Up, but the RLM should consider coordination at the time of IPC issuance.

If work was paused contingent on the procedure change, the RLM notifies the Originator and ensures affected personnel are briefed on the changes prior to resuming the work according to the changed procedure. Copies of the IPC Cover Sheet are attached to the front of marked-up copies of the procedure until the procedure is processed and issued by Document Control.

16.6.1.f IPC Control

If the shift ends before the IPC can be processed by Document Control, the RLM ensures that the IPC is included in the shift turnover, as applicable. A previously established IPC Log, or equivalent, may be used to facilitate tracking and communication of approved IPCs.

As soon as practicable, and not to exceed three working days, the RLM forwards the changed procedure and associated IPC Cover Sheet to Document Control for processing. Document Control ensures that the IPC is incorporated into all controlled copies of the procedure.

16.6.1.g IPC Roll-Ups

Procedure revisions (Section 16.6.2, *Revisions*) should be initiated when an IPC has been outstanding for an extended period (e.g., greater than 6 months), when a procedure has been affected by several changes (e.g., more than five), or when the changes obscure the interpretation of the instructions. All currently effective IPCs should normally be incorporated when the procedure is revised.

16.6.2 Revisions

Minor and major revisions are defined in Section 4, *Definitions and Terms*. The following steps apply to both revision types, unless specifically noted otherwise. Procedure revisions to incorporate IPCs follow these same steps. Permanent and temporary equipment modifications may necessitate the need for procedure revision.

If the requested revision meets the definition of a minor revision and does not affect the safe performance of work, the procedure-owning RLM must authorize in writing the changes to be annotated in the procedure and may continue with performance of the procedure.

As soon as practicable, and not to exceed three working days, the RLM forwards the revised procedure and the associated DAR to Document Control. In the interim, the RLM must ensure that the revision is effectively communicated to other procedure users, if any.

16.6.2.a Initiate a Revision

The Originator may be anyone who identifies the need to revise a procedure. He/she initiates the process by filling out Section 1 of the DAR or local equivalent, with adequate attention to the description of and justification for the requested action.

The Originator forwards the DAR to the RLM. Optionally, the Originator may include a marked copy of the procedure to be processed.

The RLM denies or approves the request, recording the decision on the DAR.

a. If denied, the RLM records the reason for the decision, initials the DAR, and returns it to the Originator. The process is terminated.
b. If approved, the RLM completes Part 2 of the DAR as described in Section 16.5.1.c, *Response to Request*.

The RLM signs and dates Part 2, indicating approval to proceed.

The RLM obtains the revision number from Document Control and enters it on the DAR. (See Section 16.5.1.e, *Document Identifiers*.) Validation is indicated in accordance with Section 16.5.1.g, *Validation Determination*.

The RLM assigns personnel for procedure processing as described in Section 16.5.1.i, *Reviewer Assignments*. **Major** Revisions receive the same types and level of review and validation as the

latest version of the procedure, or the RLM documents the justification for removing any of these reviews. **Minor** Revisions should be reviewed by a second person as a minimum.

16.6.2.b Revise the Document

The assigned preparers revise the procedure as described in Section 16.5.2, *Document Preparation*. For **Minor** Revisions, Section 16.5.2.a, *Identify Related Documents*, may be omitted.

For **Major** Revisions, any existing hazard analysis should be reviewed and updated as necessary.

Changes, other than formatting and editorial changes, should be clearly communicated to the user. Vertical lines in the margin (revision bars) adjacent to revised content are often used for this purpose. Only the marks for the most recent revision should appear in the revision.

A summary of changes is documented in the Revision History table (see FSD-315-16-001, *Technical Procedure Writer's Manual,* and the procedure template).

16.6.2.c Review and Comment Resolution

Note: The RLM must ensure Derivative Classifier review for potentially classified procedures prior to distribution for review.

Major revisions follow the process described in Section 16.5.3, *Review and Comment Resolution*.

For revised procedures, reviewers should limit comments to the content that was changed, unless safety issues or the technical accuracy of the procedure is in question. Other comments may be documented, but will be addressed at the RLM's discretion.

16.6.2.d Approval and Issue

Approval and distribution are performed in accordance with Sections 16.5.4, *Approval*, and 16.5.5, *Issue*. Implementation plans are not required to be considered for **Minor** Revisions.

16.7 Periodic Review

Periodic review is conducted at predetermined intervals to ensure that the procedure is still required and that it accurately implements current technical and administrative requirements and guidelines.

16.7.1 Frequency

Maximum review cycles are determined by document type, as detailed in Table 16-1. The review period is calculated from the procedure's effective date or the date of the last Periodic Review. A Periodic Review for scheduling purposes, at a minimum, consists of a verification (see Section 16.5.2.c) and a validation (see Section 16.5.3.d) of the entire procedure. Document Control tracks the next required review date.

Table 16-1. Maximum Review Cycles

Procedure Category	Maximum Review Cycle
Technical Procedures	3 years
Emergency and Alarm Response Procedures	1 year

The RLM may direct a Periodic Review at any time before the required date. A review may be considered if changes have occurred in the process, the facility, or related requirements, after a significant event (either human error or equipment upset), or if the procedure is a technical procedure that has not been used in six months. The complexity of the operation, maturity of operations, and the facility life cycle should also be considered.

The RLM may also elect to complete the Periodic Review concurrent with other actions, such as a revision or a self-assessment. For a revision, the RLM may use the optional checkbox on the DAR to direct the Preparer to perform a concurrent Periodic Review.

If the Maximum Review Cycle defined in Table 16-1 cannot be met, or has been exceeded, the RLM may authorize a 60-day extension to allow for completion of the periodic review and the initiation of any required changes. Extensions beyond 60 days must be approved by the RLM's Associate Director or designee. For an IWD-equivalent procedure (see Section 16.2.2), the FOD must concur with the extension. This authorization must be documented in an e-mail, or equivalent documentation, to Document Control and a copy attached to any procedure receiving an extension that is being used in the field. If a procedure has a defined expiration date, the use of an extension is not authorized beyond that date. To return a procedure to compliance that is beyond its periodic review cycle, perform a periodic review in accordance with Section 16.7.2.

16.7.2 Process and Documentation

Document Control notifies the RLM of the upcoming review, allowing adequate time to complete the revision before the review date.

For any IWD-equivalent procedure, the RLM must engage the FOD or FOD Representative to review the related P300, *Integrated Work Management,* information.

The RLM reviews the procedure or ensures that qualified personnel conduct the review, evaluating the following attributes:

- current need for the procedure
- technical accuracy
- compliance with relevant requirements
- need to incorporate outstanding IPCs
- effect of Lessons Learned on procedure content
- accurate references
- editorial correctness
- human factors

The reviewer determines one of three possible outcomes:

1. The procedure is needed and remains accurate.

   If an IWD-equivalent procedure, the FOD or FOD Representative must concur and sign the Appendix 16-H, *Documentation of Periodic Review*.

2. The procedure is needed but requires revision.

   The RLM determines the level of revision (Minor or Major) and initiates the appropriate process.

3. The procedure is obsolete and should be cancelled.

   The RLM initiates the cancellation process (Section 16.8, *Deactivation/Cancellation*).

Documentation of the review is retained in the DHF. Appendix 16-H, *Documentation of Periodic Review*, or facility specific equivalent must be used.

16.8 Deactivation/Cancellation

Deactivation is the temporary withdrawal of a procedure from authorized use. For example, a procedure might be deactivated for the duration of an activity suspension or during temporary unavailability of a facility. Deactivated procedures are exempt from periodic review requirements, but should be reviewed before reactivation.

Cancellation is the permanent removal of a procedure from active status. Cancelled procedures are archived and cannot be reactivated.

Both processes require a careful evaluation of the continued need for the procedure and the potential impact of its removal from active use.

16.8.1 Process

Requests to deactivate or cancel a procedure are initiated using the process for major revisions, Section 16.6.2.a, omitting the instructions for a new revision number.

The RLM ensures that the request is reviewed by the disciplines listed on the latest DAR as required reviews. As applicable, these reviews should ensure that deactivation or cancellation will not affect safety basis, quality, or regulatory requirements. This review period should also seek to identify any current users of the procedure and, if found, coordinate with their line management to ensure that removal of the procedure will not impact safety, security, or performance.

When concurrence is obtained from all assigned reviewers, the RLM signifies approval by signature on the DAR and forwards related forms and documentation to Document Control for inclusion in the DHF.

16.8.2 Reactivation

The requirements for Periodic Review (Section 16.7.2, *Process and Documentation*) must be followed to return a deactivated procedure to service.

16.9 Procedure Use

Procedure usage is a fundamental component of an effective procedure program. Usage both realizes the purpose of the procedure and provides the opportunity to evaluate and improve the procedure.

Successful performance of this component of the procedure program relies largely on the individual user. The user must:

- use the procedure as intended

- know the actions to take if performance cannot or should not be completed as described
- provide feedback and lessons learned to be used in improvement initiatives

Personnel must be trained in procedure use requirements, including the concept of the reader-worker method, usage levels, and the expectations for ERPs.

16.9.1 Preliminary Actions

Note: For purposes of this attachment, "readily available" means a copy can be obtained within 15 minutes.

Before placing a procedure into use, Work Supervisors/PICs (see P313, *Roles, Responsibilities, Authorities, and Accountability*, Attachment A) should ensure that, as required,

- the controlled copy of the procedure is readily available
- the workers are working to the most current version of the procedure, regardless of usage level, in effect, including IPCs, if any
- the current version of any procedures, IWDs, or other documents referenced in the procedure, also called Performance Documents, if it is to be used during the evolution
- the procedure is specific to that equipment train being worked
- workers are trained and qualified
- workers are aware of the usage requirements for the procedure
- site-specific considerations are addressed
- all affected managers, including the FOD or representative, have authorized the work
- required permits are obtained
- needed resources are available

16.9.2 General Performance Principles

16.9.2.a Procedure Validity

The worker verifies that he/she is working to the most current version of the procedure, regardless of usage level, in effect, including IPCs, if any. Additionally, the current version of any procedures, IWDs, or other documents referenced in the procedure, also called Performance Documents, must be verified if it is to be used during the evolution. If working on systems with multiple equipment trains, the worker verifies he/she is working to the procedures and procedure steps specific to that train. The worker may take credit for the verifications performed by the Work Supervisor/PIC in Section 16.9.1.

Note: For purposes of this attachment, "readily available" means a copy can be obtained within 15 minutes.

The worker either has the procedure in hand or readily available as required by the procedure usage level (see Section 16.4.1, *Usage Levels*).

The worker complies with applicable Document Control procedures concerning copying, marking, and final disposition of the procedure.

16.9.2.b Work Prerequisites

The worker verifies that all actions identified in the procedures Prerequisite Actions section of the procedure (see Section 4.5.6, *Prerequisite Actions*, of FSD-315-16-001, *Technical Procedure Writer's Manual*) are completed and that the work is properly authorized through the facility work planning and authorization process (e.g., plan of the day, plan of the week, etc.).

If the procedure is an IWD-equivalent procedure, a pre-job brief, must be held (see Section 12.2.2, *Pre-Job Briefs (PJBs)*.

16.9.2.c Work Performance

For complex or infrequently performed procedures, a review of the procedure's content is advisable before beginning work. This can be part of the pre-job briefing (see Section 12.2.2, *Pre-Job Briefs (PJBs)*.

The user performs the work as described in the procedure and in accordance with the usage expectations defined in Section 16.4.1, *Usage Levels*, and the procedure's usage level.

The Reader-Worker Method may be used for situations in which it is impracticable for the primary worker to have the procedure in their possession. Examples include glovebox work, work encumbered by Personal Protective Equipment (PPE), or work in adverse environments.

In the Reader-Worker Method, the Reader has possession of the procedure. The Reader clearly communicates each step verbatim to the Worker, either by direct voice contact or by alternate means such as radio or two-way intercom. The Worker repeats each step, paraphrasing as appropriate, before performing the action. The Worker reports completion of each step to the Reader. The Reader marks the procedure as required. Refer to Section 4.2, *Conducting Verbal Communications*, and its sub-sections of this document for guidance on verbal communications.

16.9.2.d Turning Over Procedures in Use

Note: Consult Attachment 12 of this document for shift turnover procedures.

If a procedure is in process during a change in personnel, the following actions ensure a smooth turnover to the on-coming shift:

- Off-going personnel
  - document the point at which the procedure was interrupted. Examples are marking the procedure or noting the last completed step in a logbook.
  - as needed, document any information relevant to successful completion of the procedure, and
  - brief oncoming personnel on the status of procedure performance.
- Oncoming personnel
  - review any notes made by the off-going shift,
  - verify that prerequisites are still satisfied (for example, permits remain in effect and required materials are available),
  - verify that conditions affecting performance have not changed,

- verify that the procedure is still the most current version, including IPCs, and
- ensure the process is resumed at the proper point.

16.9.2.e Procedure Modifications During Work Performance

If a procedure change or revision is issued while procedure performance is in progress, the RLM or designee will evaluate the impact on the work and will provide direction for either suspending or completing the work. Options include the following:

- Complete the work with the current procedure being used
- Transcribe applicable data to the new version, with explanatory text
- Suspend performance of the previous version, begin the new version at the appropriate step, and provide explanatory text

The RLM may direct steps to be repeated as necessary.

The RLM must document his/her decision regarding how an in-progress operation is to respond to a change in the associated technical procedure in the appropriate operating log (see Section 11.1, *General*). At a minimum, the RLM must document the impact of safety (e.g., safety basis, criticality safety, industrial safety, etc.), security, and compliance with regulatory requirements as part of this log entry.

16.9.2.f Work Close-Out

Personnel ensure that close-out actions as described in the Post Performance Activity section of the procedure (see Section 4.5.9, *Post-Performance Activity*, of FSD-315-16-001, *Technical Procedure Writer's Manual*) are completed, including notifications, waste management activities, storage of equipment and unused materials, records processing, and leaving the work area in an approved configuration.

A post-job review may be performed for any procedure execution, but is mandatory for any "IWD-equivalent" procedure involving a Moderate-Hazard or High-Hazard/Complex operation as defined in Attachment B, *Hazard Grading Tool*, of P300, *Integrated Work Management*. The Post-Job Review is to capture lessons learned and evaluate potential improvements (e.g., procedure revision, additional materials, etc.). The post-job review must be performed in accordance with Section 3.2.4, Part 4 – *Post Job Review*, of P300.

If required, the work supervisor documents the post-job review using Form 2104, *Integrated Work Document (IWD) Part 4, Feedback/Post Job Reviews*, and ensures that recommendations are effectively communicated to affected workers.

If required in the Post Performance Activity section of the procedure (see Section 4.5.9, *Post Performance Activity*, FSD-315-16-001), management reviews and signs the procedure.

16.9.2.g Retention or Disposal per Requirements

The completed procedure, records, and any associated documentation are dispositioned in accordance with the requirements of the Records section of the procedure (see Section 4.5.12, *Records*, of FSD-315-16-001, *Technical Procedure Writer's Manual*).

16.9.3 Data Collection and Sign-off Practices

Note: For use of Round Sheets, see Attachment 2 of this document. For Independent Verification, see Attachment 10.

16.9.3.a Data Entry

Procedures often require recorded responses by the user. These entries may be a description of the data observed, or initials or signatures indicating completion of a step. The notations may be recorded in digital media or on printed copy. Official markings on printed copy should be permanent and legible and should comply with records management requirements.

See Attachment 2, *Round Sheets*, Section 2.5.4, *Taking and Recording Data*, for guidance on notations.

16.9.3.b Abnormal Data

When a reading is outside the acceptable limits stated by the procedure, the user should

- take the actions specified within the procedure,
- record the data and identify it as out-of-range using red ink or another accepted protocol for marking abnormal data, and
- immediately report the abnormal data to supervision.

Supervision evaluates the data and directs the actions to be taken, as necessary.

16.9.3.c Correcting Data Errors

If the procedure user discovers an incorrect data entry, he/she first determines if the error may have affected subsequent steps.

If subsequent steps were not affected, the user

- draws a single line through the entry,
- records the correct information, and
- initials and dates next to the entry.

If subsequent steps may have been affected, the user notifies supervision. Supervision evaluates the effect of the error and directs the actions to be taken.

16.9.4 Suspending Procedure Performance

Suspension of procedure performance may be planned or unplanned. Planned suspensions are normally schedule-related, such as break periods or end of the workday, and the work is often resumed by the same personnel. Unplanned suspension can result from external events or recognition that the work can no longer be completed within the defined scope.

16.9.4.a Planned Suspension of Procedure Performance

1. Workers and supervision ensure that the activity or task is in a safe and secure condition. Additional actions may be initiated to place the activity in a safe condition, e.g., stopping a pump or meeting security requirements.

2. Supervision provides direction to document the last step completed and any actions taken to place the activity in a safe and secure condition.

Work is resumed in accordance with Section 16.9.4.d.

16.9.4.b Unplanned Suspension of Procedure Performance

Note: Procedures should, to the extent practicable, anticipate and describe potential deviations from the norm and the correct responses to them. This section addresses unexpected situations for which a response is not described.

The user should suspend procedure performance under any of the following circumstances:

- work conditions or hazards have changed from those described in the approved work document
- continued work would no longer be bounded by the work document
- An unexpected result occurs
- A procedure deficiency, inaccuracy, or conflict is identified
- The user is unsure of the actions required

The user suspends performance and notifies supervision. Supervision provides direction to document the performance status of the procedure (i.e., the step at which the procedure was interrupted).

If an IPC is required, it must be processed in accordance with Section 16.6.1.

Work is resumed in accordance with Section 16.9.4.d.

16.9.4.c Safety or Emergency Issues

Note: Every worker is authorized to pause or stop work in accordance with P101-18, *Procedure for Pause/Stop Work*.

If at any time the user believes it is unsafe to continue performance, the user must suspend the activity, taking reasonable actions to place it into a safe configuration, and must immediately notify supervision.

In an emergency, the worker may deviate from the procedure to take the actions necessary to place the work or the facility in a safe configuration or to protect personnel, the public, environment, or equipment.

16.9.4.d Resuming Procedure Performance

If work was suspended due to an emergency or off-normal situation, supervision, referencing Laboratory and organization-specific requirements, determines the actions needed and the level of management authorization required to resume work. Supervision may direct the user to repeat steps performed before suspension of the activity, or to start over from the first step.

Before resuming the procedure, the user

- reviews any notes on status made by the off-going personnel

- verifies that he/she is using the most current version of the procedure, including IPCs
- verifies that prerequisite conditions are satisfied (for example, permits remain in effect and required materials are available)
- verifies that conditions affecting performance have not changed

The user resumes the procedure at the point indicated by off-going personnel, unless directed otherwise by supervision.

16.9.5 Abnormal, Emergency and Alarm Response Procedures

Note: This section applies to ARPs, AOPs, EOPs, and ERPs.

Using procedures to respond to an abnormal condition requires methods that differ from many of the general performance principles. Entry into the procedure is usually unanticipated, being driven by an event or as-found condition. Time-critical responses may not accommodate normally routine steps such as confirming the procedure version or performing a lengthy set of prerequisites. Certain steps, or entire procedures, may need to be performed without the procedure in hand.

16.9.5.a Preparing for Use of Abnormal, Emergency and Alarm Response Procedures

Supervision

- identifies the procedures or procedure steps that should be memorized for immediate execution.
- ensures that potential users memorize their required immediate actions.
- trains potential users to recognize entry conditions for the procedures.
- ensures that controlled copies of procedures are available, for example, at the alarm panel referenced by the procedure or outside an area that may need to be evacuated.

16.9.5.b Performing Abnormal, Emergency and Alarm Response Procedures

Note: Workers should apply the Conduct of Operations principle that indications such as alarms and instrument readings should be treated as accurate unless proven otherwise**.**

The worker

- confirms the entry condition
- performs any memorized immediate actions
- obtains the procedure
- performs the procedure as written

When the situation is sufficiently stabilized, the user should consult the procedure to verify that any memorized steps, or other actions taken independent of the procedure, were appropriately completed.

16.10 Training

There is no specific mandatory training or qualification required to implement this attachment. It is recommended that all personnel implementing this document complete UTrain Course #24668, *OS-RTS ConOps, Attachment 16, Technical Procedures*, to enhance their knowledge of the development, control, and use of procedures and UTrain Course #27366, *OS-RTS Technical Procedure Writer's Manual*, to enhance their knowledge regarding the structure, format and content of procedures. This training will enhance the employee's knowledge as required and as outlined in DOE O 422.1, *Conduct of Operations*.

16.11 Records

The DHF is the repository for records related to individual procedures. The DHF is established when the RLM approves a procedure action. See 16.5.1.k, *Document History File*.

The DHF must be managed in accordance with P1020-1, *Laboratory Records Management*, and any local procedures.

16.12 Acronyms

ADNHHO	Associate Director for Nuclear and High-Hazard Operations
AOP	Abnormal Operating Procedure
ARP	Alarm Response Procedure
CS	Criticality Safety
DAR	Document Action Request
DCC	Document-Control Coordinator
DHF	Document History File
DOE	Department of Energy
DSA	Documented Safety Analysis
ENV-CP	Environmental Compliance Programs
EOP	Emergency Operating Procedure
ERP	Emergency Response Procedure
ES&H	Environment, Safety, and Health
FOD	Facility Operations Director
IPC	Immediate Procedure Change
IWD	Integrated Work Document
JHA	Job Hazard Analysis
LANL	Los Alamos National Laboratory
MSA	Management Self-Assessment
NMED	New Mexico Environment Department
OM	Operations Manager
OS	Operations Support
OS-RTS	Operations Support–Readiness and Technical Support
PFITS	Performance Feedback and Improvement Tracking System
PHS	Primary Hazard Screen
PIC	Person-In-Charge

PPE	Personal Protective Equipment
PSA	Preliminary Safety Analysis
QA	Quality Assurance
R&D	Research and Development
RLM	Responsible Line Manager
SAFE-1	Classification
SAT	Systematic Approach to Training
SBP	Safety Basis Procedure
SI-ITS	Service Innovation–Institutional Training Services
SME	Subject Matter Expert
SSC	Structure, System, and Component
TSR	Technical Safety Requirement
UET	Use Every Time
USI	Unreviewed Safety Issue
USQ	Unreviewed Safety Question
WMS	Work Management System

16.13 References

- DOE O 422.1, *Conduct of Operations*
- PD311, *Requirements System and Hierarchy*
- P300, *Integrated Work Management*
- SD601, *Conduct of Research and Development*
- P1020-2, *Laboratory Document Control*
- P1020-1, *Laboratory Records Management*
- FSD-315-16-001, *Technical Procedure Writer's Manual*
- Work Management System (WMS)
- P121, *Radiation Protection*
- DOE-STD-1212-2012, *Explosives Safety*
- P781-1, *Conduct of Training*
- P313, *Roles, Responsibilities, Authorities, and Accountability*
- P101-18, *Procedure for Pause/Stop Work*
- PD110, *Safety Basis*
- P1040, *Software Quality Management*
- DOE G 433.1-1A, *Nuclear Facility Maintenance Management Program Guide for Use with DOE O 433.1B*

16.14 Appendices

Appendix 16-A. *Document Action Request*
Appendix 16-B. *Procedure Format and Content Requirements*

Appendix 16-C. *DELETED*
Appendix 16-D. *Document Review and Concurrence*
Appendix 16-E. *Procedure Verification Checklist*
Appendix 16-F. *Procedure Validation Checklist*
Appendix 16-G. *Immediate Procedure Change Cover*
Appendix 16-H. *Documentation of Periodic Review*
Appendix 16-I. *Team Members/Review Disciplines*
Appendix 16-J. *Excluded Procedure and Document Types*

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Appendix 16-A. Document Action Request (Page 1 of 2)

Document Action Request			
Section 1 – Originator Request			
Document No.:		Revision No.:	
Title:			
Description of requested action (Attach numbered additional sheets if needed.)			
Originator Name (print)	Z#	Organization	Date
Section 2 – Responsible Manager Approval for Processing (see P315, Att. 16, Section 16.5.1.c)			
☐ New Document ☐ Minor Revision ☐ Major Revision ☐ Deactivation ☐ Cancellation		☐ Perform Concurrent Periodic Review?	
☐ Approved ☐ Disapproved (return to originator)	Comment:		
Signature	Print Name, Title	Z#	Date
RLM Concurrence Signature	Print Name, Title	Z#	Date
Section 3 – Hazard Grading (see P315, Att. 16, Section 16.5.1.f)			
Hazard Determination: ☐ Low ☐ Moderate ☐ High/Complex			
Document is authorized to serve as IWD? ☐ Part I only ☐ Full IWD			
Section 4 – Required Reviews (see P315, Att. 16, Section 16.5.3)			
Discipline	Name	Signature	Date
Validation Required? ☐ Yes ☐ No ☐ Waive	Comment:		
Scope of Validation: ☐ Entire Procedure ☐ Change Only			
Validation Method: ☐ Walkdown ☐ Simulation ☐ Tabletop			
Training Determination Completed: ☐ Yes ☐ N/A	Completed By:		
USQ/USI Number (if needed):	Signature	Z#	Date
Section 5 – Final Approvals (see P315, Att. 16, Section 16.5.4)			
☐ Release ☐ Hold	Details:		
Responsible Manager Signature	Print Name, Title	Z#	Date
Additional Approval Signature	Print Name, Title	Z#	Date

Appendix 16-A. Document Action Request (Cont.) (Page 2 of 2)

DAR Continuation

Description of Requested Action (continued from Section 1)

Approval/Disapproval Comment (continued from Section 2)

Required Reviews (Continued from Section 4)

Discipline	Name	Signature	Date

Validation Comment (continued from Section 4)

Release/Hold Details (continued from Section 5)

Appendix 16-B. Procedure Format and Content Requirements (Page 1 of 2)

The following order and Laboratory requirements for procedure format and content are captured in FSD-315-16-001, *Technical Procedure Writer's Manual*, and the associated procedure template found on the OS-RTS website.

- Directives include a written process for procedure development, including format, clear language standards, and configuration control. Refer to FSD-315-16-001 for format and clear language requirements.
- Procedures must provide administrative and technical direction to effectively conduct the work activity, using detail appropriate to the complexity of the task, the experience and training of the operators, the frequency of performance, and the significance of the consequences of error.
- The procedure DHF must contain documentation of the reason for key steps so they are not inadvertently deleted or changed in revisions and changes. Refer FSD-315-16-001, Section 3.2, *Identifying Source Documents*, for more information.
- The scope and applicability of the procedure are readily apparent. Refer to FSD-315-16-001, Section 4.5.4, *Introduction*, for more information.
- Procedures for multiple equipment trains (see Section 16.4, *Definitions*) are clearly distinguishable from each other.
- Emergency procedures (see Section 16.4, *Definitions*) are clearly distinguishable from normal operating procedures.
- Procedures incorporate appropriate information from applicable source documents, including design basis, safety basis, and vendor technical documents. Refer to FSD-315-16-001, Section 3.2, *Identifying Source Documents*, for more information.
- Prerequisites and initial conditions are clearly specified. Refer to FSD-315-16-001, Section 4.5.6, *Prerequisite Actions*, for more information.
- Tools, equipment, and materials are specified and procedures provide measures to document their calibration or condition before use. Refer to FSD-315-16-001, Section 4.5.6, *Prerequisite Actions*, for more information.
- Hold points requiring IV (see Attachment 10) or other approval are clearly indicated. Refer to FSD-315-16-001, Sections 5.9, *Verification, Determination, Notification, and Data Recording Steps*, and 5.13.2, *Sign-offs*, for more information.
- The procedure language is clear, definitions are explained, and the level of detail is appropriate for the operators' skill, experience, and training.
- Only one action per step.
- Warnings, Notes, and Cautions are clear, do not contain actions, and precede the applicable step. Refer to FSD-315-16-001, Section 5.10, *Warnings, Cautions, and Notes*, for more information.

Appendix 16-B. Procedure Format and Content Requirements (Cont.) (Page 2 of 2)

- Warnings, Notes, Cautions, and headings appear on the same page as the applicable step. Refer to FSD-315-16-001, Section 5.10, *Warnings, Cautions, and Notes*, for more information.
- Procedures are technically and administratively accurate.
- Instructions and information are correct.
- Referenced documents are correctly identified. Refer to FSD-315-16-001, Section 5.11, *Branching and Referencing Steps*, for techniques to refer to other procedures, sections, or steps.
- Instructions for transferring between procedures are clear. Refer to FSD-315-16-001, Section 5.11, *Branching and Referencing Steps*, for techniques to branch to other procedures, sections, or steps.
- Critical steps include signature/initial/checkoff blocks, with only one action per block. Refer to FSD-315-16-001, Section 5.13, *Placekeeping and Sign-offs Steps*, for placekeeping and sign-off techniques.
- Instrument readings and tolerances are specified and conform to instrument scales or readability in the field.
- Procedures contain explicit parameters and units, and do not require mental arithmetic to determine acceptability.
- Any calculations are clearly explained and space is provided in the procedure to record them.
- The procedure step sequence conforms to normal operational sequence.
- Procedures reflect human factors' considerations such as procedure callouts exactly matching equipment labels, units in procedures match instrument markings, charts and graphs are easily read, and important steps or information are highlighted. Refer to FSD-315-16-001, Section 6.0, *Key Information/Steps*, for highlighting techniques.
- Emergency procedures (see Section 16.4, *Definitions*) provide guidance for both single and multiple casualties, as appropriate.
- When procedures use or refer to other procedures or steps, they are clearly identified with the exact identification to prevent confusion in transferring to or from them. Refer to FSD-315-16-001, Section 5.11, *Branching and Referencing Steps*, for techniques to branch or refer to other procedures, sections, or steps.
- Procedures specify the restoration or shutdown steps for equipment following tests or other operations. Refer to FSD-315-16-001, Section 4.5.9, *Post Performance Activity*, for documenting testing and restoration requirements.
- "IWD-Equivalent" procedures for Moderate-Hazard and High-Hazard/Complex work activities must contain a requirement for a Pre-Job Brief (PJB) in accordance with Attachment 12, Section 12.2.2, *Pre-Job Briefs (PJBs)*, of this document. Refer to FSD-315-16-001, Section 4.5.6, *Prerequisite Actions*, (Planning and Coordination) for more information.
- "IWD-Equivalent" procedures for Moderate-Hazard and High-Hazard/Complex work activities must contain a requirement for a Post-Job Review.

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Appendix 16-D. Document Review and Concurrence (Page 1 of 2)

Document Title	Number:	Revision:	Draft:
Document Action: ☐ New ☐ Revision ☐ Deactivation ☐ Cancellation			
Comments due by:	Concurrence due by:		
Reviewer Name:	Z#:	Discipline:	
Instructions: Number comments sequentially. Designate as essential (E) or suggested (S). Only essential comments require concurrence with the disposition. Use extra sheets as needed, including the document information in the header and numbering the pages. For revisions, limit comments to the content that has changed. For no comments, check the applicable box and sign the form. Return the completed form to the Point of Contact listed below.			

☐ No comments ☐ Waive (Document has no impact or relevance to our discipline or organization.)

No.	E/S	Document Section	Comment	Disposition

Reviewer Signature:	Print Name:	Z#:	Date:
Dispositioner Signature:	Print Name:	Z#:	Date:
Concurrence Signature:	Print Name:	Z#:	Date:

Return to Point of Contact:	Z#:	Organization:

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Appendix 16-D. Document Review and Concurrence (Cont.) (Page 2 of 2)

Document Title			Number:	Revision:	Draft:
No.	E/S	Document Section	Comment	Disposition	

Reviewer Signature:	Print Name:	Z#:	Date:
Dispositioner Signature:	Print Name:	Z#:	Date:
Concurrence Signature:	Print Name:	Z#:	Date:

Return to Point of Contact:	Z#:	Organization:

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Appendix 16-E. Procedure Verification Checklist (Page 1 of 2)

Procedure Verification Checklist					
Title:	**No.:**	**Revision:**	**Draft:**		
			Yes	**No**	**N/A**
1. Applicable guidelines of FSD-315-16-001, *Technical Procedure Writer's Guide*, have been addressed.			☐	☐	☐
2. Purpose adequately presents the intent of the procedure.			☐	☐	☐
3. Scope describes the major activities, and identifies the boundaries of the procedure.			☐	☐	☐
4. Punctuation and spelling are correct.			☐	☐	☐
5. Specific safety requirements are provided.			☐	☐	☐
6. Radiation and contamination requirements listed when required.			☐	☐	☐
7. Applicable references are listed.			☐	☐	☐
8. Prerequisites are specified, such as plant conditions, valve lineups, LO/TO, RadCon, etc.			☐	☐	☐
A. Identifies all portable material and test equipment required and calibration requirements.			☐	☐	☐
B. Identifies special equipment requirements required to perform the activity.			☐	☐	☐
C. Includes requirement to be on plan-of-the-day, minimum staffing, and pre-job briefing.			☐	☐	☐
D. Identifies required support systems and personnel permits.			☐	☐	☐
9. Locations where readings are taken are clearly identified.			☐	☐	☐
10. Include unique equipment identifiers, including noun name (labels).			☐	☐	☐
11. Ensure consistency among equipment labels, drawings (as applicable), and document nomenclature.			☐	☐	☐
12. Identifies alarms that could be expected to be activated as a result of performing this document.			☐	☐	☐
13. Identifies the performer (functional or organizational title) for each action, if more than one performer.			☐	☐	☐
14. Steps involving criticality safety implications, safety basis implications, technical limits, or process requirements are identified by a dollar sign ($), asterisk (*), circle CS, or other defined designator and the requirement source is identified in brackets at the end of the step.			☐	☐	☐
15. Instrument tolerances are within the given range.			☐	☐	☐

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Appendix 16-E. Procedure Verification Checklist (Cont.) (Page 2 of 2)

	Yes	No	N/A
16. User is told what to do if tolerances, limits, or acceptance criteria are not satisfied.	☐	☐	☐
17. Space is provided to initial/check each critical action step within the text or on an attachment.	☐	☐	☐
18. When other steps, attachments, or procedures are referenced, the procedure step reference is correct.	☐	☐	☐
19. Cautions, Warnings, and Notes are easily distinguishable from performance steps.	☐	☐	☐
20. Cautions, Warnings, and Notes proceed the step to which they apply and on the same page.	☐	☐	☐
21. Cautions, Warnings, and Notes provides the needed information and do not include an action.	☐	☐	☐
22. Only one action per step unless closely related.	☐	☐	☐
23. Sign-off space for both the performer and verifier are available if Independent Verification is required.	☐	☐	☐
24. The applicable attachments are included in the procedure, pages of each attachment sequentially numbered, each page of attachment has method to uniquely identify the page in order to reassemble pages if separate (e.g., date and time, container number, or other attachment unique identifier).	☐	☐	☐
25. All attachments have steps that direct the user to the attachments.	☐	☐	☐
26. All changes are identified with change bar and previous change bars have been removed (unless a total rewrite).	☐	☐	☐
27. Records generated by the performance of the document have been identified; in-process records instructions include actions to protect/store the in-process records, and processing instructions for the disposition of the records.	☐	☐	☐
Comments:			
Verifier: Signature _____ Z Number _____ Date _____			

Appendix 16-F.Procedure Validation Checklist (Page 1 of 2)

Procedure Validation Checklist			
Part # 1 – To Be Completed by the Issuing Organization			
Title:	Number:	Rev:	Draft:
Preparer:	Z No.	Phone:	
Initial Validation Method (Sect. 16.5.1.g): ☐ Walkdown ☐ Simulation ☐ Tabletop			
Additional Validation (Sect. 16.5.4 Only): ☐			
Part # 2 – To Be Completed by the Validator(s)			
Instructions: From each "No" answer, provide comment(s) on comment sheet or mark up the procedure to reflect necessary changes.			
Part 2, Section A – User Compatibility	Yes	No	N/A
Can the instructional steps be performed in sequence as written?			
Does each step provide sufficient detail to complete the activity?			
Have steps or information been omitted that are needed to perform the activity?			
Are steps sequential?			
Are steps limited to one action per step where possible?			
Are steps easily read & understood?			
Are required actions and responsibilities clearly defined?			
Are references to other steps within the procedure correct?			
Are instructions to branch to other procedures correct?			
Are tolerances and units of measure provided where needed?			
For time-critical actions, can steps be performed with time limits?			
If an activity is performed by more than one person, is adequate direction provided for communication and coordination?			
Are stop action limits provided for steps that specify adjustment to accomplish a task?			
Does the document match the actual work or process sequence?			
Can all steps be performed without inadvertently isolating or defeating safety systems?			
Can the steps be performed with the required staffing?			
Are spaces for recording entries adequate?			
Part 2, Section B – Facility Compatibility	Yes	No	N/A
Are locations specified by the procedure consistent with field installation?			
Do specified units of measure match those indicated on the instrumentation?			
Are equipment/components identified clearly and reflect the exact equipment field nomenclature?			
Are tools, instruments, or material needed to complete the task specified?			
Is necessary personnel protective clothing or equipment specified?			
Can steps be performed safely (hazards to personnel & equipment identified)?			
Are protective measures adequate to protect personnel?			
Does information provided in figures and tables matches the field installation?			
Does the document identify major symptoms and automatic equipment associated with an abnormal condition that could be expected to occur as a result of performing the activity?			
Are steps that involve or may affect safety limits (e.g., TSR) clearly identified and communicated to the user?			
Are potential emergency actions adequately defined?			

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Appendix 16-F.Procedure Validation Checklist (Cont.) (Page 2 of 2)

Part #2, Section C – ARP/AOP/EOP Validation (Mark N/A if this section is not applicable.)			Yes	No	N/A
User Compatibility					
Are appropriate corrective actions to alarms specified?					
Are entry and exit points clearly specified?					
Facility Compatibility					
Is the correct alarm identification provided (matches the panel alarm window CRT/PLC display screen exactly)?					
Part #3 – To Be Completed by the Validator			Yes	No	N/A
The user feels that the document adequately reflects the ability of the least experienced, yet qualified user?					
Validator's Signature:	Validator's Printed Name:				
Z No.	Phone:	Date:			
Part #4 – To Be Completed by the Responsible Line Manager					
Responsible Line Manager Signature:	Responsible Line Manager Printed Name:				
Z No.	Phone:	Date:			

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Appendix 16-G. Immediate Procedure Change Cover (Page 1 of 1)

Immediate Procedure Change (IPC) Cover			
Section 1 – Originator Request			
Document No.:	Revision No.:	IPC No.:	
Title:			
Description of need and requested action (Attach procedure mark-up and numbered additional sheets if needed.):			
Originator Name (print)	Organization	Z#	Date
Section 2 –Reviews			
Discipline	Name	Signature	Date
USQ/USI Number:		☐ N/A	
Section 3 – Final Approvals			
FOD Concurrence Signature	Print Name and Title	Z#	Date
☐ Permanent ☐ Limited Use	Effective Date: Expiration Date:		
Comments:			
Responsible Line Manager Signature	Print Name and Title	Z#	Date

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Attachment 16. Local Procedures (Cont.) (Page 45 of 51)

Appendix 16-H. Documentation of Periodic Review (Page 1 of 1)

Documentation of Periodic Review

Document Number: _____ Revision: _____

Title: _____

Due Date for Review: ____ Responsible Line Manager: _____ Z#: _____

Evaluation

1. Perform a Verification of the entire procedure.
2. Perform a Validation of the entire procedure.

Evaluation Results	YES	NO
3. Is the document, in its entirety, still need for operations at the facility? (If No, skip questions 4-7 and select "Cancellation" or "Revision."	☐	☐
4. Is the document technically accurate?	☐	☐
5. Is the document usable in its current form?	☐	☐
6. Are the references current and complete? (If No, a Minor Revision should be considered.)	☐	☐
7. Does the document satisfy the current format requirements?	☐	☐

IWD-Equivalent Evaluation Results	YES	NO	N/A
8. Is the P300 Hazard Grading Matrix for this document still accurate?	☐	☐	☐
9. Is this document still acceptable as P300 Part 1, *Activity Specific Information*?	☐	☐	☐
10. Is this document still acceptable as P300 Part 2, *Work-Area Information*?	☐	☐	☐
11. Is this document still acceptable as P300 Part 3, *Validation and Work Release Information*?	☐	☐	☐
12. Is this document still acceptable as P300 Part 4, *Post-Job Review*?	☐	☐	☐

13. Based on this evaluation, the following actions is required.
    - ☐ None — The document is extendable in accordance with its periodic review cycle.
    - ☐ Revision — Initiate a revision in accordance with the governing procedure.
    - ☐ Cancellation — Initiate cancellation in accordance with the governing procedure.

14. Periodic Review Evaluation Performed By:

Name (print)	/ Signature	/ Z number	/ Date

Comments: _____

_____

_____

_____

Responsible Line Manager (RLM) Approval:

RLM/Representative (print)	/ Signature	/ Z number	/ Date

Facility Operations Director (FOD) Concurrence (if required):

FOD/Representative (print)	/ Signature	/ Z number	/ Date

Appendix 16-I. Team Members/Review Disciplines (Page 1 of 3)

Initial Development	Revision	IPC	Organization that must Review	Condition for Review and Comment (i.e., does the procedure do the following?)
S	S	R	Operations (FOD)	Describe operation of facility equipment, systems, or administrative processes; or describe a work activity performed within the facility.
R	R	See Note 1	Training	All procedures must be evaluated to determine training requirements and potential impact to existing training courses (see P315, Attachment 16, Section 16.5.3.e).
S	S	S	Training	Involve the planning or performance of training activities.
R	R	R	Safety Basis	▪ Implement or affect the facility safety basis documents. ▪ Describe or affect aspects of the facility design basis and operational requirements relied upon for authorization (e.g., safety analyses, hazard classification documents, or system evaluation reports).
S	S	S	Facility System Engineering and Management	▪ Involve equipment and systems under Configuration Management. ▪ Describe or affect aspects of the facility design basis and operational requirements relied upon for authorization (e.g., safety analyses, hazard classification documents, or system evaluation reports).
R	R	R	Nuclear Criticality Safety	Describe the handling, processing, use, storage, transfer, measurement, or inventory of fissile material.
S	S	S	Emergency Planning and Preparedness	Involve emergency response, emergency operations, or emergency planning.
S	S	S	Fire Protection	Affect fire safety, including fire protection engineering, fire response, fire prevention, and fire system inspection, testing, and maintenance.
R	R	R	Waste Management Coordinator Program	Describe waste-related activities.
S	S	S	Procurement	Describe procurement activities.
S	S	S	Institutional Quality	Potentially impact quality assurance requirements.

Appendix 16-I. Team Members/Review Disciplines (Page 2 of 3)

Initial Development	Revision	IPC	Organization that must Review	Condition for Review and Comment (i.e., does the procedure do the following?)
S	S	S	Radiological Engineering	Affect radiological or radioactive systems/processes or alter systems or components that monitor/mitigate the consequences of a radiological accident. Also, documents that involve packaging, transfer, or shipment of radioactive materials.
S	S	S	Health Physics Operations	Direct activities involving monitor/survey for radioactive contamination, or direct activities that could potentially breach systems/components and result in the release of radioactive material. Also, documents that involve packaging, transfer, or shipment of radioactive materials.
R	R	R	Nuclear Materials Control and Accountability	Describe the handling, processing, use storage, transfer, measurement, or inventory of nuclear material.
S	S	S	Standards and Calibration Laboratory	Involve the use and control of calibrated measurement and test equipment, or the calibration of field instrumentation.
S	S	S	Security	Address: ▪ Protection of or access to classified matter ▪ Physical or administrative access controls or boundaries of security areas ▪ The installation, modification or removal of door or motion alarms ▪ Access or work performed by foreign nationals
S	S	S	Industrial Hygiene and Safety	Concern issues associated with industrial hygiene and occupational safety.
S	S	S	Software Quality Management	Require the use and control of any software.
R	R	R	Packaging and Transportation	Involve packaging, onsite transfer, or off-site shipment of hazardous material.
S	S	S	Affected Organization	Affect the operation of an organization either residing or performing work activities within the facility.

Appendix 16-I. Team Members/Review Disciplines (Page 3 of 3)

Initial Development	Revision	IPC	Organization that must Review	Condition for Review and Comment (i.e., does the procedure do the following?)
R	R	R	Environmental Compliance Programs (ENV-CP)	▪ Involve activities that may generate, process, store or dispose of waste for the Laboratory. ▪ Activities conducted within New Mexico Environment Department (NMED) Hazardous Waste Facility permitted or interim status units must meet specific permit requirements including: – Permit-required equipment (e.g., eye wash, non-sparking tools for certain waste streams, etc.) – Infrastructure (e.g., fire suppression, dikes and berms, specific secondary containment, etc.) – Site configuration (e.g., fencing, secured access, buffer areas, specific waste container clearances, etc.)
Note 1: Per Attachment 16, Section 16.6.1.e, the Responsible Line Manager (RLM) is to provide a briefing on the IPC to workers with a follow-up review by the Training organization to determine long term training requirements and impact to other training courses and qualifications. **R –** Require Review and Comment from this organization **S –** Suggest Review and Comment from this organization				

Appendix 16-J. Excluded Procedure and Document Types (Page 1 of 3)

Table 16-J-1. Excluded Procedure and Document Types

Procedure/Document Type	Requirements Document	Justification for Exclusion
Integrated Work Document (IWD)	P300, *Integrated Work Management*	An IWD directs the performance of an individual work activity, and P300 contains the minimum set of development and change control, format and content, document control, and usage requirements to be a stand-alone process. Additionally, IWDs are required to be reviewed by the Safety Basis organization and an Unreviewed Safety Question/ Unreviewed Safety Issue (USQ/USI) performed as required. IWDs **are** excluded from the requirements found in Attachment 16 of this document.
Safety Basis Documents [e.g., Documented Safety Analysis (DSA), Preliminary Safety Analysis (PSA), etc.]	PD110, *Safety Basis* and the Safety Basis Procedures (SBPs)	These documents do not direct the performance of individual work activities or the facility or its equipment/system. But these documents are the basis for which all facility operations flow. The SBPs series defined in PD110 contains the minimum set of development and change control, format and content, document control, and usage requirements to be a stand-alone process. These documents are generated by the Safety Basis organization. These Safety Basis documents **are** excluded from the requirements found in Attachment 16 of this document.
Software Documentation (e.g., software design documentation, software verification and validation documentation, etc.)	P1040, *Software Quality Management*	These documents do not direct the performance of individual work activities or the facility or its equipment/system. Typically they provide some of the basic controls like a "technical procedure," such as configuration management, due to the potential for this software to impact the design and/or operations of the facility and its equipment/systems. P1040 provides a basic description of the different document types that may be required for a given software application, including expected content and requirements for Safety Basis review and potential USQ. Additionally, it links to P1020-2, *Laboratory Document Control* for document control requirements. These Software documents **are** excluded from the requirements found in Attachment 16 of this document.

Appendix 16-J. Excluded Procedure and Document Types (Cont.) (Page 2 of 3)

Table 16-J-1. Excluded Procedure and Document Types (Cont.)

Procedure/Document Type	Requirements Document	Justification for Exclusion
Maintenance Procedures	DOE G 433.1-1A, *Nuclear Facility Maintenance Management Program Guide for Use with DOE O 433.1B*, Section III.F, *Maintenance Procedures*	A maintenance procedure provides the instructions for the performance of an individual maintenance work activity, and DOE G 433.1-1A provides the minimum set of development and change control, format and content, and usage requirements to be a stand-alone process. Additionally, the DOE Guide requires any maintenance procedure that could affect safety Structures, Systems, and Components (SSCs) be reviewed by the Safety Basis organization and an USQ performed as required. Maintenance procedures **are** excluded from the requirements found in Attachment 16 of this document.
Training Documents (i.e., training material and qualification standards)	P781-1, *Conduct of Training*	These documents are developed as a result of the Systematic Approach to Training (SAT) analysis and do not direct the performance of individual work activities or the facility and its equipment/system. But these documents typically provide some of the basic controls as a "technical procedure," such as configuration management, due to the potential impact on the training of workers operating the facility and its equipment/systems. P781-1 acknowledges the need for a review by Safety Basis and a USQ/USI as required. These training documents **are** excluded from the requirements found in Attachment 16 of this document.
Local Management Control Documents (e.g., policies, plans, etc.)	Local Requirements	Management control documents created locally may impact the execution of work activities or the operation of the facility and its equipment/systems. Lacking a specific requirement document, it must be assumed that insufficient development, format and content, and configuration controls are established. These documents **are not** excluded from the requirements found in Attachment 16 of this document.

Appendix 16-J. Excluded Procedure and Document Types (Cont.) (Page 3 of 3)

Table 16-J-1. Excluded Procedure and Document Types (Cont.)

Procedure/Document Type	Requirements Document	Justification for Exclusion
Classified Procedures	Local Requirements	Classified procedures may impact the execution of work activities or the operation of the facility and its equipment/systems. Any requirements resulting from being classified, such as storage and access requirements, are in addition to those identified in Attachment 16 of this document. These documents **are not** excluded from the requirements found in Attachment 16 of this document.

No: P315 Conduct of Operations Manual
Attachment 17. Operator Aid Postings (Page 1 of 9)

17.0 OPERATOR AID POSTINGS

The purpose of this attachment is to provide guidance for operator aids by achieving the major objectives of 1) ensuring that the number of aids are limited to only those considered essential; 2) issue and posting of aids are controlled by requiring facility management review and approval; 3) once issued/posted, the aids are maintained in good physical condition, their technical content is current and correct; and 4) aids are removed when no longer required.

This attachment describes the requesting, authorization, documentation, placing, and reviewing required to ensure operator aids are current, complete, and necessary. Information used in the operation of facility systems must be properly controlled. Operator aids provide an important function in the safe operation of the facility. Operator aids may come in many forms: copies of procedures (portion or pages thereof), system drawings, handwritten notes, curves, and graphs, etc.

The scope of the Operator Aid Program does not include postings controlled through another established safety management program, such as radiological postings that are controlled by P121, *Radiation Protection*. Direct any questions regarding the applicability of this attachment to OS-RTS.

17.1 General Requirements

Facility operator aids (information posted for personnel use) should provide general information useful to operators in performing their duties. An operator aid program should be established to ensure that operator aids that are posted are current, correct and useful.

Do not post operator aids (sample topics and types in Appendix 17-A) in a manner that will obscure controls, indications, or indicating lights. They should be firmly attached in close proximity to where they would be expected to be used and suitably protected from the environment.

Any person finding an unauthorized operator aid must take appropriate steps to notify the Operations Manager (OM). The OM either authorizes the operator aid in accordance with this attachment or has the aid removed.

Personnel must not independently label components or systems in the facility through the use of operator aids. Requests for labeling of components or systems should be directed to the applicable OM and be controlled by the equipment and piping labeling program described in Attachment 18, *Equipment and Piping Labeling*.

The requester/department originating the operator aid notifies the OM when the need for the operator aid no longer exists, and ensures the operator aid is disposed.

Do not use operator aids in the place of the lockout/tagout process used for the protection of personnel, equipment, and the environment.

Do not use operator aids in place of the administrative lock process.

Do not use operator aids to bypass the normal procedure review and approval process. Do not approve operator aids that alter or contradict procedures. Instead, appropriate procedures should be changed to incorporate the necessary information.

Operator aids may supplement approved procedures, but are not used in place of approved procedures. Operator aids should be viewed as a convenience to the individual using them, not as a requirement.

During routine facility inspections, operations personnel should review operator aids to ensure that they are approved. Report unapproved postings to the OM for approval in accordance with this attachment or remove the operator aids.

Update operator aids that are derived from approved procedures when the "parent" procedure is revised.

Documents that are posted in accordance with other approved site programs, such as Confined Space Entry Permits, Radiation Work Permits, Safety Notices, Personal Protective Equipment (PPE) donning/doffing instructions and Personal Contamination Monitor (PCM) monitoring instructions, etc., are not considered to be operator aids.

Operators, maintenance staff, and other facility staff are trained on the operator aids process, as appropriate.

Any facility that has a single control area does not require duplicate tracking of Operator Aids using Appendix 17-D, T*emplate for Control Area Information Book Index Sheet*.

17.2 Request and Approval of Operator Aids

Any facility employee may develop an operator aid; however, the operator aid must be approved before posting or use. All facility personnel should be informed of the importance of controlling posted information and the procedure to be followed for posting information.

Submit operator aids to the OM for approval in a professional format on a suitable medium; e.g., graph on laminated paper or Bakelite conversion chart. (See the template in Appendix 17-B, *Template for Operator Aid Request*). Each operator aid request submitted contains the signature of the originator. Supply information listed in Section I of Operator Aid Request. Submit the Operator Aid Request with the attached proposed operator aid. The OM signs in the "Responsible Manager" space for aids requested by operations department personnel. Operator aids also may include a sketch of the location of the aid in conditions where the signature block would create congestion or approved media does not allow for signature (e.g., Bakelite). For example, control board labeling, NOT on a controlled drawing, would require the use of an operator aid. Due to control board congestion, signatures on all aids are not required as long as they are indicated on the sketch. Operator aids may be used on electronic systems provided they do not interfere with the intended function.

The OM reviews each proposed operator aid submitted and verifies the aid's technical content, preparation and approval are correct and that the aid is necessary. The OM documents approval or disapproval in a manner similar to Appendix 17-B, *Template for Operator Aid Request*, Section III, and then signs and dates the request, and determines training requirements for implementation of the aid. Notify the training department of any training requirements. If the operator aid request is disapproved, return to the requester.

The OM:

- reviews and approves each operator aid submitted,

- completes an Operator Aid Record Sheet (Appendix 17-C provides a template) in accordance with instructions below and enters the sequential serial number on the bottom right corner of the operator aid, and
- places a copy of the operator aid in the file log binder and has the original posted or placed in the Control Area Information Book as appropriate.

Changes to operator aids must receive the same level of review and approval as the original posting.

17.3 Operator Aid File

Maintain the Operator Aid File in the Control Area or the OM's office. This file may be generated and maintained electronically. The operator aid file includes an Operator Aid Record Sheet and a copy of each operator aid either posted or contained in a Control Area Information Book. Use this file to support periodic reviews and to provide a reference copy should the posted copy be damaged or lost.

The Operator Aid Record Sheet includes the following information:

- Serial number—The number should indicate the facility, year and the next consecutive number of the operator aid to be issued. For example, 54E-06-27 would indicate the 27th operator aid issued for the year 2006.
- Requester/department—Name of the individual wishing to post the operator aid and the department represented.
- Date posted—The date the OM authorizes the operator aid to be posted (or placed in the Control Area Information Book).
- Title/Reference—The title of the operator aid or a brief description of the topic addressed within the aid. The primary reference(s) used to develop the operator aid should be listed here including the revision number where applicable.
- Location—Area where the operator aid is to be posted. This location should be specific enough to be easily found by the information contained in the Operator Aid File. "Auxiliary Building," for example, is not specific; "Unit 1 Waste Monitoring Panel," however, is more complete.
- OM Posting Approval—The OM indicates his/her authorization to post the operator aid.
- Removal Approval Initial/Date—When the operator aid is no longer current, correct, complete, or necessary, the OM recommends its removal. The OM initials and dates this column on the index and has the operator aid removed. In the case of operator aids originated by a department other than Operations, the OM should notify the originating department to remove the operator aid. The OM will dispose of the aid as appropriate.

17.4 Control Area Information Book

Control Area Operators frequently make use of information such as tables or graphs of tank volumes, chemical concentrations, etc. All such information must be controlled to ensure that the information is the latest revision. Rather than posting operator aids in Control Areas, it may be more convenient to file the aids in a Control Area Information Book. The Control Area Information Book is optional. The Operator Aid File is still required.

If the organization opts to use a Control Area Information Book, all operator aids contained within it must be approved and controlled as specified in this section.

The OM files the operator aid by entering on the Control Area Information Book Index Sheet (Appendix 17-D) the serial number assigned to the aid, the title of the operator aid, his/her signature, and the date the operator aid is effective. The operator aid should then be filed in the Control Area Information Book in the same sequential order as listed on the index sheet.

When the need for the Control Area Information Book operator aid no longer exists or it is superseded, the OM will recommend its removal. The OM removes the aid from the book, initials, and enters the removal date on the Control Area Information Book Index Sheet and also removes the aid from the Operator Aid Log as specified above.

17.5 Periodic Reviews and Audits of Operator Aids

17.5.1 Reviews

The OM directs a review of the Operator Aid Record Index periodically, but at a minimum semi-annually (every six months) in conjunction with the audit. This review is a "book review" only. Physical verification of posted material is not required. The review should confirm the continued need for each aid, that no procedure changes have been made that affect the aids, and that the Operator Aid Record Index is correct and up-to-date. The reviewer documents the review by writing below the last index entry "Reviewed by (name) on (date)." If maintaining via an electronic system, the audit will be noted within the electronic system or a memo to the file.

17.5.2 Audits

The OM directs an audit of all aids listed in the Operator Aid Record (both posted operator aids and aids contained in the Control Area Information Book).

Perform audits semi-annually and include the following (for those operator aids not initiated by the operations department, the initiating department is contacted to perform the review):

- A continuing need exists.
- Information contained in operator aids is current and applicable.
- Unauthorized operator aids are removed.
- The physical location of each operator aid is verified. Operator aids no longer posted should be removed from the index or replaced, as needed.
- Each operator aid is legible and in good condition, and no unapproved pen-and-ink changes exist.
- Drawings or controlled documents that are approved and posted as operator aids are confirmed as the correct revision.
- The use of operator aids is minimized.

Document the audit by writing below the last entry in the Operator Aid Record Index " Audit performed by (name) on (date)." If maintaining via an electronic system, the audit will be noted within the electronic system or a memo to the file. List any operator aids not audited due to inaccessibility.

At the end of each audit, results of that audit will be submitted to the OM. The report should include a short description of any problems found and the actions taken to resolve the problems. In addition, a list of those operator aids that the OM recommends be made permanent. For instance, a permanent procedure change may be required or a fabricated label may need to be produced.

The possible need for permanent information should be addressed if the operator aid has been in the operator aid log for two or more quarters. The OM approves all information that is to be permanently posted and ensures an adequate review of the information is completed. In some cases, a design change may need to be initiated to correct an abnormal or hazardous condition that may not be acceptable on a permanent basis.

17.6 Training

There is no specific mandatory training or qualification required to implement this attachment. It is recommended that all personnel implementing this document complete UTrain Course #24669, *OS-RTS ConOps, Attachment 17, Operator Aids*. This training will enhance the employee's knowledge as required and as outlined in DOE O 422.1, *Conduct of Operations*.

17.7 Records

The following are considered records generated by this attachment and must be managed in accordance with P1020-1, *Laboratory Records Management*, and any local procedures:

- Operator Aid Request
- Operator Aid Record Sheet

17.8 Acronyms

LANL	Los Alamos National Laboratory
OM	Operations Manager
PCM	Personal Contamination Monitor
PPE	Personal Protective Equipment

17.9 References

- P121, *Radiation Protection*
- DOE O 422.1, *Conduct of Operations*
- P1020-1, *Laboratory Records Management*

17.10 Appendices

Appendix 17-A. *Sample Topics and Types of Operator Aids*
Appendix 17-B. *Template for Operator Aid Request*
Appendix 17-C. *Template for Operator Aid Record Sheet*
Appendix 17-D. *Template for Control Area Information Book Index Sheet*

No: P315 Conduct of Operations Manual
Attachment 17. Operator Aid Postings (Cont.) (Page 6 of 9)

Appendix 17-A. Sample Topics and Types of Operator Aids (Page 1 of 1)

Operator Aids should include, but are not limited to, the following:

1. Pages from procedures posted on bulletin boards, under desk glass, etc.
2. Conversion charts or formulas maintained in the Control Area Information Book.
3. Plaques, conversion charts, formulas posted in vicinity of operating equipment indicating devices (e.g., gages, meters, recorders, etc.).
4. Set points on posted instructions for setting tank level indicator set points.
5. Set points on various instrument nameplates in the field.
6. Instructions or set points on where to set equipment or component operation (e.g., Glovebox air monitor flows).
7. Tables or charts used by operators that are not in a procedure and are not controlled by some other method.
8. Notes (permanent or temporary) that instruct operators to use specific instrumentation points for Logbook, Run book or round sheet readings.
9. Motor Control Center load lists if not controlled by a procedure or the Configuration Management System.

No: P315 Conduct of Operations Manual
Attachment 17. Operator Aid Postings (Cont.) (Page 7 of 9)

Appendix 17-B. Template for Operator Aid Request (Page 1 of 1)

OPERATOR AID REQUEST FORM				
OA # - - REV.				
SECTION I				
TYPE OF AID : (check one	Drawing Sketch	Graph Chart	List	Other
TITLE :		LOCATION OF AID :		
SOURCE DOCUMENT:		REV. NO.	DATE :	
REASON :				
REQUESTER SIGNATURE : PRINT NAME :			DATE: PHONE NUMBER :	
SECTION II				
RECOMMENDED FOR (check one):		APPROVAL	DISAPPROVAL*	
COMMENTS OR REASONS FOR DISAPPROVAL :				
RESPONSIBLE MANAGER SIGNATURE : _____ PRINT NAME :			DATE :	
* Requester document reasons why approval should still be required				
SECTION III				
(check one)	APPROVAL	DISAPPROVAL*		
COMMENTS OR REASONS FOR DISAPPROVAL :				
REQUIRED TRAINING? (check one)	REQUIRED READING	SHIFT BRIEFING	NONE	OTHER
SECTION IV				
POSTED BY SIGNATURE : PRINT NAME :			DATE :	
SECTION V				
REASON FOR REMOVAL :				
OPERATIONS MANAGER SIGNATURE : PRINT NAME :			DATE :	
SECTION VI				
OPERATOR AID REMOVED BY (signature) : PRINT NAME :			DATE :	

Change Control-4

No: P315 Conduct of Operations Manual
Attachment 17. Operator Aid Postings (Cont.) (Page 8 of 9)

Appendix 17-C. Template for Operator Aid Record Sheet (Page 1 of 1)

OPERATOR AID RECORD SHEET						
Serial Number	Title	Requester/ Department	Date Posted	Location	Operations Manager (OM) Signature	OM Removal Init/Date

No: P315 Conduct of Operations Manual
Attachment 17. Operator Aid Postings (Cont.) (Page 9 of 9)

Appendix 17-D. Template for Control Area Information Book Index Sheet (Page 1 of 1)

Control Area Information Book Index Sheet					
Serial No.	Title	Operations Manager (OM) Signature	Date Posted	OM Initials for Removal	Removal Date

No: P315 Conduct of Operations Manual
Attachment 18. Equipment and Piping Labeling (Page 1 of 1)

18.0 EQUIPMENT AND PIPING LABELING

18.1 Equipment and Piping Labeling

Equipment and piping labeling must be managed in accordance with the applicable Laboratory policies and procedures. See the *LANL Engineering Standards Manual*, Chapter 1, Section 200, *Equipment Numbering and Labeling*.

The minimum scope of this attachment must be the equipment and systems credited in accordance with the requirements of Attachment 8, Section 8.1.2.

18.2 Equipment and Piping Labeling Administration

The use of informal labels is not authorized. Instead, a new label must be generated and installed in accordance with established engineering standards. In the period between discovery of a missing or damaged label and its formal replacement, a facility approved and controlled temporary label should be used.

Personnel must identify damaged or missing labels during routine operations (e.g., following maintenance, during facility rounds and/or tours, executing alignment checklists, etc.) and, if a new label is required, a new label must be generated and installed in accordance with established engineering standards. It is recommended that a separate review of labels for safety related systems or components be performed on a periodic basis.

The installation of any new or replacement labels is documented through the facility maintenance work control system or other facility specific process.

The application and content of a temporary label must be approved by the Operations Manager (OM) or designee.

Temporary labels to replace a damaged label must contain the same information as the original label. Otherwise, personnel must acknowledge that detailed information was unavailable and formally request engineering to provide the data.

18.3 Training

There is no specific mandatory training or qualification required to implement this attachment. It is recommended that all personnel implementing this document complete UTrain Course #24670, *OS-RTS ConOps, Attachment 18, Equipment and Piping Labeling*. This training will enhance the employee's knowledge as required and as outlined in DOE O 422.1, *Conduct of Operations*.

IMPORTANT

If you wish to receive credit for the preceding document you **must** enter the course through *UTrain* **not** the Policy Office website.

Los Alamos
NATIONAL LABORATORY
EST. 1943

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Integrated Work Management

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Integrated Work Management

1.0 PURPOSE

The purpose of this document is to establish the Laboratory Integrated Work Management (IWM) expectations for doing work in a manner that protects people, the environment, property, and the security of the nation. The supporting processes are designed to accommodate work ranging from a preventive maintenance operation with a set of well-defined steps to a large, one-time research experiment. For simplicity in this document, the term “hazard” will be used to mean any source of environmental, safety, or health danger or any safeguards and security threat or vulnerability. Similarly, the term “controls” will be used to convey the mechanisms, processes, procedures, and preventive measures used to eliminate or reduce the risks posed by these hazards.

The five core functions, of Integrated Safety Management (ISM) and Integrated Safeguards and Security Management (ISSM) are (1) define the work, (2) identify and analyze hazards, (3) develop and implement controls, (4) perform the work, and (5) provide feedback and continuous improvement. These core functions of IWM emphasize the following:

- Management and worker accountability;
- Applying the worker’s knowledge, experience, skills, and training;
- Providing integrated, worker-friendly documentation that includes defined work tasks/steps linked to specific hazards and unambiguous controls;
- Identifying a single Person in Charge (PIC) for each work activity;
- Providing independent oversight and facility coordination; and
- Formally validating, releasing, and closing out work activities.

The most important aspects are the direct involvement of workers in preparing the work control document and controlling the hazards, and the accountability of Responsible Line Managers (RLMs) and Facility Operations Directors (FODs) for safety, security, and environmental protection.

Workers must be actively engaged throughout the IWM process to provide the practical knowledge needed to fully identify the hazards and to ensure that controls are effective and procedures are workable. Workers must perform their work within established control systems and continually evaluate these systems to ensure their adequacy for the work being performed.

IWM allows management judgment, tailoring, and decision-making to address the broad range of hazards and complexity of work at the Laboratory. For all work, the FODs or a FOD representative, and RLMs must

- establish processes that ensure the implementation of the requirements of IWM;
- determine the adequacy of controls to mitigate the hazards;
- determine the competence and commitment of workers to perform work in a safe, secure, environmentally responsible manner; and
- assess operations to identify needed improvements.

In certain cases, the adequacy of controls must be evaluated and approved by institutional support organizations (e.g., Biosafety Committee, Occupational Safety and Health [OSH] Division, Radiation Protection Division for Radiological Work Permits (RWPs), Environmental Protection Division (ENV) for environmental requirements, and Security and Safeguards Directorate for vaults, classified computing, alarms, access control systems, etc.).

2.0 AUTHORITY AND APPLICABILITY

2.1 Authority

This document is issued under the authority of the Laboratory Director to direct the management and operation of the Laboratory, as delegated to the Associate Director for Nuclear and High Hazard Operations (ADNHHO) as provided in the Prime Contract. This document derives from the Laboratory Governing Policies, particularly the section on Management Systems.

- Issuing Authority (IA): Associate Director for Nuclear and High Hazard Operations (ADNHHO)
- Responsible Manager (RM): Operations Support-Division Leader (OS-DL)
- Responsible Office (RO): Operations Support-Division Office (OS-DO)

2.2 Applicability

This document applies to all Laboratory workers, and the requirements contained in this document apply to work activities performed at the Laboratory. It does not apply to subcontractors and activities covered under an Exhibit F. IWM emphasizes expectations for the safe, secure, and environmentally-sound conduct of work at the activity level, and it complements facility and institutional controls that mitigate safety, security, and environmental hazards.

IWM and this document establish the general expectations for the conduct, authorization, and coordination of all activity-level work at the Laboratory, including the line manager's authorization of workers, based on the worker's competence and commitment, to perform his/her assignments in a safe, secure, and environmentally responsible manner. FODs coordinate the activities within their assigned facilities.

This document should be used directly for the development of

- Integrated Work Documents (IWDs),
- other equivalent work control documents, or
- other more specifically tailored IWM flow down procedures and related processes.

Such documents must meet the **seven** (7) criteria required for Part 1 of an IWD as defined in Section 3.2.1 of this document.

For certain types of work, the detailed implementation of certain requirements in Section 3.0 has been tailored specifically to that work through other IWM implementation documents, e.g., AP-WORK Procedures, Attachment A, *Integrated Work Management (IWM) Process for Research and Development (R&D),* etc.

Section 3.1 (which describes the 5-steps of ISM and ISSM) applies to all work at Los Alamos National Laboratory (LANL or the Laboratory), and Sections 3.2 applies to all IWDs.

However, for the work categories listed below, the tailored requirements that are identified for each should be followed rather than the specifics in Section 3.1 and 3.2, where the tailored

requirements offer additional instructions or alternative forms to use. The work-specific IWM implementation documents or processes listed here fully implement the underlying requirements of Section 3.0 in a way appropriate to that work and the associated hazards.

2.2.1 Research and Development (R&D)

- Follow Attachment A of this document.

2.2.2 Facilities and Maintenance

- Follow P950, *Conduct of Maintenance,* and the AP-WORK Procedures.

2.2.3 Operations

- Nonroutine work—Follow the processes in Section 3.0 (no tailored requirements are applicable).
- Routine Operations—Follow Section 3.0, however, technical procedures may be developed as IWD-equivalent work control documents in accordance with Attachment 16 of P315, *Conduct of Operations Manual*, and DOE-STD-1029-92, *Writer's Guide for Technical Procedures,* found on the IWM Toolbox, in the Guidance documents section.

2.2.4 Subcontractors

- Follow P101-12, *ES&H Requirements for Subcontractors,* and the processes in this document.

2.2.5 Security

- Follow SD200, *Integrated Safeguards and Security Management*.

The requirements contained in this document do not apply to activities performed under emergency circumstances. However, the general principles and concepts of ISM and ISSM should be considered in the preplanning for emergencies and once emergency situations are stabilized, the IWM process must be applied to recovery and follow-up activities.

Work conducted at a non-Laboratory site must ordinarily follow that site's work-control mechanisms. For work at locations having inadequate work-control processes, the appropriate LANL IWM implementation process requirements must be implemented to the extent practical as defined by the RLM.

3.0 PROCEDURE DESCRIPTION

3.1 Integrated Work Management (IWM) Requirements

All Laboratory work is governed by the five steps, or Core Functions, of ISM and ISSM:

1. Define the work.
2. Identify and analyze hazards.
3. Develop and implement preventive measures and controls.
4. Perform work safely, securely, and in an environmentally responsible manner.
5. Provide feedback and strive for continuous improvement.

Work activities that meet the criteria established and maintained by the Deputy Associate Director (DAD) committee must be documented in the Work Management System unless excluded by that

committee. Both the criteria and the list of excluded activities are accessible from the IWM website.

Documentation in the Work Management System must include:

- Activity title*
- Activity description*
- Identifying organizational information
- Work location(s)*
- A completed initial hazard screening of the activity
- An activity hazard level determination, with justification
- An exposure assessment for activities with chemical, biological, or physical agents

  Note: In order to keep information in the institutional inventory unclassified or to control unclassified controlled information such as Unclassified Controlled Nuclear Information (UCNI):

  – The activity title and description may be replaced with a statement that says to contact the organization for more information.

  – All or part of the work location may be omitted, if needed. The preferred method is to omit the activity title and description.

As the levels of risk posed by the hazards and work complexity increase, IWM requires documentation and a more rigorous process. To guide this process, activities must be graded as Low-Hazard, Moderate-Hazard, or High-Hazard/Complex based on the results of the initial hazard screening. See Fig. 1. Attachment B, *Hazard Grading Table*, must be used to determine the appropriate category.

Note: The thresholds in the *Hazard Grading Table* are subject to interpretation—they are guidelines, often requiring the help of a Subject Matter Expert (SME) to determine hazard grading. Section 9.1 describes the types of SMEs available. In some cases, thresholds are better defined in referenced institutional requirements documents, e.g., Radiation Protection, OSH procedures. With concurrence from an SME, engineered controls may be considered in determining the hazard grading if engineered controls have been established, thoroughly reviewed, and proven highly reliable in minimizing the hazards without active worker involvement.

For new activities, activities that are being changed, or for activities that are being resumed, RLMs should refer to NHHO-AP-009, *New or Changed Activity Approval Process,* and complete the steps as required. NHHO-AP-009 is an Associate Director for Nuclear and High-Hazard Operations (ADNHHO) procedure intended to complement, not replace, requirements in this document. ***(Note:*** There is currently some duplicate effort required to complete the steps in NHHO-AP-009 and the IWM process. LANL is aware of the duplication and is developing solutions to consolidate processes and minimize duplication.)

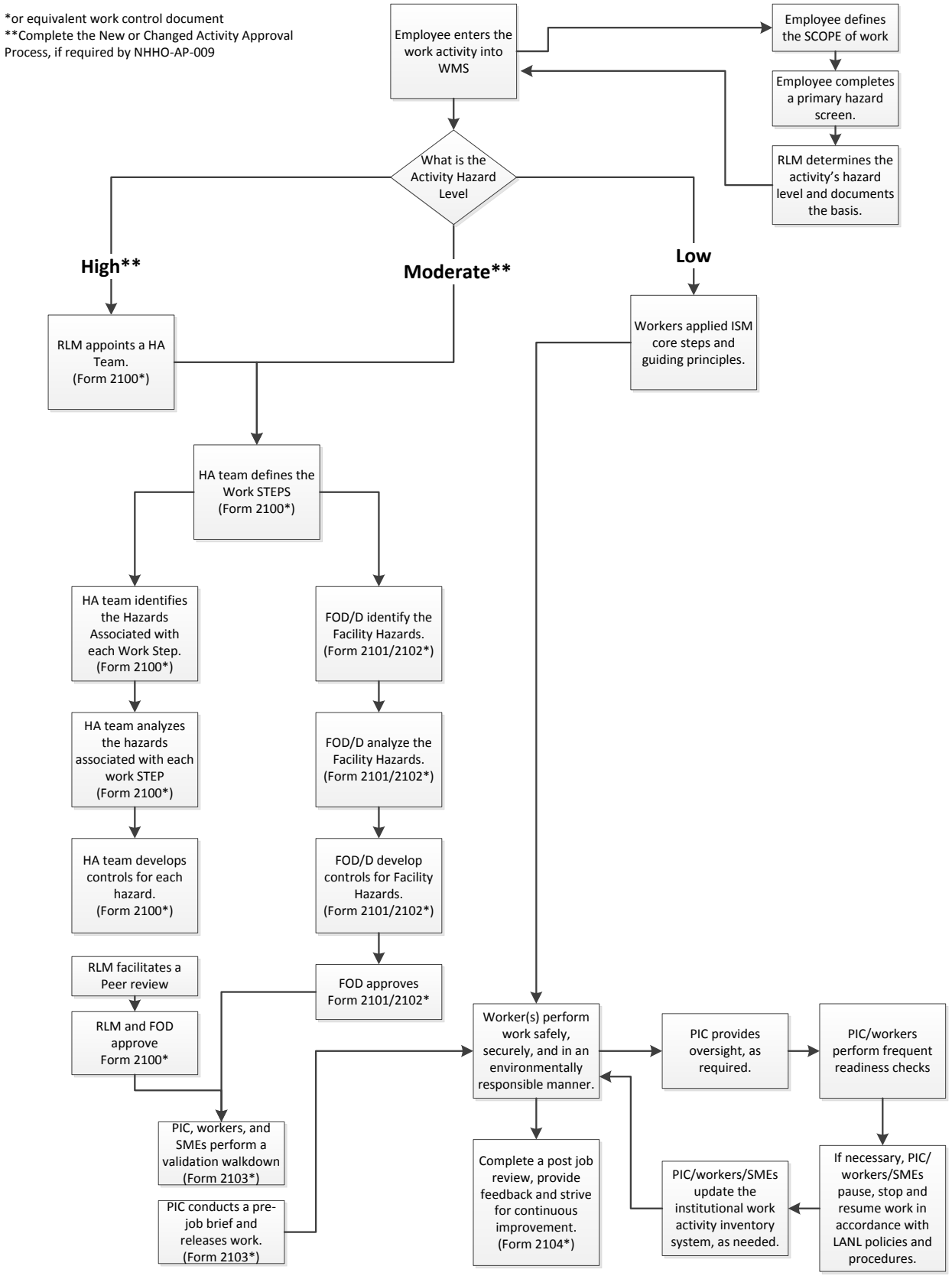


Fig. 1. Integrated Work Management Process

3.1.1 Define the Work

Work components and processes must be defined in sufficient detail to allow identifying and analyzing hazards and the circumstances in which they could cause harm. This generally requires each of the tasks and work steps within an activity to be identified, defined, and planned so the associated hazards can be adequately mitigated. Where required by DOE requirements, e.g., 10 CFR 851, *Worker Safety and Health Program*, an existing job task analysis or new job task analysis should be used to identify and define work processes. The work definition should include factors such as the:

- facility and/or location where the work will be performed;
- configuration and use of equipment;
- use of classified or sensitive information or components;
- effects on the environment, including chemical and materials use, waste streams, and other potential environmental impacts; and
- impacts to ancillary and co-located workers.

One RLM must be identified as responsible and accountable for the safety, security, and environmental compliance of each work activity. The RLM for the activity is responsible for defining the work in sufficient detail to identify and analyze the hazards. The RLM and/or PIC should engage appropriate SMEs to assist in defining the scope and method of work and ensure the appropriate level of detail, subject to further refinement in subsequent steps of defining the work. This may require a "scoping walk down." The need for a scoping walk down should be determined jointly by the RLM and the PIC. If the scoping walk down involves activity level hazards or requires anything other than a visual assessment, then it must be planned and executed as a work activity.

When activities involve workers from multiple organizations, or take place in shared space in such a way that multiple RLMs are potentially involved, responsibilities must be identified for each RLM before work begins. If multiple activities within a project or work area must be coordinated to ensure safety, security, or environmental protection, the FOD must designate an individual to provide that coordination and must inform the other participating RLMs and PICs of that individual's identity and authority. Information regarding "Negotiating Shared Space/Shared Activities" is available in the IWM Toolbox in the *Guidance Documents* section.

Work planning should include all aspects of the work cycle including setup, work, maintenance, cleanup, waste disposal and material disposition, and the use of other Laboratory-permitting systems such as the Permits and Requirements Identification (PRID) System (see P351, *Permits and Requirements Identification [PRID]*).

3.1.2 Identify and Analyze Hazards

Hazards and accident scenarios that could cause harm must be identified and analyzed using a graded approach to determine what controls are needed to eliminate or reduce the hazards to manage risks to an acceptable level. The RLM or designee, who in most cases is the PIC, will determine the hazard grading level based upon input from workers or worker representatives of those who will participate in the work. In addition the impact of the planned work on workers, co-located activities and workers, ancillary workers, and the public must be taken into consideration and addressed.

Attachment B, *Hazard Grading Table,* must be used by the RLM or designee, who in most cases is the PIC, to determine the hazard level of the activity (Low, Moderate, or High/Complex). When answering the hazard grading questions, both activity and work-area hazards must be considered, such as when a low-hazard activity is performed in an area where it is co-located with high-hazard/complex work activity hazards. The examples listed are meant to be illustrative and do not represent a complete set of hazards. When in doubt about the appropriate grading level, the next higher level should be used.

Note: The Risk Matrix Work Aid, found in the IWM Toolbox in the *Hazards Analysis* section, may be used in evaluating and determining residual risk and hazard levels. See Section 9.1 for risk and hazard definitions.

Note: The Error Precursors table in Attachment C, *Error Precursor Card and Task Preview Work Aids,* will assist in identifying potential human error risks.

SMEs with specific process knowledge or knowledge of the applicable hazards should be consulted to assist with hazard classification. The RLM must involve Environment, Safety, and Health (ESH) deployed personnel in the planning stages of activities, to ensure that worker exposure assessments are completed and the recommended controls are in place and included in the IWD before the start of work. (Deployed Managers contact information is located at http://int.lanl.gov/org/padops/adesh/deployed-services/index.shtml.) During the development of the hazard analysis and controls, institutional, facility, and activity documents should be used when available. Notify your ESH Deployed Manager of any changes in activities, including a change in scope, hazards or controls, that would require an update of worker exposure assessments.

Note: Examples include: introduction of a new type of exposure hazard (especially where existing controls may not be adequate); introduction of a Category 1 chemical; adding to, deleting, or changing controls (engineering, administrative or Personal Protective Equipment [PPE]).

SME involvement should also be obtained during development of work control documents containing such information to assist in accurately identifying Lockout/Tagout (LOTO) locations/devices.

Use of drawings, sketches, and/or photographs in the work control document to accurately identify these locations/devices is recommended.

Note: IWDs and supporting work control documents must include or reference available documentation, where applicable, to ensure thorough identification of hazards. This documentation may include, but is not limited to:

- facility drawings,
- sketches,
- photographs,
- safety basis documents,
- schematics of hidden systems,
- survey results, such as radiation survey maps and utility locates, and
- Comprehensive Tracking System (CTS) exposure assessment number (Assessment Unit).

In Category 1, 2, or 3 nuclear facilities, new or modified activities must be approved through the Unreviewed Safety Question (USQ) process. In nonnuclear facilities, PD110, *Safety Basis* (Operational Safety Requirements [OSR] and Accelerator Safety Envelope [ASE]), a change-control process must be used. In high hazard non-nuclear facilities, the Unreviewed Safety Issue (USI) process applies.

The RLM or designee and PIC must also be knowledgeable of the applicable Process Hazard Analysis (PHA) and/or facility safety basis documentation such as the Facility Safety Plan (FSP) or Documented Safety Analysis (DSA) and must ensure that the planned activities are within the bounds of these documents. If not within the bounds, the RLM determines whether to modify the scope of the activities or to pursue, with the FOD, additional safety analysis and revision of the PHA or safety basis. Activities outside the bounds of the PHA or safety basis must not be performed.

The RLM, as accountable to the FOD and Responsible Associate Director (RAD), must ensure the planned activity is compatible with the safety/security basis and environmental protection envelope where the work will be performed.

For **Low-Hazard** activities as determined by the *Hazard Grading Table*, a formal hazard identification and analysis process and a complete IWD are not required.

This does not mean exemption from ISM functions and principles or LANL policies and procedures. All low-hazard activities are subject to facility-specific access, facility postings, coordination, and scheduling requirements and must apply work-area controls required by the FOD. In lieu of a complete, four-part IWD, low-hazard work can be controlled by implementation of other processes. For example, qualified workers, expedited work, work orders, permits, facility-specific training/access control, Plan of the Day (POTD), equivalent work control documents, and/or Part 2 of the IWD (Form 2101, *IWD Part 2, FOD Requirements and Approval for Entry and Area Hazards and Controls, Non-Tenant Activity Form* or Form 2102, *IWD Part 2, FOD Requirements and Approval for Entry and Area Hazards and Controls, Tenant Activity Form*), which addresses approvals for entry and area hazards and controls, may be adequate. However, the RLM and FOD may require a complete IWD be developed based on their review of hazards and controls.

For **Moderate-Hazard** activities, as determined by using the *Hazard Grading Table*, a hazard analysis method such as “what if” or Hazard and Operability Analysis (HAZOP) must be performed to determine the hazards associated with potential accidents or incidents and how harm might be caused. A hazard analysis tool may be used as an aid to validate that the hazards and associated institutional requirements are identified. However, a tool is not intended to substitute for critical thinking coupled with sound professional judgment provided by the review team. Part 1 of the IWD is used to document the hazard analysis method used and review team information. Workers representative of those involved in the activity must be part of this analysis. The analysis may be graded based upon the complexity of the moderate-hazard activity ranging from a relatively quick “brainstorming” for simple activities to a documented “what if” or HAZOP for more complicated ones. (See the IWM Toolbox *Hazards Analysis* section.) The RLM and FOD may exempt specific activities from this requirement if, in their judgment, equivalent means have been employed to ensure all significant hazards and associated institutional requirements have been identified.

A hazard analysis tool should be

- supportive of the IWM process,
- capable of identifying hazards and defining controls, and
- capable of identifying associated institutional requirements.

For **High-Hazard/Complex** activities, a documented "what if," HAZOP, or other effective analysis technique must be used. This analysis must be performed by a documented Hazard Analysis (HA) team with appropriate depth and breadth of expertise to identify and analyze the hazards thoroughly and to determine how effective hazard mitigation will be achieved. The Preparer leads the team and must include workers or a representative set of workers, dependent upon activity scope. In some cases, such as maintenance work activities, individuals technically qualified and knowledgeable of the work activity can participate on the hazard analysis team as a representative for the workers who may be assigned to the work. Appropriate SME involvement is required to ensure that the analysis is complete and effective. The names of the HA team participants must be documented, (e.g., on Form 2100, *IWD Part 1, Activity Specific Information,* or equivalent work control document) unless specifically exempted by the RLM and FOD.

3.1.2.a Subject Matter Expert (SME) Involvement

One type of SME, ESH, includes designated organizational experts representing Laboratory core safety programs (e.g., Radiological Control Technicians [RCTs], Industrial Hygienists, ESH Specialists, Deployed Environmental Professionals, or Waste Management Coordinators, as well as Electrical Safety Officers, Explosive Safety Officers, Laser Safety Officers, Chemical Hygiene Officers, etc.). Their involvement may be specifically mandated by other requirements or indicated because of desirable expertise relative to the nature of the work (see Table 1).

Table 1. Environment, Safety, and Health (ESH) Subject Matter Expert (SME) Involvement

Hazard Level	Activity		
	Hazard Category	**Define Work**	**Hazard Analysis**
High/Complex	SME Recommended	SME Recommended	SME **Mandatory**
Moderate	SME Recommended	SME Recommended	SME Recommended/ **Mandatory***
Low	SME Recommended	SME Recommended	N/A

*SME participation is mandated by specific requirements when Moderate (and High-Hazard/Complex) work involves, but is not limited to, activities such as energized electrical, explosives, radiological, beryllium, confined space, hot work, and/or environmental.
SMEs may reside in ESH Divisions or are deployed to the various Facility Operations Directors (FODs). In addition there are programs where the SME resides within the line organizations (e.g., electrical, explosive, and laser safety officers).

A second, distinct type of SME, the technical SME, includes technical experts who have knowledge relevant to the hazards involved in the work. For Moderate- and High-Hazard/Complex R&D work, this type of SME is required. (See Attachment A, *Integrated Work Management (IWM) Process for Research and Development [R&D]*.)

3.1.3 Develop and Implement Controls

Controls must be defined and implemented, as needed, to reduce the hazards associated with the work to an acceptable level. To effectively mitigate the hazards, the Preparer together with appropriate team members must:

- Identify all institutional, facility, and activity requirements and controls applicable to the work. The Laboratory Policy Center contains current institutional documents.
- Implement appropriate controls, identified in the work control documents, based on the outcome of the hazard analysis and the institutional, facility, and activity requirements. Controls must reduce the probability and/or consequence of adverse events. When establishing controls, the following hierarchy must be used:
  - Hazard elimination by process modification
  - Substitution of a less hazardous substance, if available
  - Application of engineering controls such as enclosures, machine guards, interlocks, worker booths, stack filters, security barriers/alarms, sharps disposal containers, or similar devices
  - Application of administrative controls, e.g., training, LOTO, and procedures
  - Use of appropriate PPE
- Specify the knowledge, skills, and abilities needed by the workers and the training required to handle the hazards and effectively use the controls, e.g., formal training prerequisites to performing the job tasks. Define the On-the-Job Training (OJT) needed to qualify workers for specific tasks. Training coordinators and training specialists assigned to the organization should be involved, as necessary, in the accurate identification of prerequisite training.
- Analyze, with a rigor commensurate with the hazard level, potential failures of controls, equipment, utilities, facility systems, procedures, or human factors; and establish enhancements and/or alternatives as needed.
- Develop and/or identify emergency actions to follow in the event of a system failure, spill/release, or an accident.
  - IWDs involving use of hazardous chemicals should address chemical spill control, mitigation, and cleanup or reference procedures established for spill response, where appropriate.

When permits, plans, or special procedures are required for the work, as specified by required institutional procedures, they must be developed concurrently with the IWD or equivalent work control document to ensure conflicts in hazards and controls and inconsistencies between documents are resolved. Examples of Required Permits, Plans, or Procedures are (this list is not all-inclusive):

- Energized Electrical Work Permit
- Excavation/Fill/Soil Permit Identification (EX-ID)
- National Environmental Policy Act (NEPA), Air, Resource Conservation and Recovery Act (RCRA), Stormwater, etc.
- Penetration Permit
- Spark- or Flame-Producing Permit
- Confined Space Entry Permit
- Lockout/Tagout specific written procedure

- RWP
- Fall Protection Plan

Prevention measures and controls must be integrated to provide optimized protection among different hazards. e.g., balancing security measures with safety measures, or contamination control with minimizing waste.

For High-Hazard/Complex activities, the controls established must be developed by a team with appropriate depth and breadth of expertise to ensure the effectiveness and adequacy of the controls. Generally, this team will be the same as the one engaged in the hazard identification and analysis. The team must decide whether the activity is most effectively covered by a single or multiple IWDs. When multiple IWDs are used, they must be closely coordinated by the owning RLM and PIC and must address hand-offs of activities and responsibilities to the RLM and PIC performing the next IWD in sequence; any interfaces between separate IWD activities; and potential conflicts between steps, hazards, controls, or the entities identified in two or more IWDs.

Consideration should also be given to facility-related conditions that may adversely affect the safety of an activity such as the loss of electrical power, and operational upsets in shared facilities.

3.1.3.a Documentation Requirements

For Moderate-Hazard and High-Hazard/Complex activities, the work process, hazards, and controls must be documented in an IWD or an equivalent work control document such as a technical procedure. The work process, hazards, and controls may also be listed in an attached permit to eliminate repetition. However, the work process, hazards and controls must be reviewed within the permit as part of the work authorization approval process. Workers must have the applicable and fully authorized work control document readily accessible where the activity is being conducted to guide their work.

The FOD is responsible for documenting and communicating work-area information, including the hazards associated with the facility or location in which the work is performed. The work-area part (Part 2) of an IWD identifies the FOD or FOD representative, FOD designated Point-of-Contact, entry and coordination requirements, ESH safeguards and security hazards, and controls for the work area. The FOD, or his or her representative, and the RLM/Preparer must work closely together to ensure that the work can be performed safely, securely, and in an environmentally responsible manner within the facility or at the location designated for the work.

3.1.3.b Peer Review

The RLM must have a peer review performed for all moderate and high hazard work before approving the IWD. Having another set of eyes (a peer review) reviewing the unapproved product provides benefit by bringing a systems approach, big picture view, and/or breadth of focus to ensure that the IWD has adequately identified the potential hazards and required the necessary controls.

The RLM determines the scope, form, and participant(s) for the peer review. The reviewer(s) should not have been directly involved in the development of or later approval of the IWD to be reviewed. The RLM can consider the level of definition (certainty) of the work scope, experience of the IWD development team and the employees identified to perform the work, recent related experiences, Lessons Learned, and other factors that may influence the work when determining who the reviewer (or reviewers) should be. The peer review may include recognition of additional peer reviews that the RLM may have established as a control for ongoing work.

There is no requirement to document the peer review, however, the RLM signature on Part 1 of the IWD or equivalent work control document includes an acknowledgement that a peer review was completed and comments were adequately addressed.

Comments/concerns identified during the peer review must be communicated to the RLM for his or her consideration before approving the IWD. After completion of the peer review, the RLM must address the review comments appropriately. RLMs are expected to use due diligence in making this determination.

For Maintenance, peer review is described in AP-WORK-002, *Work Planning*, found on the AP-WORK Procedures webpage, and for R&D is described in Attachment A, *Integrated Work Management (IWM) Process for Research and Development (R&D)*.

Note: Peer review is not required for the annual IWD review (before IWD expiration).

3.1.3.c Integrated Work Document (IWD) Validation

Before any new work is released, a "validation walk down" of the IWD, or equivalent work control document, must be performed to review tasks and steps for workability and to ensure that the hazards and controls are described effectively. It should be performed at the work site, when possible, assuming environmental configurations/scheduling/resources allow, and as close in time to the actual start of the work as feasible. This validation walk down of the IWD must involve the PIC and workers (or qualified worker representatives of those who will participate in the work) and SMEs for High-Hazard/Complex work or when determined appropriate by the RLM and/or PIC.

Documentation of the validation walk down is required on Form 2103, *IWD Part 3, Validation and Work Release.* For High-Hazard/Complex work the validation walk down must also involve appropriate SMEs and subsequent walk downs will be determined by the RLM or PIC based on the hazards and complexity of the activities. Any issues identified during the validation walk down must be resolved before the work is started.

3.1.3.d Worker Authorization

The RLM responsible for the work activity must authorize workers, including workers from other organizations, to perform work activities. This entails determining whether each individual is enrolled in the required training, is up-to-date in the required training, and qualified for the activity to be performed.

Authorization is achieved by enrolling (assigning) workers to an appropriate activity curriculum and ensuring the worker has completed and is current in the required training.

Authorization is revoked by being de-enrolled or having training credit expire.

The RLM directly responsible for the work activity is responsible for determining whether each worker (including those deployed by other RLMs) is authorized, meets facility access requirements, and is fit to perform the work. This determination may be delegated to the PIC (serving as the designee of the RLM responsible for the work) and must be achieved before workers begin work, e.g., at the Pre-Job Brief. Each worker is responsible for keeping required training current and for assuring his or her authorization and fitness to perform the work. The signature of the PIC on Part 3 of the IWD verifies the assigned workers are authorized, and fit to perform the work. The worker confirms his or her authorization, and fitness by also signing Part 3 of the IWD (for R&D activities, reference Attachment A, *Integrated Work Management [IWM] Process for Research and Development [R&D]*).

3.1.3.e Security

Managers and workers must also examine the security aspects of work being performed and determine the appropriate training required to perform the work.

Deployed security workers, such as Deployed Security Officers (DSOs) and Security Program Leads (SPLs), are available to assist managers and workers in evaluating safeguards and security issues related to their work.

3.1.4 Perform Work Safely, Securely, and in an Environmentally Responsible Manner

All work must be performed in a safe, secure, and environmentally responsible manner using the established hazard control systems.

For Moderate-Hazard and High-Hazard/Complex activities, the PIC must perform a Pre-Job Brief with the workers immediately before beginning any new work and cover, at a minimum, the questions listed on Part 3 of the IWD. The PIC must then formally release the work by performing the following steps:

- verify the RLM and FOD or FOD representative have signed the IWD;
- conducted a validation walk down;
- confirm that the required controls are in place and functioning and that initial conditions are as expected;
- confirm with each assigned worker that he or she has the required training and authorization to perform the activity;
- determine that each assigned worker is qualified to perform the work in a safe, secure, and environmentally responsible manner;
- ensure coordination with any Operations Manager or other FOD-designated interface point-of-contact when required by the FOD; and
- sign the IWD work release section.

If permits are required for the work activity, applicable portions of each permit must be included in the Pre-Job Brief. In some cases, e.g., RWPs, the Pre-Job Brief should be conducted by the respective SME.

Depending on the scope of the planned activity, the nature of the hazards, associated work controls, and/or the population of workers, the Pre-Job Brief may be conducted for different phases of work to ensure clear instruction to affected workers. If this approach is taken as determined by the PIC, it is important to capture the date and signature of the workers for each Pre-Job Brief in Part 3 of the IWD which validates worker agreement and confirms his or her authorization, qualifications, and fitness to perform the work.

The content for Pre-Job Briefs is included in Part 3 of the IWD. Additional guidance for conducting a Pre-Job Brief is included in Attachment C, *Error Precursor Card and Task Preview Work Aids*, and also in the IWM Toolbox. A Pre-Job Briefing and Post-Job Review video is available on the IWM Toolbox.

3.1.4.a Work Execution

Workers must perform the work in strict accordance with the IWD or equivalent work control document. If unexpected conditions arise, work must be paused or stopped and re-evaluated. If the conditions indicate a hazard that is not effectively mitigated by the existing controls, the work must not be restarted until adequate controls have been established, as defined in P101-18, *Procedure for Pause/Stop Work*.

The PIC must observe work execution to the extent required to ensure it is performed in accordance with the IWD. The PIC must be readily available to workers to resolve issues and to answer questions. The PIC must remain at the immediate work site for all High-Hazard/Complex work activities. For all other activities, the PIC should spend enough time at the job site to ensure that the work activity is carried out in accordance with the specifications of the IWD.

The RLM may designate alternate PICs to oversee a work activity if the primary PIC is unavailable or if work extends across work shifts. **However there must never be more than one PIC for an activity at any given time.** The alternate PIC must sign the IWD the first time the alternate acts as PIC to acknowledge his or her responsibilities. When assuming these responsibilities, the alternate PIC must confer with the previous PIC to obtain all required information associated with the hand off and ensure that the workers have been notified of the change in PIC. Shift turnover must follow conduct of operations requirements.

3.1.4.b Changes

The PIC and each involved worker must perform frequent readiness checks to confirm that conditions remain within planned parameters. Readiness checks at the start of the workday, the next shift, and the next task are recommended. These checks should determine whether the needed personnel, tools, and materials are available and whether any changes in the operating conditions or work environment have occurred. Safety basis impact must be considered for all changes where safety basis requirements apply.

The PIC and workers must assume that any change would result in increased risk until proven otherwise. Changes in the following are of particular significance:

- assigned workers,
- work scope,
- hazards or status of controls, and
- facility and/or work conditions.

If changes remain within bounding conditions specified in the IWD, the work may continue. For example, a minor change would include non-substantive editorial changes such as “including safety shields” with safety glasses to clarify and reinforce a control. For all other changes, the PIC must evaluate, with input from the workers, the significance of any identified changes and determine how to proceed.

The PIC may address minor changes with revisions to the IWD on the job site by lining out and/or adding text, initialing and dating the revision, and notifying all affected workers of the changes.

Minor revisions are not to be used where the change would

- increase the safety risk to personnel;
- create a difference to a source document requirement and require a variance to continue work;
- alter the purpose or the scope of the procedure;
- eliminate any required reviews or approvals;
- impact the safety or Authorization Basis (AB) of the facility or exceed established facility-operating limits; or
- alter the operating, technical, design, process, regulatory, or quality control requirements of a procedure.

For ongoing work, the PIC must subsequently update the master copy of the IWD. Significant changes require repeating affected parts of the IWM process to include a USQ determination, where appropriate, and obtaining RLM and FOD approval. Worker authorization must also be reviewed and renewed as necessary. Examples of significant changes include

- major change in scope;
- unanticipated hazards or conditions;
- failure of controls and/or changes in controls; and
- any change that would impact the safety or AB of the facility or exceed established facility-operating limits.

3.1.5 Provide Feedback and Strive for Continuous Improvement

The RLM, PIC, and the workers must monitor the activity to identify needed improvements and to capture Lessons Learned.

Feedback from the workers on the adequacy and effectiveness of the preventive measures and controls is critically important. Improvements essential to safety, security, or environmental compliance must be implemented if the work is to continue.

Moderate-Hazard and High-Hazard/Complex activities require a Post-Job Review soon after completion to close out the job and capture any Lessons Learned. This review should involve a discussion among workers and the PIC to

- verify that the activity is complete and make notifications required by the FOD;
- ensure that follow-through actions (e.g., cleanup, recycle, waste disposal, equipment removal, and secure storage) are completed;
- capture the positive aspects of the activities, including human performance improvement concepts;
- identify inefficiencies, problems during the activity, procedural deficiencies, coordination issues, unanticipated conditions, and near misses; and
- develop recommendations for improvement.

The PIC must document the Post-Job Review and ensure that Lessons Learned of value to future activities are communicated to affected workers, RLMs, and FODs. (See Section 3.3 for specific information related to Standing Integrated Work Documents [SIWDs].) For ongoing work activities, feedback and Lessons Learned should be obtained during the normal course of the work. This information may be documented in

- Part 4 of the IWD;
- the Institutional Lessons Learned program;
- the Radiological Work Control Package (RWCP);
- the Asset Suite software program for facilities maintenance work (see AP-WORK-005, *Work Closeout*); or
- other documented organization-specific methods that capture lessons learned on a periodic basis (e.g., during work execution, during annual IWD review, and/or at the termination of an activity).

Note: An alternative IWD Part 4, Feedback/Post-Job Review feedback tool has been developed for IWD users in the Footprints program. It allows for text searching within the body of the feedback content making it easy to identify relevant information for future work planning. In addition, the LANL Lessons Learned process provides for sharing across the institution through the use of the Lessons Learned Submittal form.

3.1.5.a Periodic Reviews

IWDs and other equivalent work control documents must be reviewed periodically to ensure that the work control documents, work activities, and work practices are aligned and to ensure integrated implementation of the Integrated Safety Management System (ISMS) and IWM programs, as well as adequacy of IWD and hazard identification. Periodic reviews should be established by the RLM and FOD based on operational schedules (R&D/Programmatic) and related maintenance activities, whether programmatic or facilities maintenance. Therefore, review periods may vary in frequency from monthly to a maximum of three years (which coincides with a maximum expiration period of three years for IWDs), depending upon the activity cycle/schedule, and on the complexity of and the hazards involved with the activity.

Note: See Attachment A, *Integrated Work Management (IWM) Process for Research and Development (R&D),* for R&D expiration and periodic review requirements.

3.2 Preparing the Integrated Work Document (IWD)

IWDs must systematically describe the work activity, the associated hazards, and the controls that must be employed to mitigate the hazards. DOE-STD-1029-92, *Writer's Guide for Technical Procedures*, and the National Nuclear Security Administration *(NNSA) Activity Level Work Planning and Control Processes*, are excellent sources of reference for Preparers. Both of these documents can be found on the IWM Toolbox, in the *Guidance Documents section*.

Note: All LANL IWDs have an expiration date of three (3) years maximum as determined by the RLM and FOD.

IWDs consist of four parts:

Part 1—Activity-Specific Information

Part 2—Work Area Information

Part 3—Validation and Work Release

Part 4—Post-Job Review

See the following Forms associated with the IWD Parts:

- Form 2100, *IWD Part 1, Activity Specific Information*
- Form 2100-WC, *Facilities Maintenance IWD* (for work performed by Maintenance and Site Services [MSS] craft)
- Form 2101, *IWD Part 2, FOD Requirements and Approval for Entry and Area Hazards and Controls, Non-Tenant Activity Form*
- Form 2102, *IWD Part 2, FOD Requirements and Approval for Entry and Area Hazards and Controls, Tenant Activity Form*
- Form 2103, *IWD Part 3, Validation and Work Release*
- Form 2104, *IWD Part 4, Feedback/Post-Job Review*

Note: Current forms (or equivalent) must be used, and must contain required information (e.g., in lieu of Part 4, periodic job status reviews or weekly experiment review processes can be used to capture feedback and lessons learned.)

Hazards analysis tools or approaches should include:

- support of the IWM process
- ability to define hazards and controls
- identifying institutional requirements
- determining facility requirements

IWDs and other work control documents pertaining directly to the specific work, must be kept current and, as appropriate, revised and reauthorized, incorporating information from ongoing readiness checks and Lessons Learned. The PIC must use appropriate change control to ensure that workers are using the most current IWD or equivalent work control document for the activity. For the purposes of change control and records management, the four parts of the IWD may be treated as separate documents.

The normal process for extending the expiration date of an IWD requires making a copy of the original document, reviewing the hazard analysis for changes, confirming hazards and controls are appropriate, and updating as necessary. The IWD must then be re-approved following the approval requirements in this document.

An extension of the expiration date only must be approved by the RLM and FOD with justification in writing including the required signatures, Z Numbers, and the date.

The original IWD expiration date (lined out and revised) may be extended for **no more than 60 days**. This action may only be performed **once** for each IWD. If an extension beyond 60 days is requested, it must be approved in writing and documented on the IWD by the RLM's Associate Director (AD).

3.2.1 Part 1—Activity-Specific Information

Part 1 (Form 2100, *IWD Part 1, Activity Specific Information* or Form 2100-WC, *Facilities Maintenance IWD*) of an IWD or other equivalent work control document must systematically describe the work activity, the associated hazards, and the controls that must be employed to mitigate the hazards. The document must meet the following **seven** requirements:

1. It must be worker friendly with a focus on the information needed by the worker (e.g., short, well-organized, integrated, consolidated, and reviewable).
2. Activities and their associated hazards and controls must be sufficiently detailed to ensure the worker can understand the associated ESH/Security and Safeguards (S&S) hazards, concerns, and potential accidents/incidents.
3. Tasks/steps in the IWD or equivalent work control document must be listed sequentially when such sequencing contributes to the safety, security, and/or environmental protection of the activity.
4. Hazards and the associated controls must be linked to specific activity tasks/steps when such linkage will contribute to the worker's understanding of the hazards and use of the controls (e.g., "wear hard hats" for Steps 2 thru 7).
5. Activity and work-area hazards and the associated controls must be addressed.
6. Descriptions of hazards and associated controls **must be specific** and not generic (e.g., "goggles and face shield" rather than "refer to Material Safety Data Sheet [MSDS]," or "certified vault" rather than "secure storage").
7. Curricula in U*Train*, approved permits, and area postings must be referenced if they are required controls; if these are used, specific details do not have to be listed.

Excessive and duplicate controls are not required (i.e., once a control is listed, it does not need to be listed in every step, but it must be clear for which steps the control applies). Avoid over-using "boiler plate" controls that create cumbersome documents that detract from the real hazards.

For facilities maintenance work, use Form 2100-WC, *Facilities Maintenance IWD*. A facilities maintenance IWD for facility maintenance work is performed in accordance with the AP-WORK series and the MSS IWD Writers Guide, found in the IWM Toolbox, in the *Guidance documents* section.

The RLM approval on Part 1 of the IWD indicates

- completion of a peer review;
- IWM has been applied appropriately;
- work is authorized;
- verification by the RLM or designee (usually the PIC) that workers are qualified in accordance with the Part 3 process;
- work will be performed in accordance with ESH/S&S requirements and the IWD; and
- facility safety basis, aggregate hazards, and co-located hazards were appropriately included in the hazard analysis.

The FOD or FOD representative (for the FOD's specific facility safety envelope) approval on Form 2100 indicates

- work is appropriate to be conducted in this facility (the activity is within the AB, and the work is appropriate for the facility); and
- facility safety basis, aggregate hazards, and co-located hazards will be managed.

Note: Work activities in multiple FOD jurisdictions, e.g., additional facility safety envelopes, require those respective FOD or FOD representative approvals, as applicable.

The FOD may designate an appropriate representative to assist with specific duties, e.g., IWD or equivalent work control document approvals. The representative, in most instances, will be the RLM.

IWDs or equivalent work control documents for work activities in multiple FOD jurisdictions, e.g., additional facility safety envelopes, require those respective FOD or FOD representative approvals, as applicable.

3.2.1.a Integrated Work Document (IWD) Attachments and References

The activity-specific part of the IWD (Part 1) may attach or reference documents such as an existing work instruction, operating procedure, hazard control plan, or experimental plan, however, the resulting document must meet the above seven requirements. For example, a Detailed Operating Procedure (DOP) with the hazards and associated controls described within it for the appropriate work steps may be attached to Form 2100, *IWD Part 1, Activity Specific Information*, and under Work Tasks/Steps, Step 1, would simply read "Reference DOP-XXX-XX, R1."

Note: If specific work activity procedures, e.g., those documents (DOPs, Standard Operating Procedures [SOPs], Work Instructions, etc.) that are considered equivalents or part of the IWD expire before the IWD expiration date, then the IWD is no longer valid. All work control documents must be current. Periodic review dates for procedures are not considered "expiration" dates. (See P315, *Conduct of Operations Manual*, Attachment 16.)

Note: If an IWD or other work control document references an Institutional Document (such as the Institutional Documents P101-13, *Electrical Safety Program*, or P121, *Radiation Protection*) the IWD needs to be kept current to match the referenced Institutional Document. If there has not been a substantive change in the referenced Institutional Document, the IWD will be revised according to Section 3.1.4.b of this document.

Alternatively, a clear description of the safety envelope, including the hazards, controls, and allowable limits for safe operation may be attached if it effectively conveys when and/or how the hazards would be encountered and links the controls to these hazards. A general description of the hazards and controls is not sufficient.

A similar approach may be used for activities with security and/or environmental hazards. Required permits and security plans **must** be included as part of the work package—the IWD itself does not have to incorporate all hazards and controls from these permits, and the permits typically do not describe work tasks or steps in detail. (It may be useful to organize the permit for different phases of work.)

It is critical that the workers be able to easily locate the information needed to perform work safely, securely, and in an environmentally responsible manner. The IWD must establish specific and clear connections to required permits during applicable tasks/steps/phases of the work (e.g., hold points for specific steps in an IWD).

IWDs may also reference Qualified-Worker Activities without documenting the detailed steps, hazards, and controls associated with the task (e.g., "Qualified RCT performs swipe" after Step 5). For these activities, workers must complete a training and qualification process developed in accordance with all the requirements listed under Level 2/Course Classification Determination as defined in P781-1, *Conduct Of Training*. Academic credentials and work experience are not specific enough in relation to individual tasks/steps, hazards, and controls and therefore do not alone fulfill the requirements for Qualified-Worker Activities.

Note: Qualified-Worker Activities, supported by qualification and training requirements, do not require a separate IWD. If the documentation associated with a training and qualification program provides the documented details of the tasks, hazards, and controls associated with a work activity, then it may be considered to be equivalent to Part 1 of a Standing Qualified-Worker IWD, making a separate IWD unnecessary. Permits may be required for some work activities, based on hazards and requirements for coordination of those activities.

3.2.2 Part 2—Work-Area Information

The Preparer is responsible for obtaining the information for the work-area part of the IWD (Form 2101, *IWD Part 2, FOD Requirements and Approval for Entry and Area Hazards and Controls, Non-Tenant Activity Form* or Form 2102, *IWD Part 2, FOD Requirements and Approval for Entry and Area Hazards and Controls, Tenant Activity Form*) from the FOD and must ensure the activity-specific and work-area requirements are integrated and do not conflict.

The FOD or FOD representative must complete Form 2101 or Form 2102 specific to his or her work area to identify requirements for area hazards and controls and provide approval. This should be completed as close in time to the start of work as reasonably possible.

When activities involve multiple FODs, or a single RLM performing work activities together with multiple FODs, the RLM must coordinate the activities through the FOD responsible for the work area.

Note: The RLM must comply with applicable work control procedures for a FOD's area unless pre-determined, written work agreements exist that may include established procedures and interface agreements.

Where explicit IWDs allow workers to enter and perform work activities in multiple FOD jurisdictions (e.g., facility safety envelopes) with prior FOD approval, Form 2100, *IWD Part 1, Activity Specific Information,* may only require the work–authorizing FOD or FOD representative's approval.

Different forms for Tenant (Form 2102) and Non-Tenant (Form 2101) activities are provided in accordance with this document. The FOD must determine which of the forms applies to the activity and provide the appropriate content in the form, if used, or ensure this content is provided in the equivalent work control document.

IWDs or equivalent work control documents for work activities in multiple FOD jurisdictions, e.g., additional facility safety envelopes, require those respective FOD or FOD representative approvals, as applicable. The FOD or FOD representative approval on Part 2 of the IWD (Form 2101 or Form 2102, the work-area part of the IWD), indicates facility-specific work area hazards, controls, and requirements have been identified. The suggested IWM assessment criteria contained within Attachment D, *Integrated Work Management (IWM) Self-Assessment Criteria* may be used to guide the evaluation of the adequacy of the IWD. This is also found in the IWM Toolbox, in the *Guidance Documents* section.

IWDs are specific to the task, not the area. It is possible to have a low-hazard work activity being performed where there are co-located moderate or high-hazard/complex work activity hazards. Form 2100 (Part 1 of the IWD) is not required for changing a light bulb. Form 2101 (Part 2 of the IWD) identifies the area hazards and controls and if changing a light bulb in the Weapons Engineering Tritium Facility is a low-hazard job, the only required document would be Form 2101.

3.2.3 Part 3—Validation and Work Release Information

As described in Section 3.1.3, the PIC is responsible for validating the activity and work-area parts of the IWD (including their compatibility) through a validation walk down with workers initially assigned to the activity, for conducting a Pre-Job Brief, and for releasing the work before execution. Following the Pre-Job Brief, workers must agree to and sign the IWD work release section of Part 3. The FOD may also require an Operations Manager or other facility designated point-of-contact to sign Part 3 immediately before work release to verify the activity is compatible with current facility configuration and operations. The PIC must document the work release by filling out and signing Part 3 of the IWD. Signed copies of all Part 3 documents should be routed back to the RLM as this enables the RLM to be knowledgeable of new workers.

3.2.4 Part 4—Post-Job Review

Moderate-Hazard and High-Hazard/Complex activities require a Post-Job Review soon after completion to close out the job and capture any Lessons Learned. The PIC must document the Post-Job Review on the close-out section of the IWD. (For example, Form 2104, *IWD Part 4, Feedback/Post-Job Review,* or at an organizational level, see the AP-WORK-002, *Work Planning* work documentation process.) For information deemed valuable for performing future activities, the PIC must ensure Lessons Learned are documented and communicated to affected workers, RLMs, and FODs.

For facilities maintenance, when Lessons Learned and Post-Job Review are entered directly into the Asset Suite software program in accordance with AP-WORK-005, *Work Closeout*, Part 4 of the IWD does not need to be completed.

3.3 Standing Integrated Work Documents (SIWDs)

For repetitive, Moderate-Hazard and High-Hazard/Complex work activities in single or multiple facilities, an SIWD may be used. This document consists of a standardized, previously developed and approved Part 1 combined with an appropriate Part 2 for each facility listing the specific facility entry and coordination requirements and work-area hazards. In each case, the PIC must ensure the activity-specific and work-area requirements do not conflict.

Activities covered by SIWDs require the PIC to walk down the actual system or equipment and conduct a Pre-Job Brief before beginning work. Only one Pre-Job Brief is required if the work is performed repetitively in the same location with the same workers, and when periodic reviews are performed to detect changes in the work, work site, and hazards. **However, High-Hazard/ Complex activities require a Pre-Job Brief before each evolution**. Work activities conducted using SIWDs do not require close out or Post-Job Review. Follow the requirements in Attachment A, *Integrated Work Management (IWM) Process for Research and Development (R&D),* for R&D related work activities.

Note: Lessons Learned and feedback should be captured and documented during the normal course of the work.

SIWDs may also be used for Moderate-Hazard Qualified-Worker Activities as described in the IWD Attachments and References Section above.

Examples of when use of SIWDs would be beneficial include the following:

- preventive maintenance activities performed across the Laboratory not covered by qualified worker requirements,
- routine maintenance activities performed similarly across the Laboratory that benefit from a step-by-step procedure,
- custodial services in labs with radiological, chemical, or laser hazards, and
- drywall installation.

4.0 RESPONSIBILITIES

Roles and Responsibilities are defined in detail in P313, *Roles, Responsibilities, Authorities, and Accountability*. The following have been adapted for use in this document.

4.1 Facility Responsible Associate Director (RAD)

- Has overall responsibility and accountability to the Director for the safe, secure, and environmentally compliant operations of all work within an assigned set of facilities.
- Defines the mission need and use of the facility.
- Has authority to establish strategy and priorities for assigned facilities.
- Accountable to the Director for operations within assigned facilities.

4.2 Responsible Line Manager (RLM)

- Is the line manager having the responsibility, authority, and accountability to plan, validate, coordinate, approve, execute, and close out work activities in accordance with IWM.
- Must ensure that IWM is applied effectively to all activities for which he or she is responsible.
- Ensures work activities are entered into the institutional work activity inventory system that includes a completed initial hazard screen, and a substantiated activity hazard level determination.
- Controls and manages activities in order to execute the responsibilities outlined in P313, *Roles, Responsibilities, Authorities, and Accountability*.
- Is accountable to the FOD and RAD to ensure that their activities are conducted within the safety envelope of the facility and do not place the public, co-located workers, or the environment at risk.

4.3 Facility Operations Director (FOD)

- Takes direction from the RAD and is the senior line manager who provides owner stewardship and overall facility operations. Provides organizational leadership for facility Maintenance; Operations; ESH; Waste Services; and Engineering. Coordinates the efforts of the respective managers to ensure that all facility and programmatic activities are performed in a safe and compliant manner. Facility operations-related deployed personnel will report through the FOD; exceptions for unique reasons will report through the RAD.
- Establishes and maintains the safety, security, and environmental compliance envelope.
- Has authority to control and manage activities and work within his or her facilities in order to execute the responsibilities outlined in P313, *Roles, Responsibilities, Authorities, and Accountability*.
- Is accountable to the RAD in managing the facility.

4.4 Preparer

- Is encouraged to identify the roles and responsibilities of the persons performing every step within a work control document. To ensure proper assignments based on the individual's roles and responsibilities, it is recommended the Preparer identify the discipline required to perform the work step at the beginning of the step.
- Is knowledgeable of required training and required permits to complete the work activities safely.
- Is the person responsible for the development of planning. May be a Laboratory employee or a subcontractor.
- Plans, develops, resolves comments, obtains approvals, and resolves issues for scheduling.
- Has authority to control and manage activities and work based on organizational assignments.
- Is accountable to a line manager.

4.5 Work Provider

- Is responsible for actually performing work.
- Performs work in accordance with approved documents.
- Has authority and accountability to control and manage activities and work based on organizational assignments.
- Is accountable to a line manager.

4.6 Work Supervisor/Person in Charge (PIC)

- Is responsible for supervising the performance of work.
- Performs work in accordance with approved documents.
- Has authority to control and manage activities and work based on organizational assignments.
- Is accountable to a line manager.
- Determines SME engagement and, for R&D, independent worker participation.
- Is knowledgeable of applicable PHA and/or facility safety basis documentation, such as the FSP or DSA, and ensures that the planned activities are within the bounds of these documents.

4.7 Subject Matter Expert (SME)

One type of SME includes designated organizational experts representing Laboratory core safety programs (e.g., RCTs, Industrial Hygienists, ENV or ESH support, or Waste Management Coordinators, as well as Electrical Safety Officers, Explosive Safety Officers, Laser Safety Officers, Chemical Hygiene Officers, etc.). Their involvement may be specifically mandated by other requirements, or may be indicated because of desirable expertise relative to the nature of the work.

A second type of SME includes independent technical experts who have knowledge relevant to the hazards involved in the work.

Any SME participating in IWD development is expected to:

- Provide assistance in identifying and evaluating hazards and in developing and evaluating controls.
- Contribute to identifying opportunities for hazard elimination or substitution where appropriate, based on his or her expertise.
- Provide technical input as prescribed in SD350, *Project Management for Capital Asset Acquisition and Construction*, and in functional areas. Input must be technically accurate, complete, and timely, and should be accepting of appropriate business risk, and cost effective.
- Provide input to help ensure work is compliant with applicable codes and standards, if appropriate to his or her area of expertise.
- Sign the IWD, agreeing, in the SME's opinion, with the IWD's hazard analysis and the adequacy of controls as appropriate to the level of risk.
- Be amenable to being called upon by the PIC for additional input during annual or other review of evolving R&D activities.

4.8 Peer Reviewers

- Review the unapproved product by bringing a systems approach (big picture view), to the development of the IWD.
- Ensure potential hazards have been identified.
- Confirm that the IWD has included required necessary controls.
- Communicate comments/concerns to the RLM before RLM approval of the IWD.

5.0 IMPLEMENTATION

The requirements in this document are effective on the issue date.

6.0 TRAINING

6.1 Integrated Work Management (IWM) Required and Suggested Training (see Table 2)

Table 2. Required and Suggested Integrated Work Management (IWM) Training

Role	Training Course #12454, IWM: Refresher (CBT)	Training Course #31881, IWM: Overview (CBT)	Training Course #31883, IWM: Preparer (CBT)	Training Course #31884, IWM: PIC (CBT)	Training Course #31882, IWM: FOD/RLM (CBT)	Training Course #12494, IWM: What-If Checklist (2-day Course)
Preparer (Moderate Hazard Level)	R	R	R	N/R	N/R	S
Preparer (High/Complex Hazard Level)	R	R	R	N/R	N/R	R
Person in Charge (PIC)	R	R	N/R	R	N/R	S/R*
Workers	R	R	N/R	N/R	N/R	S
Facility Operations Director (FOD)	R	R	N/R	N/R	R	S
Responsible Line Manager (RLM)	R	R	N/R	N/R	R	S
Subject Matter Expert (SME)	R	R	S	S	S	S

CBT = Computer Based Training
R = Required
N/R = Not Required
S = Suggested (For suggested training, the RLM must determine who in his or her organization should attend.)
*Required for High Hazard/Complex work.

7.0 EXCEPTION OR VARIANCE

To obtain an exception or variance to this document, see the following instructions:

- Managers may request an exception or variance from the IA.
- The IA or designee will provide the requestor with a written response.

The IA will maintain the record copy of all exceptions or variances and provide a copy to the Policy Office.

8.0 DOCUMENTS AND RECORDS

8.1 Office of Record

The Policy Office is the Laboratory Office of Record for this Institutional Document and maintains the administrative record.

8.2 Other Records

The RLM will identify and control IWDs and/or equivalent work control documents, such as technical procedures, as records in accordance with P1020-1, *Laboratory Records Management*, and P1020-2, *Laboratory Document Control,* respectively.

An inventory of work activities will be maintained in the Work Management System.

9.0 DEFINITIONS AND ACRONYMS

9.1 Definitions

See LANL *Definition of Terms*.

Activity—A subset of a project describing floor-level work, made up of one or more tasks.

Activity Hazard—An ESH/S&S hazard inherent to an activity and not specific to the location of the activity.

Aggregate Hazards—Hazards resulting from the accumulation and/or summation of individual hazards from multiple activities in a facility or across facilities.

Ancillary Worker—Any worker necessary to support a work activity, but not directly involved with performing the defined work. Examples include RCTs, Security Police Officers, Industrial Hygienists, fire and other safety watches.

Co-located Hazards—Hazards from an activity that have the potential to negatively impact other activities or workers not directly involved with the activity creating the hazard.

Co-located Worker—Any person who is not involved in a work activity, but who could potentially be exposed to hazards from that activity.

Controls—Preventive measures, administrative and engineered features, and PPE applied to work for the purpose of protecting people, the environment, property, and/or national security.

Emergency—Actions/work completed during a situation involving an imminent threat of death, serious injury, or illness of a member of the public or the Laboratory, severe damage to the

environment beyond the boundaries of LANL, imminent threat to security, or major damage to a facility (see PD1200, *Emergency Management* for details).

Environmental Management System (EMS)—A systematic method for assessing mission activities, determining the environmental impacts of those activities, controlling those impacts, prioritizing improvements, and measuring results.

Facility—An area, physical structure, or combination of structures together with the associated support infrastructure that form the envelope in which work is accomplished.

Hazard—Any source of ESH danger or Safety Significant (SS) threat or vulnerability with the potential to cause harm to people, the environment, property, and/or national security.

Hazard Analysis—A technique(s) that focuses on job tasks as a way to identify hazards before they occur. It focuses on the relationship between the worker, the task, the tools, and the work environment.

Hold Point—A step in the work package where work is not allowed to proceed until the step is complete, e.g., inspection point, verification point.

Integrated Work Document (IWD)—A worker-friendly document that describes the work activity, identifies the hazards, and links them to specific controls. The IWD may be a subset of a larger work package that includes other documents and information that do not address hazards and controls for that activity.

Non-Tenant Activity—An activity conducted by workers who are not resident in the facility and, therefore, may not be familiar with the facility hazards and associated controls or the facility entrance and work coordination requirements.

On-the-Job Training (OJT)—Activity–level training that is a systematically designed instructional experience in which hands-on training is conducted and evaluated in the work environment.

Operations Manager—An individual designated by the FOD who provides coordination of activities within a specific facility on a daily basis and concurs with work-release when stipulated by the FOD.

Peer Review—A review of the unapproved final IWD by a person or persons not directly involved with development of or later approval of the IWD to help ensure that the IWD has adequately identified the potential hazards and required the necessary controls.

Person in Charge (PIC)—The person assigned responsibility and authority by the RLM or designee for overall validation, coordination, execution, and closeout of a work activity in accordance with IWM.

Plan of the Day/Plan of the Week—A daily/weekly meeting to plan and schedule operations and programmatic activities performed within an area under the administration of a FOD. The FOD may require attendance by the PICs and/or workers for identified activities.

Post-Job Review—Review by the PIC and workers to capture Lessons Learned when an activity is terminated or fully completed as a function of ISM feedback and improvement.

Pre-Job Brief—Review by the PIC and workers of a work activity immediately before release to ensure understanding of the IWD and agreement on how to execute the work.

Preventive Measures—Incorporation of alternative materials, processes, or work steps into an activity to reduce or avoid pollution, exposure to hazards, or security threats.

Program—A set of related projects or ongoing operations managed to execute Laboratory missions.

Project—A subset of a program undertaken to create a defined product or service within a specified schedule.

Qualification—A formal program that defines the required education, experience, training, examination, and any special conditions necessary to ensure that personnel can perform their assigned duties in a safe and reliable manner.

Qualified—A determination that an individual has demonstrated the practical skills necessary to perform a work activity in a safe, secure, and environmentally responsible manner.

Qualified-Worker Activities—Activities that workers can be qualified to perform without detailed instructions. At a minimum, qualifications must be developed in accordance with all the requirements listed under Level 2/Qualification as defined in P781-1, *Conduct of Training*.

Release—The final, formal approval by the PIC to initiate execution of an activity based upon all prerequisites and preparation being completed.

Research and Development (R&D)—"Any creative systematic activity undertaken in order to increase the stock of knowledge, and the use of this knowledge to devise new applications" (after a definition used by the Organization for Economic Cooperation and Development and the United Nations Educational, Scientific and Cultural Organization [UNESCO]. See also SD601, *Conduct of Research and Development*, Section 9).

Risk—The quantitative or qualitative expression of possible harm or loss that considers both the probability that an event will occur and the consequence of that event.

Safety Basis Document—Defines and establishes the safety basis for a facility or area. It describes the activities performed in the associated structures as well as identifies and assesses the hazards associated with these activities. Safety controls are also identified to manage, i.e., mitigate, the hazards.

Safety Envelope—The range of conditions covered by the safety documentation of a process or facility under which safe operation is adequately controlled.

Scope—The bounding extent of a work activity to include work tasks and/or steps, work location(s), involved worker(s), required support personnel, hazards, and controls.

Scoping Walk Down—A walk down performed to aid in determining the scope of a work activity. It is a visual assessment that does not, by itself, have any associated activity hazards. It can provide information on hazards, controls such as PPE and entry requirements, and tools and resources needed to perform the work, and evaluate equipment status.

Subject Matter Expert (SME)—An individual who has been identified as being competent in a given specific functional area and within the respective ESH or Technical discipline as defined below:

- **SME, Environment, Safety, and Health (ESH)**—Designated organizational expert representing Laboratory core safety programs (e.g., RCTs, Industrial Hygienists, Environmental Protection or ESH support, or Waste Management Coordinators, as well as Electrical Safety Officers, Laser Safety Officers, Chemical Hygiene Officers, etc.). SME involvement may be specifically mandated by other requirements, or may be indicated because of desirable expertise relative to the nature of the work.
- **SME, Technical**—Independent technical expert who has knowledge relevant to the hazards involved in the work.

Step—A subset of a task, typically sequenced into an IWD, procedure, or work instruction, having a discrete set of related hazards and controls.

Task—A subset of an activity made up of one or more steps and often having different hazards than other tasks within the activity.

Tenant Activity—An activity conducted by the tenants of a facility and/or workers who are very familiar with the facility hazards and associated controls. Such activities must be carefully reviewed to ensure that they do not produce inadequately controlled aggregate or co--located hazards.

Unreviewed Safety Issue (USI)—Exists if a proposed change, modification or experiment will either: (1) Significantly increase the probability of occurrence or the consequences of an accident or malfunction of equipment important to safety from that evaluated previously by safety analysis; or, (2) Introduce an accident or malfunction of a different type than any evaluated previously by safety analysis that could result in significant consequences. (See DOE G 420.2-1A, *Accelerator Facility Safety Implementation Guide for DOE O 420.2C, Safety of Accelerator Facilities*.)

Unreviewed Safety Question (USQ) Process—The mechanism for keeping a nuclear facility safety basis current. The process involves formally reviewing any changes to facility configuration, processes, or activities, reporting these issues to DOE, and determining the final approval authority for any changes.

Validation Walk Down—An on-site documented review of the work area to ensure that work conditions are consistent with the IWD. Includes a review of the tasks and steps to ensure "workability;" hazards have been identified; and required controls are in place, operational, and functional.

Vulnerability—Susceptible or exposed to a threat or to loss of control of classified material, safety, or environmental protection.

Work-Area Hazard—An ESH/S&S hazard specific to the location of a work activity and not a hazard inherent in the activity itself.

Work Authorization—The combination of RLM and FOD approvals of the activity, accepting that the necessary conditions for the activity to be released and executed are clearly established.

Worker Authorization—The combination of the line manager's determination of assigned worker competence (including knowledge, skills, and abilities) and commitment to perform the work in a safe, secure, and environmentally responsible manner and the RLM's or PIC's confirmation of the worker's qualifications and fitness during the Pre-Job Brief.

9.2 Acronyms

See LANL *Acronym Master List*.

AB	Authorization Basis
AD	Associate Director
ADNHHO	Associate Director for Nuclear and High-Hazard Operations
ASE	Accelerator Safety Envelope
BSL	Biosafety Level
CBT	Computer Based Training
CTS	Comprehensive Tracking System
DAD	Deputy Associate Director
DEP	Deployed Environmental Professional
DOP	Detailed Operating Procedure
DSA	Documented Safety Analysis
DSO	Deployed Security Officer
EMS	Environmental Management System
ENV	Environmental Protection
ESH	Environment, Safety, and Health
EX-ID	Excavation/Fill/Soil Permit Identification
FOD	Facility Operations Director
FSP	Facility Safety Plan
HAZOP	Hazard and Operability Analysis
HVAC	Heating, Ventilating, and Air Conditioning
IA	Issuing Authority
IMP	Implementation Procedure
ISM	Integrated Safety Management
ISMS	Integrated Safety Management System
ISSM	Integrated Safeguards and Security Management
IWD	Integrated Work Document
IWM	Integrated Work Management
HA	Hazard Analysis
LANL	Los Alamos National Laboratory
LOTO	Lockout/Tagout
MSDS	Material Safety Data Sheet
MSS	Maintenance and Site Services
NEPA	National Environmental Policy Act
NNSA	National Nuclear Security Administration
NPDES	National Pollutant Discharge Elimination System
OJT	On-the-Job Training
OOS	Out of Service
OS-DL	Operations Support-Division Leader
OS-DO	Operations Support-Division Office
OSH	Occupational Safety and Health
OSR	Operational Safety Requirements
PFITS	Performance Feedback and Improvement Tracking System
PHA	Process Hazard Analysis

PIC	Person in Charge
POTD	Plan of the Day
POTW	Plan of the Week
PPE	Personal Protective Equipment
PRID	Permits and Requirements Identification
R&D	Research and Development
RAD	Responsible Associate Director
RCRA	Resource Conservation and Recovery Act
RCT	Radiological Control Technician
RLM	Responsible Line Manager
RM	Responsible Manager
RO	Responsible Office
RWCP	Radiological Work Control Package
RWP	Radiological Work Permit
S&S	Security and Safeguards
SBP	Safety Basis Procedure
SIWD	Standing Integrated Work Document
SME	Subject Matter Expert
SOP	Standard Operating Procedure
SPL	Security Program Lead
SRT	Security Requirements Tool
SS	Safety Significant
UCNI	Unclassified Controlled Nuclear Information
UNESCO	United Nations Educational, Scientific and Cultural Organization
USI	Unreviewed Safety Issue
USQ	Unreviewed Safety Question
WSST	Worker Safety and Security Team

10.0 HISTORY

Revision History		
10/31/08	P300, Rev. 0	Renumbered document, Implementation Procedure (IMP) 300, *Integrated Work Management*.
10/30/09	P300, Rev. 1	Added the following new requirements: ▪ procedure for extending the effective date of an Integrated Work Documents (IWD), and ▪ Facility Operations Director (FOD) signature needed to approve work activities in multiple FOD jurisdictions (facility safety envelopes). Clarified the following: ▪ Integrated Work Documents (IWDs) should address hazardous chemical spill control, mitigation, and cleanup, where appropriate. Updated Attachment A, *Integrated Work Management (IWM) Process for Research and Development (R&D)*, to emphasize critical thinking, identify the potential for interacting with the facility, the dangers of scope creep and getting fresh eyes and

Revision History		
		outside help, including the following: ▪ retained and reinforced the basic process for Integrated Work Management (IWM) and Integrated Safety Management (ISM), ▪ strengthened guidance to reduce likelihood of "missed" moderate or high hazards in initial Person in Charge (PIC) grading, ▪ strengthened hazard analysis review teams, ▪ called for specific additional considerations in hazard analysis and development of controls, ▪ added that PIC is to verify that workers from other line organizations are authorized by their own Responsible Line Managers (RLMs) to perform work, and ▪ clarified annual review requirement for Research and Development (R&D) IWDs. Reformatted to meet the requirements set forth in P311-1, *Creating, Revising, and Cancelling Institutional Documents.*

Revision History		
07/16/10	P300, Rev. 2	Revised to improve LANL activity-level work and integration of safe work practices. Revised to improve IWM implementation including strengthening Subject Matter Expert (SME) involvement, incorporating a peer review process, and clarifying other elements of IWM as follows: 1. Clarified applicability of document when implementing within or across the IWM work categories, e.g., R&D, operations, facilities maintenance, and subcontractors. 2. Added requirement for confirming use of *Hazard Grading Table* (new requirement). 3. Clarified applicability of IWD elements for low-hazard activities, e.g., forms. 4. Clarified SME types and involvement. 5. Added Peer Review requirement (new requirement). 6. Added requirement for validation walk down documentation (new requirement). 7. Revised complete security section to clarify annual review requirements and Security Requirements Tool (SRT) implementation. 8. Added requirement for safety basis consideration (new requirement). 9. Removed requirement for RLM or FOD to determine adequacy of IWD and communicate approval via memo (new requirement). 10. Added requirement for IWDs and specific work activity procedures to be kept current (new requirement). 11. Revised instructions for extending effective dates of IWDs. 12. Removed requirement for RLMs to maintain listing of IWDs requiring qualified workers. 13. Revised Attachment A to include requirements for peer review (flowchart revised); annual IWD review and expiration date established; PIC to involve SMEs throughout the process, as needed; PIC to appoint SMEs for Hazard Analysis team; and peers selected by RLM. (new requirements). 14. Updated forms as applicable.
10/31/11	P300, Rev. 3	Added two new required training courses: Course #12454, *IWM: Refresher*, and Course #12494, *Integrated Work Management*: *What-If Checklist* (2-day Course). Clarified existing requirements to align with current practice. Modified to reflect that this Quick Change does not require an Unreviewed Safety Question/Unreviewed Safety Issue (USQ/USI) review. Added “Note 1” and reference to Box 12 instructions to Fig. A-1. Updated links, titles, and acronyms. Clarified references to forms.

Revision History		
03/30/12	P300, Rev. 4	Revised IWM Toolbox references to be consistent with Toolbox format changes. Clarified existing requirements to align with current practice. Clarified and improved alignment of Attachment A with the main body of the document. Clarified use of "workers or a representative set of workers…" for High-Hazard Complex hazard analysis team. Clarified process for RLM, or RLM designee, authorization of workers from other organizations. Incorporated optional Form 3024, *Responsible Line Manager Delegation Form* into the IWM Toolbox. Eliminated requirements for use of Security Requirements Tool (SRT). Clarified requirement for documenting feedback and lessons learned. Incorporated acceptance of organizational-specific methods that capture lessons learned on a periodic basis. Added "Note" to clarify requirement to keep IWDs or equivalent current to match referenced Institutional Documents.
01/22/14	P300, Rev. 5	Section 3.1.2, Identify and Analyze Hazards, was modified to be consistent with an existing requirement in P101-32, Worker Exposure Assessments. Specifically, RLMs must involve ESH deployed personnel in work planning activities to ensure worker exposure assessments are completed when required during the hazard identification and analysis stage of work planning. Updated language in Section 5.0 to reflect Unreviewed Safety Question/Unreviewed Safety Issue (USQ/USI) process and implementation dates for affected facilities.
10/16/14	P300, Rev. 6	Performed three-year review in accordance with PD311, *Requirements System and Hierarchy*. Clarified requirements associated with maintaining an institutional inventory of work activities, determining an activity's hazard level based on an initial hazard screening process, and documenting the determination. Redefined worker authorization to be based on training requirements. Revised Attachment A to be consistent with the clarified requirements associated with the Work Management System and completing an initial hazard screening that supports the activity hazard level determination. Reordered Attachment B questions to be from high hazard to low hazard. Deleted references to the JHA tool. Updated language in Section 5.0 to reflect Unreviewed Safety Question/Unreviewed Safety Issue (USQ/USI) process and implementation dates for affected facilities.

Revision History		
12/09/15	P300, Rev. 7	Section 2.1: The Issuing Authority (IA), Responsible Manager (RM), and Responsible Office (RO) were changed as follows: ▪ IA changed from Associate Director for Environment, Safety, and Health (ADESH) to Associate Director for Nuclear and High Hazard Operations (ADNHHO) ▪ RM changed from ADESH to Operations Support-Division Leader (OS-DL) ▪ RO changed from ADESH to Operations Support-Division Office (OS-DO) Section 5.0: Updated to reflect that this document is effective on the date of issue. Section 9.2: Updated acronyms. Section 14.0: Update contact information.

11.0 REFERENCES

Prime Contract:

- Clause I-121, DEAR 970.5203-1, *Management Controls* (Dec. 2000)
- Clause I-122, DEAR 970.5203-3, *Contractor's Organization* (Dec. 2000)
- Clause I-123, DEAR 970.5204-2, *Laws, Regulations, and DOE Directives* (Dec. 2000)

11.1 Other References

- AP-WORK Procedures
- P950, *Conduct of Maintenance*
- P315, *Conduct of Operations Manual*
- DOE-STD-1029-92, *Writer's Guide for Technical Procedures*, found on the IWM Toolbox in the *Guidance Documents* section
- P101-12, *ES&H Requirements for Subcontractors*
- SD200, *Integrated Safeguards and Security Management*
- Work Management System
- IWM website
- NHHO-AP-009, *New or Changed Activity Approval Process*
- 10 CFR 851, *Worker Safety and Health Program*
- "Negotiating Shared Space/Shared Activities" in the IWM Toolbox in the *Guidance Documents* section
- P351, *Permits and Requirements Identification (PRID)*
- The Risk Matrix Work Aid, found in the IWM Toolbox in the *Hazards Analysis* section
- PD110, *Safety Basis*
- Laboratory Policy Center
- Lessons Learned

- AP-WORK-002, *Work Planning*
- P101-18, *Procedure for Pause/Stop Work*
- AP-WORK-005, *Work Closeout*
- *NNSA Activity Level Work Planning and Control Processes*, found on the IWM Toolbox, in the *Guidance Documents* section
- MSS IWD Writers Guide, found in the IWM Toolbox, in the *Guidance Documents* section
- P101-13, *Electrical Safety Program*
- P121, *Radiation Protection*
- P781-1, *Conduct of Training*
- P313, *Roles, Responsibilities, Authorities, and Accountability*
- SD350, *Project Management for Capital Asset Acquisition and Construction*
- SBP112-3, *Unreviewed Safety Question (USQ) Process*
- P1020-1, *Laboratory Records Management*
- P1020-2, *Laboratory Document Control Program*
- PD1200, *Emergency Management*
- SD601, *Conduct of Research and Development*
- DOE G 420.2-1A, *Accelerator Facility Safety Implementation Guide for DOE O 420.2C, Safety of Accelerator Facilities*
- P311-1, *Creating, Revising, and Cancelling Institutional Documents*
- PD311, *Requirements System and Hierarchy*
- Laboratory Forms website for Environment, Safety, and Health (ESH)
- PD902, *Space Management*
- P101-8, *Explosives Safety*
- P101-15, *Biological Safety*
- P101-29, *Working with Nanotechnology Materials and Processes*
- P101-34, *Pressure Safety*
- P101-24, *Laser Safety Program*
- P101-20, *Fall Protection Program*
- P101-1, *Ergonomics*
- AP-WORK-001, *Work Initiation, Screening, and Acceptance*
- Exhibit F" for Construction, Environmental, Drilling and D&D High Hazard Work

12.0 FORMS

Form 2100, *IWD Part 1, Activity-Specific Information*
Form 2100-WC, *Facilities Maintenance IWD (for MSS facility maintenance work)*
Form 2101, *IWD Part 2, FOD Requirements and Approval for Entry and Area Hazards and Controls, Non-Tenant Activity Form*
Form 2102, *IWD Part 2, FOD Requirements and Approval for Entry and Area Hazards and Controls, Tenant Activity Form*
Form 2103, *IWD Part 3, Validation and Work Release*
Form 2104, *IWD Part 4, Feedback/Post-Job Review*
Form 3024, *Responsible Line Manager Delegation Form*

13.0 ATTACHMENTS

Attachment A. *Integrated Work Management (IWM) Process for Research and Development (R&D)*
Attachment B. *Hazard Grading Table*
Attachment C. *Error Precursor Card and Task Preview Work Aids*
Attachment D. *Integrated Work Management (IWM) Self-Assessment Criteria*

14.0 CONTACT

Operations Support-Division Office (OS-DO)
Telephone: (505) 665-5550
http://int.lanl.gov/org/padops/adnhho/operations-support/index.shtml

No: P300 Integrated Work Management
Attachment A. Integrated Work Management (IWM) Process for Research and Development (R&D) (Page 1 of 17)

Scope/Applicability

This attachment provides specific requirements that must be implemented for Research and Development (R&D) work activities and operations only.

Definition of Research and Development (R&D): Research and Development is "any creative systematic activity undertaken in order to increase the stock of knowledge, and the use of this knowledge to devise new applications" (after a definition used by the Organization for Economic Cooperation and Development and the United Nations Educational, Scientific and Cultural Organization [UNESCO]; See also SD601, *Conduct of Research and Development*, Section 9).

All research and development is performed within an operational world. For that reason SD601 explicitly supports the application to research and development of this document for Integrated Work Management (IWM) as well as controls required by the facility or program environment. It is Los Alamos National Laboratory's (LANL's) intent to support continued excellence and innovation across all LANL research and development through SD601 (i.e., as a stepwise, iterative, discovery-laden intellectual pursuit), while ensuring through this document that hazards of the work—including the environment within and ingredients/processes with which the research and development may be conducted—are appropriately identified and managed.

Workers at LANL conduct R&D separately or with collaborators at LANL as well as at other sites. Work conducted at a non-LANL site will follow that site's work-control mechanisms unless, in the judgment of the workers or their LANL Responsible Line Manager (RLM), the local work controls do not provide a level of safety and security equivalent to LANL's processes. In this case the IWM process requirements must be implemented and integrated into the site work control mechanisms.

Work with a significant safeguards and security component must be evaluated using additional security-specific criteria.

Deployed security workers, such as Security Program Leads (SPLs) and Deployed Security Officers (DSOs), are available to assist managers and workers in evaluating safeguards and security issues related to their work.

While it is not unique to R&D, the nature of R&D (as compared to a fixed, repetitive operation) implies that both situational awareness and critical thinking are essential to identifying hazards that may emerge due to evolution of the work (as well as when beginning new work) or by the interaction of the work with the facility environment (which may be affected by changing environmental as well as R&D conditions). The process described in this attachment is intended to facilitate and encourage that thinking within a systematic structure for the IWM process. Awareness and critical thinking are not only important in the development of a hazard analysis and Integrated Work Document (IWD), but also in recognizing emerging hazards as work is conducted.

No: P300 Integrated Work Management
Attachment A. Integrated Work Management (IWM) Process for Research and Development (R&D) (Cont.) (Page 2 of 17)

Periodic Reviews (applicable to R&D only)

The RLM establishes an expiration date (one-, two-, or three-year maximum) depending on the complexity and hazards of the activity and the rate of change in the work area. However, all R&D IWDs must be reviewed annually, at a minimum, by the RLM and workers to ensure the adequacy of the IWD and hazard analysis (specifically, to ensure that the work remains within the scope and no new hazards and/or improved controls have been identified). This includes a review of the work and work site, and hazards therein.

If the IWD is found to be adequate during this periodic review the RLM indicates this by initialing and dating Form 2100, *IWD Part 1, Activity Specific Information* or other equivalent work control document. If minor changes are necessary, they must be noted as "field changes" within the IWD. Field changes made as part of this periodic review are noted by RLM signature and date of the review (including a brief explanation for the change is suggested). If more substantive changes are necessary, the RLM will initiate a full review and a new IWD.

Involvement of Subject Matter Experts (SMEs) (see Fig. A-1, Box 6) in these annual work planning periodic reviews is encouraged. The one-year review of ongoing R&D activities recognizes the potential for evolution of the work and of related knowledge. Some flexibility in scheduling of both annual R&D work planning and full periodic IWD reviews may be provided by a variance to this document following the process in Section 7.0, if, for example, IWD reviews must be coordinated with separately scheduled activities such as maintenance outages.

No: P300 Integrated Work Management
Attachment A. Integrated Work Management (IWM) Process for Research and Development (R&D) (Cont.) (Page 3 of 17)

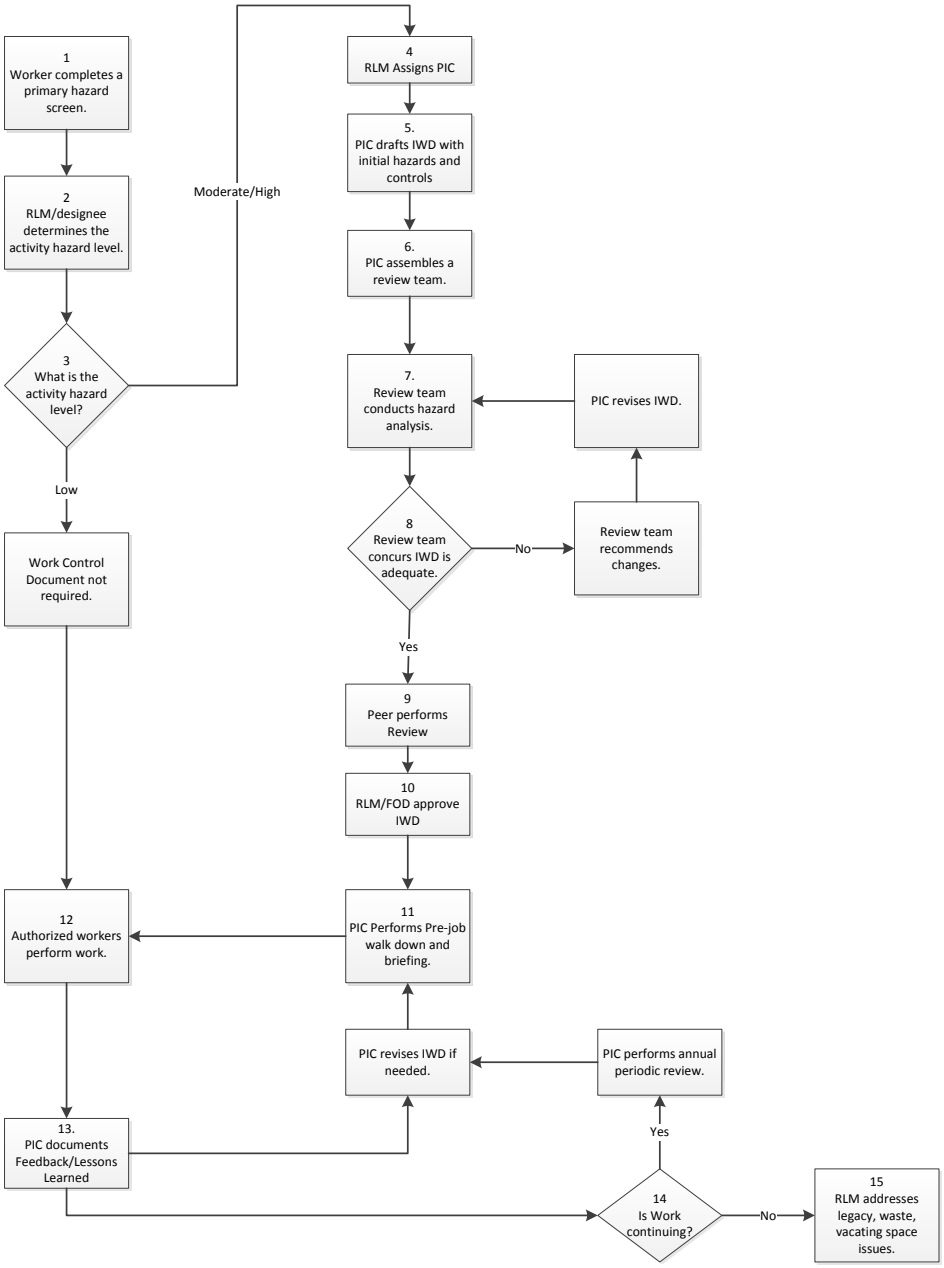


Fig. A-1. Integrated Work Management (IWM) Research and Development (R&D) Process Flow Chart

No: P300 Integrated Work Management
Attachment A. Integrated Work Management (IWM) Process for Research and Development (R&D) (Cont.) (Page 4 of 17)

IWM Process Steps

Here is an explanation of the steps shown in Fig. A-1.

Box 1—Conduct Initial Hazard Screen

The worker enters the activity into the Work Management System and completes an initial hazard screen on the activity. This includes entering the following information:

- Activity title*
- Activity description*
- Identifying organizational information
- Work location(s)*
- A completed initial hazard screening of the activity.

Box 2—Determine the Activity's Hazard Level

The RLM or designee determines the activity's hazard level and documents that determination in the Work Management System. Documentation includes both selecting the hazard level and providing a brief description of the basis for the selected level.

Attachment B, *Hazard Grading Table,* must be used by the RLM or designee to determine the hazard level of the activity [Low, Moderate, or High/Complex]). The examples listed in Attachment B are meant to be illustrative and do not represent a complete set of hazards. The Risk Matrix Work Aid, found in the IWM Toolbox in the *Hazards Analysis* section, may be used in evaluating and determining residual risk and hazard levels.

These matrices are aids only and are intended to spur insight and development of an appropriate level of expert knowledge for identifying the hazard level. The RLM or designee has the responsibility of applying professional and expert judgment to determine the sufficiency of information for identifying the hazard level and where indicated, to seek additional assistance and expert resources.

Note: SD601, *Conduct of Research and Development* remarks that "judgment is inherently required in determining how best to plan, conduct, interpret, and communicate…R&D."

Additional resources include (other) SMEs from the local organization or peers, relevant Laboratory institutional documents or local guidance, and other hazard grading tools. When determining the hazard level of the work, the RLM or designee must take into account the work activity itself and potential impact of work area hazards and co-located work activities. While it is not intended to make the identification of clearly low-hazard work dilatory or ponderous, the application of judgment, tools, and of additional (e.g., expert) resources, where available, is important to ensure that issues not immediately obvious, which, in particular, would raise the work above low hazard, are not missed at this step.

No: P300 Integrated Work Management
Attachment A. Integrated Work Management (IWM) Process for Research and Development (R&D) (Cont.) (Page 5 of 17)

If the work is a low-hazard activity, a complete IWD is not required. The Person in Charge (PIC) must inform the Facility Operations Director (FOD) of any new, low-hazard work activities to be conducted in a facility. Low-hazard activities may be subject to facility-specific access, coordination, and scheduling requirements and must comply with work-area controls required by the FOD. Such requirements might include check-in, training, attending Plan of the Day (POTD) meetings, wearing specified Personal Protective Equipment (PPE), or working under an IWD that addresses work-area hazards. These requirements must be communicated by the FOD (or FOD representative) to existing tenants and non-tenant workers through one of the following mechanisms:

- Form 2101, *IWD Part 2, FOD Requirements and Approval for Entry and Area Hazards and Controls, Non-Tenant Activity Form,* or Form 2102, *IWD Part 2, FOD Requirements and Approval for Entry and Area Hazards and Controls, Tenant Activity Form*;
- facility postings;
- facility-specific training; or
- POTD or Plan of the Week (POTW) meetings.

The worker is responsible for conducting the activity using the Integrated Safety Management (ISM) 5-Step process (go to Box 12). In some cases, the RLM or designee may choose to develop an IWD even though the activity was determined to be low hazard, or low-hazard activities may be included in a broader moderate- or high-hazard/complex work activity IWD.

Box 3—Low Hazard Work

If the activity hazard level is determined to be low, then a complete IWD is not required unless stipulated by the RLM and FOD. Low hazard activities are subject to facility-specific access, coordination, and scheduling requirements and must comply with work-area controls required by the FOD. Such requirements might include check-in, training, attending POTD meetings, wearing specified PPE, or working under an IWD that addresses work-area hazards. These requirements must be communicated by the FOD (or FOD representative) to existing tenants and non-tenant workers through any or all of the following mechanisms:

- Form 2101, *IWD Part 2, FOD Requirements and Approval for Entry and Area Hazards and Controls, Non-Tenant Activity Form* or Form 2102, *IWD Part 2, FOD Requirements and Approval for Entry and Area Hazards and Controls, Tenant Activity Form*;
- facility postings;
- facility-specific training; or
- POTD or POTW.

The worker is responsible for conducting the activity using the ISM 5-Step process (go to Box 12).

No: P300 Integrated Work Management
Attachment A. Integrated Work Management (IWM) Process for Research and Development (R&D) (Cont.) (Page 6 of 17)

Note: If the RLM or designee determines that the activity is a moderate- or high-hazard activity, then the subsequent boxes in the flow chart are followed. At Box 4 the PIC may determine, after defining the work, that the activity is low hazard rather than moderate hazard or high hazard/complex. Low-hazard work may include radiological hazards and activities at thresholds defined in P121, *Radiation Protection* (see Attachment B, *Hazard Grading Table*). The determination made in Box 2, may be adjusted up or down at any time based on additional information as it becomes available or is discovered. If adjusted, the determination must be updated in the Work Management System and the work planning process resumed at the appropriate place.

Box 4—Determine Person in Charge (PIC)

The RLM or designee determines which individuals are qualified to serve as PICs, defines the specific training requirements to allow them to conduct work planning and assigns one person as the PIC for the specific work activity.

Activities can involve multiple organizations, and multiple people may be assigned to participate on the hazard analysis review team, but a single PIC must be responsible for the work planning and day to day execution of the activity.

Box 5—Person in Charge (PIC) Plans the Work

The PIC defines the work to be conducted. The definition must be sufficiently detailed to assess all hazards, including the following:

- security;
- environment;
- safety and health;
- facility, equipment, tools, and/or materials, including inherent hazards and any hazards solely associated with their interaction with the R&D itself; and
- impact on facility safety basis.

The work should be defined clearly enough to help prevent the work evolving outside the configurations for which these hazards are appropriately managed, without that fact being recognized and addressed by workers. Such evolution outside of conditions that have been appropriately analyzed and managed can occur because of the evolving nature of the work (e.g., changing materials or equipment) or even from apparently minor changes in a nearly routine aspect of an activity. While it is impractical to attempt to define the work in detail sufficient to identify all such possible boundaries, it is desirable (as an aid to future situational awareness and critical thinking) for the PIC to also consider potentially hazardous aspects of “scope creep” when thinking about how to define and detail the scope.

Note: Planning should include permit requirements, the disposition of excess equipment, materials, and waste, and potential facility decontamination.

No: P300 Integrated Work Management
Attachment A. Integrated Work Management (IWM) Process for Research and Development (R&D) (Cont.) (Page 7 of 17)

If the work is not low hazard, an IWD is required. The PIC creates a first draft of the IWD in preparation for team review. This first draft should generally describe the work activity with enough detail to allow identification of hazards, expected outcomes and controls that are clearly evident.

The IWD includes initial hazards and controls developed by using a hazard analysis process *or tool* or the IWD forms available through the Laboratory Forms website for Environment, Safety, and Health [ESH]. At all points during this process, the PIC must apply "critical thinking." The PIC should not rely solely on a tool to develop a complete set of hazards and controls. Again, tools are intended to spur insight and development of an appropriate level of expert knowledge for identifying hazards and controls. The PIC has the responsibility of applying professional and expert judgment to determine the sufficiency of information for a draft IWD, and where appropriate to identify the need to seek additional assistance and expert resources during Hazard Analysis Review.

Hazard analysis tools should be reviewed and determined by the RLM to be

- supportive of the IWM process,
- capable of identifying hazards and defining controls, and
- capable of identifying associated institutional requirements.

The PIC, as designated by the RLM, in consultation with SMEs and the RLM as needed, confirms whether the activity is Moderate Hazard or High Hazard/Complex, using Attachment B, *Hazard Grading Table* and applicable Laboratory documents.

Box 6—Establish Hazard Analysis Review Team

The intent of this step is to assemble the right people to review the planned activity, to ensure the appropriate level of communication, and to stimulate critical thinking and discussion. The draft IWD identifies hazards that are clearly evident or otherwise identified by the PIC; these may not be all the hazards present, or some hazards assumed to be controlled may interact with the work to pose the need for additional controls. The intent of critical thinking and discussion during Hazard Analysis is to identify such hazards and controls. Since IWDs may be used to address a class of work, the Hazard Analysis should also attempt to identify changes within the work that may need to be flagged as among the possible causes for more detailed review of the applicability of an IWD, as a reminder for workers using the IWD in the future. This is similar in intent to the recommendation that the PIC think about potentially hazardous areas for "scope creep" when determining how to define the scope. However, what is flagged in this way can only be an *aid* to future critical thinking by workers while performing the work (see Box 12), not a substitute for it. To accomplish all of this during hazard analysis, it is important to assemble a hazard analysis review team with appropriate members.

No: P300 Integrated Work Management
Attachment A. Integrated Work Management (IWM) Process for Research and Development (R&D) (Cont.) (Page 8 of 17)

Moderate-Hazard Requirements

The PIC identifies and assembles the hazard analysis review team consisting of the following categories of members:

- PIC(s);
- researcher/worker(s) (including students and postdocs who are doing the work, depending on the size and complexity of work team);
- SMEs of two distinct types described below;
- one or more independent team members representative of other workers affected by co-located hazards (as applicable); and
- as needed, a training specialist assigned to the organization familiar with training requirements and prerequisites for the work activities being planned.

The RLM must be involved in the review of an IWD as a member of the review team and/or during the walk down of the activity, given that the RLM will approve the final IWD. Any intermediate first line manager(s) whose work scope includes the work scope for the IWD should also be considered as a member(s) of the review team.

The PIC may include a FOD or representative of the FOD on the hazard analysis review team, depending on the nature of the activity, e.g., when there are co-located operations and/or facility interfaces that need to be communicated and coordinated.

The “independent team member(s)” are worker(s) who would be knowledgeable of the facility and safety and, in particular, represent other, presumably nearby, workers potentially affected by co-located hazards. He or she would know who to go to when more information is needed, may aid the PIC in getting the right people on the review team, would take an active part in the review itself, and provide an unbiased review of the planned work. While it is desirable that the independent (co-located) team member have the technical skills and experience to understand the planned process, this is not required, because of the separate requirement to include SMEs.

The PIC must include appropriate SMEs of two distinct types, where applicable. It is possible in some circumstances for one individual to be both an ESH SME and Technical SME:

- ESH SMEs include designated organizational experts representing Laboratory core safety programs (e.g., Radiological Control Technicians [RCTs], Industrial Hygienists, ESH Specialists, Deployed Environmental Professionals, or Waste Management Coordinators, as well as Electrical Safety Officers, Explosive Safety Officers, Laser Safety Officers, Chemical Hygiene Officers, etc.). Their involvement may be specifically mandated by other requirements, or may be indicated because of desirable expertise relative to the nature of the work, in which case the PIC will also include these as warranted.

- Technical SMEs include technical experts who have knowledge relevant to the hazards involved in the work. To add expert "fresh eyes" and critical thinking, the PIC will include one or more such technical SMEs from outside the immediate organization that is planning and conducting the work. However it is recognized that there will be cases, for example, involving narrow specialties, where this may not be achievable. Where this is the case, including only SMEs from among the researchers/workers or immediate organization requires approval by the RLM for the work activity, and this limitation in viewpoints should be recognized when the review team conducts the hazard analysis.

The PIC must include appropriate SMEs of the first organizational type as warranted, as well as one or more external technical SMEs appropriate to the work. SMEs of both types should contribute to identifying opportunities for hazard elimination, substitution, or controls where appropriate, based on their expertise, as well as contributing to hazard identification (in Box 7).

In some cases, where justifiable, an independent co-located worker could also be one of the SMEs; however that individual would have to be able to serve both distinct functions on the team.

Note: SMEs on the Hazard Analysis Review Team are appointed by the PIC. Individuals responsible for Peer Review (in Box 9) may have some similar skills, but are selected by the RLM.

High Hazard/Complex Requirements

In addition to the members listed for Moderate Hazard, the High Hazard/Complex hazard analysis review team must include a FOD or FOD representative. High Hazard/Complex work requires assembly of this team together to ensure appropriate hazard analysis.

Box 7—Team Conducts Hazard Analysis

The hazard analysis review team confirms the activity hazard grading determined by the PIC and performs a hazard analysis based on the hazards and complexity of the activity. Table A-1 captures requirements for both moderate and high-hazard/complex activities.

When possible and reasonable, the HA team should visit the work location(s).

The team conducts the hazard analysis, reviews the adequacy of associated procedures, and determines if contingency or emergency plans must be developed. The Error Precursor table in Attachment C, *Error Precursor Card and Task Preview Work Aids,* will assist in identifying potential human error risks.

Hazard analysis tools may be used as an aid to validate that the hazards and associated institutional requirements are identified. However, such tools are not intended to substitute for critical thinking coupled with sound professional judgment provided by the review team. Part 1 of the IWD is used to document the hazard analysis method used and review team information.

The team reviews the draft IWD (Parts 1 and 2), including work tasks/steps, hazards (including hazards from the activity itself, work area hazards, and known co-located and aggregate hazards), the controls appropriate for the hazards, reference documents, and training and qualifications. The PIC incorporates the results of the team's review into the draft IWD.

Note: Both during the PIC's development of a draft IWD and during the hazard analysis, it may be helpful to apply judgment and critical thinking not only to identification of hazards (and their controls) but also to whether the utility of the IWD for the workers regarding specific and potentially consequential hazards is diluted by overly extensive or "cluttered" discussion of routine/common or low-consequence hazards. The team may consider how best to address this balance in reviewing the IWD during this step.

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Attachment A. Integrated Work Management (IWM) Process for Research and Development (R&D) (Cont.) (Page 10 of 17)

Table A-1. Hazard Analysis Team Criteria

	Moderate Hazard	High Hazard/Complex
Hazard analysis team members	Person in Charge (PIC), worker(s), independent member, Subject Matter Experts (SMEs), and as applicable co-located worker, Responsible Line Manager (RLM) participation required for either Hazard Analysis review or walk down.	Add RLM and Facility Operations Director (FOD) or FOD representative
Team member participation documented	Required	Required
Team assembly together	Recommended	Required
Hazard-analysis rigor	At least brainstorming, consistent with the expectations of the hazard analysis as described under Box 6.	At least "What-If" Analysis
Hazard-analysis documentation	Optional	Required*
Contingency planning	Recommended	Required
Review of operational steps**	Recommended	Required
Include FOD and SME(s) in validation walk down	Optional	Required

* Hazard analysis for high-hazard/complex work must be documented, with the following qualities as a minimum:
- it must capture clear logic supporting final decisions;
- it must be retrievable in the future to review logic and decisions; and
- it must reflect requirements of Attachment B, *Hazard Grading Table.*

** Operational steps may be captured in an operational procedure, work instruction, plan, permit, or the Integrated Work Document (IWD) itself.

Teams should *consider* a range of controls for high-hazard or complex work in particular. For example, while R&D itself follows a plan (see SD601, *Conduct of Research and Development*) but may *not* as an intellectual discovery-laden pursuit be pursued in a rigid sequence of work, teams should consider whether it may be appropriate to the hazards and/or to the R&D to use, as an administrative control, checklists for execution of operational steps involved in conducting a set of tests or experiments, including setup and post-measurement activities.

During the hazard analysis for either moderate- or high-hazard/complex work, teams should *consider whether* the R&D involves or can affect the facility or facility operations beyond the bounds of existing analyses or agreements/controls. If so, the interaction with or potential to impact controlled operations must be resolved with the FOD and addressed in the IWD.

No: P300 Integrated Work Management
Attachment A. Integrated Work Management (IWM) Process for Research and Development (R&D) (Cont.) (Page 11 of 17)

The PIC and team must be knowledgeable of the applicable Process Hazard Analysis (PHA) and/or facility safety basis documentation such as the Facility Safety Plan (FSP) or Documented Safety Analysis (DSA) and must ensure that the planned activities are within the bounds of these documents. If not within the bounds, the RLM determines whether to modify the scope of the activities or to pursue, with the FOD, additional safety analysis and revision of the PHA or safety basis. Activities outside the bounds of the PHA or safety basis must not be performed.

Teams should recognize any elements of the activity, including those that support but are not directly part of the R&D itself, for which involved workers may have more limited expertise and that may call for particular attention to hazards and the adequacy of controls. The Pre-Job Brief should be tailored appropriately (see Box 11).

Note: This hazard analysis is the most crucial in the work planning process. It must be conducted to facilitate critical thinking, worker involvement, and team interaction. The team should apply the hierarchy of controls (below), and address the impact of adjacent and potentially aggregate hazards:

1. elimination of hazards,
2. substitution with a lesser hazard,
3. engineered control,
4. administrative control, then
5. PPE.

Box 8—Review Team Concurs Integrated Work Document (IWD) is Adequate

The team ensures the adequacy of the work scope, work steps, the hazards analysis and appropriateness of the controls, and the clarity of the overall IWD and associated work control documents. The PIC will make any adjustments identified by the hazard analysis review team or cycle the comments back through the team for resolution and concurrence.

Box 9—Peer Review

The RLM must have a peer review performed on IWDs for all moderate- and high-hazard work before approving the IWDs. Having another person reviewing the unapproved product provides benefit by bringing a systems approach, big picture view, and/or breadth of focus to ensuring that the IWD has adequately identified the potential hazards and required the necessary controls.

The RLM determines the scope, form, and participant(s) for the peer review. The reviewer(s) should not have been directly involved in developing or approving the IWD to be reviewed. The RLM can consider the level of definition (certainty) of the work scope, experience of the IWD development team, and the employees identified to perform the work, recent related experiences, and Lessons Learned, and other factors that may influence the work when determining who the reviewer (or reviewers) should be.
The peer review may include recognition of additional peer reviews that the RLM may have established as a control for ongoing work.

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Attachment A. Integrated Work Management (IWM) Process for Research and Development (R&D) (Cont.) (Page 12 of 17)

As with scientific peer review, having the peer reviewer(s) remain anonymous keeps the process and critical review robust. However, there will be situations where anonymity may be in conflict with performing an adequate review. These considerations should be discussed by the RLM and peer reviewers when the peer review process is initiated.

The RLM signature on Part 1 of the IWD or equivalent work control document includes an acknowledgement that a peer review was completed and comments were adequately addressed.

Comments/concerns identified during the peer review must be communicated to the RLM for his or her consideration before approving the IWD. After completion of the peer review, the RLM must address the review comments appropriately. RLMs are expected to use due diligence in making this determination.

Box 10—Responsible Line Manager (RLM) and Facility Operations Director (FOD) Approve Integrated Work Document (IWD)

The PIC reviews the final IWD with the RLM and FOD (or representative) and obtains their signatures of approval to conduct the work. The RLM approval on Part 1 of the IWD indicates:

- IWM has been applied appropriately,
- work is authorized,
- workers are qualified,
- work will be performed in accordance with ESH/Security and Safeguards (S&S) requirements and the IWD, and
- facility safety basis, aggregate hazards, and co-located hazards were appropriately included in the hazard analysis performed by the team.

The FOD approval on Form 2100, *IWD Part 1, Activity Specific Information* indicates

- work is appropriate to be conducted in this facility (the activity is within the Authorization Basis [AB], the facility is appropriate for the work, and the work is appropriate for the facility), and
- facility safety basis, aggregate hazards, and co-located hazards will be managed.

Note: The RLM and FOD or FOD representative (for the FOD's specific facility safety envelope) sign Form 2100, approving work based upon confidence that the IWD has been properly prepared, that the work will be performed within ESH/S&S requirements and facility requirements and capabilities, and will be performed in accordance with the IWD. Work activities in multiple FOD jurisdictions, e.g., additional facility safety envelopes, require those respective FOD or FOD representative approvals, as applicable.

The FOD or FOD representative approval on either Form 2101, *IWD Part 2, FOD Requirements and Approval for Entry and Area Hazards and Controls, Non-Tenant Activity Form* or Form 2102, *IWD Part 2, FOD Requirements and Approval for Entry and Area Hazards and Controls, Tenant Activity Form* indicates facility-specific work area hazards, controls, and requirements have been identified.

The FOD or FOD representative release on Form 2103, *IWD Part 3, Validation and Work Release* for Standing Integrated Work Documents (SIWDs) may be given concurrently with the signature on Part 2 of the IWD.

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Attachment A. Integrated Work Management (IWM) Process for Research and Development (R&D) (Cont.) (Page 13 of 17)

Note: The recommended IWM assessment criteria (see Attachment D, *Integrated Work Management [IWM] Self-Assessment Criteria*) may be used to guide this evaluation of the adequacy of the IWD.

Box 11—Pre-Job Activities and Pre-Job Brief

Validation Walk Down

The PIC performs a validation walk down of the work area and work activity. The walk down must include workers assigned to conduct the work. The walk down must be conducted as close in time as reasonable to the actual performance of work, to ensure conditions in the area have not changed and the appropriate personnel, procedures, and equipment are available to start the work.

For High-Hazard/Complex Work, the FOD or FOD representative and SMEs appropriate to the hazards involved must be included in the validation walk down.

Validation and Work Release

At this point, the PIC and/or FOD-designated facility point-of-contact releases the work near the time the work is to commence with a work release signature on Part 3 of the IWD. Work activities must be released once, before initial execution. The FOD may also choose to require another work release when there are significant delays, changes in the work activity, or changes in the facility conditions. This work release may occur at the time the IWD is approved by the FOD, at the discretion of the FOD.

The work release indicates:

- the activity is compatible with the current facility configuration and operating conditions and co-located activities,
- controls are in place to protect co-located workers and non-tenant workers, and
- the work activity can proceed.

Work should be controlled through POTD or POTW meetings; this should be a current and ongoing effort to schedule and resolve schedule conflicts, paying particular attention to co-located hazards. The FOD is responsible for ensuring co-located workers and non-tenant workers who may be affected by the work are appropriately notified.

Pre-Job Brief

The PIC performs a Pre-Job Brief for all workers engaged in the work activity. A Pre-Job Brief is required for each worker before he or she begins work.

The Pre-Job Brief will include a review of the hazards and controls, critical steps in the process and any identified contingency actions, and a review of potential human error precursors that may affect the safe and secure conduct of the work. Suggested content for Pre-Job Briefs is included in Form 2103, *IWD Part 3, Validation and Work Release*. Additional guidance for the Pre-Job Brief is included in the Task Preview (see Attachment C, *Error Precursor Card and Task Preview Work Aids*). ***Where appropriate the Pre-Job Brief should be responsive to known differences among individual workers regarding the error precursors shown in Attachment C, such as knowledge and familiarity with tasks within the activity.***

No: P300 Integrated Work Management
Attachment A. Integrated Work Management (IWM) Process for Research and Development (R&D) (Cont.) (Page 14 of 17)

Pre-Job Briefs should be conducted as frequently as necessary. At a minimum, they must be conducted before beginning work, whenever the work scope is changed, when new Lessons Learned are available, when unanticipated hazards or conditions have been identified, or before critical steps are to be initiated.

The PICs and all workers who will be working under the IWD must sign Part 3 of the IWD.

The worker signatures indicate that they

- agree to follow the work steps and implement the controls as written;
- agree to pause/stop work when conditions or hazards change, when they encounter unexpected conditions during the execution of work, when work cannot be performed as written, or when instructions become unclear during execution; and
- confirm that they are authorized, qualified, and fit to perform the work.

The PIC's signature indicates that he or she

- has verified authorization of the work by ensuring approval signatures of the RLM and FOD on Parts 1 and 2 of the IWD;
- has jointly conducted a validation walk down with workers and SMEs, as required, to confirm the IWD can be performed as written, and required initial conditions and other prerequisites are in-place and adequate;
- has conducted the Pre-Job Brief, and all workers have been briefed;
- has ensured coordination with any required FOD work-area representatives (e.g., area work coordinators); and
- has ensured that assigned workers are authorized and are qualified and fit to perform the work in a safe, secure, and environmentally responsible manner.

The main text of this document (see Section 3.1.3.d,) requires that the RLM responsible for the work activity is responsible for ensuring that personnel are trained and qualified on the activity to be performed, as well as being knowledgeable of facility access requirements. This determination may be delegated to the PIC and must be achieved before workers begin work, e.g., at the Pre-Job Brief.

To support these responsibilities and to support the PIC's signature on Part 3 of the IWD, the PIC is expected to verify (through U*Train*, other documentation, and confirmation with the worker's RLM, e.g., by e-mail or Form 3024*, Integrated Work Management Responsible Line Manager Delegation Form*) that the assigned, deployed workers are authorized and qualified to perform the work. The PIC (serving as the designee of the RLM responsible for the work) is expected to obtain this confirmation before signing Part 3 of the IWD or including new workers. Both initially and when new workers are added to an IWD, the PIC should communicate to the RLM responsible for the work activity that workers have been signed on to Part 3 of the IWD.

Note: Using institutional systems such as U*Train* to identify that workers are authorized by their RLMs may facilitate the PIC's meeting this verification requirement.

No: P300 Integrated Work Management
Attachment A. Integrated Work Management (IWM) Process for Research and Development (R&D) (Cont.) (Page 15 of 17)

Box 12—Performing the Work

Workers must perform the work in accordance with the IWD and supporting procedures. Workers must apply critical thinking while they prepare for and conduct work. If unexpected conditions arise, work must be paused or stopped and reevaluated. If the conditions indicate a hazard is not effectively mitigated by the existing controls, the work must not be restarted until adequate controls have been established. As work proceeds under an IWD, changes within the work or in the environment should be the subject of critical thinking and review because they may have the potential to move work outside the planned and controlled parameters of the IWD.

The PIC and each worker must perform frequent readiness checks to confirm that conditions remain within planned parameters. Readiness checks at the start of the workday, the next shift, and the next task (i.e., as work performed under the IWD evolves) are particularly important. These checks are informal, used to confirm that needed personnel, tools, and materials are available, to confirm work is still within scope (avoiding “scope creep”), and whether any changes in the operating conditions or work environment have occurred. The PIC and workers must assume that any change would result in increased risk until proven otherwise.

The following are of particular significance:

- change in scope of activity,
- change in facility work area conditions,
- changes in personnel readiness,
- unanticipated hazards or conditions,
- failure of controls,
- any change that impacts the safety basis of the facility or exceeds established facility operating limits,
- an incident or injury associated with the planned work, or
- new co-located work is introduced into the area that may affect the safety of the ongoing activities.

Workers should approach the work each day with an understanding that task demands, the work environment, individual capabilities and elements of human nature may have changed from the previous day. They should approach tasks critically to ensure potential problems are identified as early as possible. Attachment C, *Error Precursor Card and Task Preview Work Aids,* should be used, as should techniques such as peer-checking, before completing critical steps in a task.

If changes remain within bounding conditions specified in the IWD, the work may continue. For all other changes, the PIC must evaluate, in consultation with the appropriate SME, the significance of any identified changes and determine how to proceed. In particular, if technical changes in the work may introduce new hazards or deviate from planning assumptions or bounding conditions used in developing the IWD, the PIC should consult with internal and external SMEs, as required, to evaluate the significance of the changes. Similarly, the PIC should consult with appropriate SMEs if changes in the facility or the facility’s interaction with the work could introduce new hazards or deviate from assumptions used in the IWD.

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Attachment A. Integrated Work Management (IWM) Process for Research and Development (R&D) (Cont.) (Page 16 of 17)

The PIC may address minor changes with revisions to the IWD on the job site by lining out and/or adding text, initialing and dating the revision, and notifying all affected workers of the changes. For ongoing work, the PIC must subsequently update the master copy of the IWD. Significant changes require repeating affected parts of the IWM process to include an Unreviewed Safety Question (USQ) or Unreviewed Safety Issue (USI) determination, where appropriate, and obtaining peer review and RLM and FOD approval. Worker authorization must also be reviewed and renewed as necessary. Examples of significant changes include:

- major change in scope,
- previously unanticipated hazards or conditions,
- failure of controls and/or changes in controls, and
- any change that would impact the safety or AB of the facility or exceed established facility-operating limits.

Minor revisions are not to be used where the change would

- increase the safety risk to personnel,
- create a difference to a source document requirement and require a variance to continue work,
- alter the purpose or the scope of the procedure,
- eliminate any required reviews or approvals, or
- alter the operating, technical, design, process, regulatory, or quality control requirements of a procedure.

Information in the Work Management System must be maintained current and must be updated to reflect changes in work scope and activity level hazards.

Box 13—Feedback/Lessons Learned

Workers and PICs should be aware of opportunities to improve their operations. Minor improvements must be routinely incorporated into the existing IWD by the PIC using field revisions, or for more significant changes, by revising the IWD. (See discussion above of Box 12—Performing the Work for requirements on minor changes and PIC-approved field revisions.) The potential for feedback and Lessons Learned from performing the work to identify the potential need to revise the IWD is shown on Fig. A-1, *Integrated Work Management (IWM) Research and Development Process Flow Chart*.

Opportunities for improvement and subsequent Lessons Learned should be captured at any time during the activity—during work execution, during the annual IWD review, and/or at the termination of the activity.

Important opportunities for improvement must be communicated as potential Lessons Learned to co-workers and other work planners. It is also a best practice to communicate them to the local Worker Safety and Security Team (WSST). The local WSST will review and forward important Lessons Learned using the LANL Lessons Learned program or other LANL-approved processes.

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Attachment A. Integrated Work Management (IWM) Process for Research and Development (R&D) (Cont.) (Page 17 of 17)

Note: When an activity is terminated or fully completed and the IWD is no longer needed, a Post-Job Review and Lessons Learned review must be performed and the results communicated to co-workers and work planners, and provided institutionally through LANL Lessons Learned processes or alternatively provided to the ESH Manager for the FOD and facility. (See discussion below on Box 15—Project or activity close out, for more details.)

Box 14—Is Work Ongoing or Completed?

IWDs for continuing R&D work must be reviewed annually for adequacy before their expiration date, which is determined by the RLM and may be one, two, or three years.

For the annual IWD review, the PIC must initiate a review tailored to the operating experience and degree of work scope change to be performed by the RLM and workers. This process should be based on the existing IWD and should incorporate any Lessons Learned identified. If more substantive changes are necessary, the RLM will initiate a full review and a new IWD. The PIC will obtain RLM and FOD approvals on the new IWD and the activity will be subject to re-release.

Peer review is not required for the annual IWD review (before IWD expiration). However, the RLM can invoke additional peer review at his or her discretion.

Note: The normal process for extending the effective date of an IWD is described in Section 3.2.

Box 15—Project or Activity Close-Out

At the completion of a project or activity, the PIC must conduct a Post-Job Review.

If an IWD was required, the PIC must document the Post-Job Review on the close-out section of the IWD. (For example, Form 2104, *IWD Part 4, Feedback/Post-Job Review*, or at an organizational level, see the AP-WORK-002, *Work Planning* work documentation process.) In any case, the Post-Job Review should include the following:

- verify that the activity is complete and make notifications in accordance with FOD requirements;
- ensure that follow-through actions (e.g., clean-up, recycle, waste disposal, equipment removal, and secure storage) are completed;
- identify inefficiencies, problems during the activity, coordination issues, unanticipated conditions, and near misses;
- develop recommendations for improvement; and
- any Lessons Learned as described in the discussion of Box 12, above.

If the work has been completed and the space is being vacated at the end of a project or task, the RLM, or designee, and PIC will follow the requirements in PD902, *Space Management.*

Note: Further guidance on Shared Space/Shared Activities is available in the IWM Toolbox in the *Guidance Documents* section, titled “Negotiating Shared Space/Shared Activities.”

No: P300 Integrated Work Management
Attachment B. Hazard Grading Table (Page 1 of 5)

The Hazard Grading Table (see Table B-1) requires that the Responsible Line Manager (RLM) or designee, who in most cases is the Person in Charge (PIC), review not only the hazards, but also the risk of an incident occurring and the worst case consequence. Additional hazard grading tools may be used to supplement the criteria below.

The Hazard Grading Table must be used to determine the hazard level of the activity (Low, Moderate, or High/Complex). When answering the hazard grading questions, both activity and work-area hazards must be considered, such as when a low-hazard activity is performed in an area where it is co-located with high-hazard/complex work activity hazards. The examples listed are meant to be illustrative and do not represent a complete set of hazards. When in doubt about the appropriate grading level, the next higher level should be used.

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Attachment B. Hazard Grading Table (Cont.) (Page 2 of 5)

Table B-1. Hazard Grading Table

Hazard Grading Questions	Examples of Work
1. Does the work involve hazards that inherently could cause critical or catastrophic harm to people, property, national security, the environment, or the institution, such as ▪ severe or fatal injuries, life-shortening disease, permanent disability, or ▪ major environmental contamination or permit violation (i.e., National Pollutant Discharge Elimination System [NPDES], Resource Conservation and Recovery Act [RCRA], etc.)? ***Note:*** This question may be answered "NO" if engineered controls have been established, thoroughly reviewed, and proven highly reliable in minimizing the hazards without active worker involvement (e.g., commercial insulation on electrical wiring, sharps disposal containers). Additional engineered controls, e.g., gloveboxes, must have concurrence by applicable Subject Matter Experts (SMEs). **YES— High Hazard/Complex—Documented Hazard Analysis with Hazard Analysis (HA) Team and Integrated Work Document (IWD) required** **NO—Answer question 2**	**Examples of High-Hazard/Complex Work** ▪ Radiological hazards and activities at thresholds defined in P121, *Radiation Protection* ▪ Use of significant amounts of stored electrical energy (e.g., large capacitor banks) ▪ Use of significant quantities of highly toxic or hazardous materials ▪ Work with high explosives in a quantity, form, and manner that could detonate and cause major damage according to P101-8, *Explosives Safety* ▪ Work with Biosafety Level 3 (BSL-3) bioagents/biohazards P101-15, *Biological Safety* ▪ Use of materials that, if released, could cause major environmental contamination ▪ Work with a combination of crafts and/or multiple workers requiring precise sequencing and careful coordination of their activities to prevent critical or catastrophic harm to people, property, national security, the environment, or the institution. ▪ Work with multiple hazards with potentially conflicting controls ▪ Potential for rapidly changing work-area conditions ▪ Nonroutine or infrequently performed work where worker proficiency is important to managing the hazards ▪ Entering environments where unevaluated hazards may exist or performing low or moderate hazard tasks in a high-hazard environment ▪ Nanotechnology work, as defined in P101-29, *Working with Nanotechnology Materials and Processes*

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Attachment B. Hazard Grading Table (Cont.) (Page 3 of 5)

Table B-1. Hazard Grading Table (Cont.)

Hazard Grading Questions	Examples of Work
2. Does the work involve hazards that inherently could cause moderate harm, such as: ▪ injury requiring medical attention or leading to temporary disability, or ▪ spill or unplanned release to the environment of hazardous materials? ***Note:*** This question and Question 3 may be answered "NO" if engineered controls have been established, thoroughly reviewed, and proven highly reliable in minimizing the hazards without active worker involvement (e.g., commercial insulation on electrical wiring, sharps disposal containers). Additional engineered controls, e.g., gloveboxes, must have concurrence by applicable SMEs.	**Examples of Moderate Hazard Work** ▪ Work with hazardous chemicals, materials, or Biosafety Level 2 (BSL-2) bioagents/biohazards as defined in P101-15, *Biological Safety* ▪ Radiological hazards and activities at thresholds defined in P121, *Radiation Protection* ▪ Exposure to electrical energy at hazardous levels defined in P101-13, *Electrical Safety Program* ▪ Use of hazardous pressure, vacuum, or cryogenic systems defined in P101-34, *Pressure Safety* ▪ Exposure to laser radiation with potential for eye damage as defined in P101-24, *Laser Safety Program* ▪ Elevated work when fall protection is not provided by conventional handrail systems or required according to P101-20, *Fall Protection Program* ▪ Manually lifting more than 50 pounds by a single person ▪ Welding or other process that produces sparks or flame ▪ Work associated with decontamination or demolition
3. Does the work involve unfamiliar hazards or a combination of moderate hazards (as defined in Question 2 above) and significant complexity?	
Question 2 YES: Question 3 YES – High Hazard/Complex—Documented Hazard Analysis with HA Team and IWD required **Question 2 YES: Question 3 NO – Moderate Hazard Activity – An IWD is required** **Question 2 NO: Question 3 NO – Answer Question 4**	

No: P300 Integrated Work Management
Attachment B. Hazard Grading Table (Cont.) (Page 4 of 5)

Table B-1. Hazard Grading Table (Cont.)

Hazard Grading Questions	Examples of Work
4. Does the work involve only hazards that could cause negligible harm and be controlled by means well known to the workers? **YES—An IWD is not required (unless stipulated by Responsible Line Manager [RLM] and/or Facility Operations Director [FOD])** **NO—refer back to questions 1, 2, and 3 OR consult one or more SMEs to assist in determining the activity's hazard level**	**Examples of Low-Hazard Work** ▪ General office work Normal use of household appliances (e.g., coffee makers, microwave ovens, etc.) ▪ Activities not requiring hands-on work (e.g., visual inspections, log taking, etc.) ▪ Ordinary lifting (e.g., ergonomic risk factors for lifting considered in accordance with P101-1, *Ergonomics*) ▪ Use of a dolly or hand truck to move non-hazardous materials ▪ Elevated work when fall protection is provided by conventional handrail systems or otherwise not required according to P101-20, *Fall Protection Program* ▪ Radiological hazards and activities at thresholds defined in P121, *Radiation Protection* ▪ Other everyday accepted activities such as driving automobiles, food preparation, etc.

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Attachment B. Hazard Grading Table (Cont.) (Page 5 of 5)

Table B-2 is applicable only for **facility maintenance activities.**

Table B-2. Hazard Grading Table for Facility Maintenance Activities	
Hazard Grading Questions	**Examples of Work**
1. Does the facility maintenance work involve only hazards that could cause negligible harm, and is it controlled by means well known to the workers? **YES—An Integrated Work Document (IWD) is not required (unless stipulated by Responsible Line Manager [RLM] and Facility Operations Director [FOD])** **NO—answer question number 2 in Table B-1.**	**Examples of Low-Hazard Work** ▪ Expedited Work as defined in AP-WORK-001, *Work Initiation, Screening, and Acceptance* ▪ Radiological hazards and activities at thresholds defined in P121, *Radiation Protection* ▪ Facility repairs such as repairing individual doors, windows, and locks ▪ Installation and removal of all scaffolding ▪ Equipment routine lubrications ▪ Maintenance of equipment, e.g., adjusting, changing of belts, sheaves, shafts, or bearings ▪ Shop equipment maintenance ▪ Inspect, diagnose, test, adjust, clean, perform minor repair of Heating, Ventilating, and Air Conditioning (HVAC), building controls systems and air handling systems or equipment ▪ Repair of kitchen appliances ▪ Repair or replace filter assemblies and periodic replacement of filter cartridges (e.g., on drinking fountains or on nonhazardous systems) ▪ Backflow preventer inspection ▪ Restroom repairs ▪ Minor plumbing and safety shower repairs ▪ General office repairs or renovations ▪ Snow removal, use of household mowing equipment, sweeping, traffic control, vegetation control, general cleanup of facilities, roads, and grounds ▪ Routine custodial work, including use of household cleaners and waxing activities ▪ Elevated work when fall protection is provided by conventional handrail systems or otherwise not required according to P101-20, *Fall Protection Program* ▪ Ordinary lifts with lift plan ▪ Class-1 penetrations authorized by the RLM or designee with knowledge of no existing hazards in structure, wall, floor, or other surface

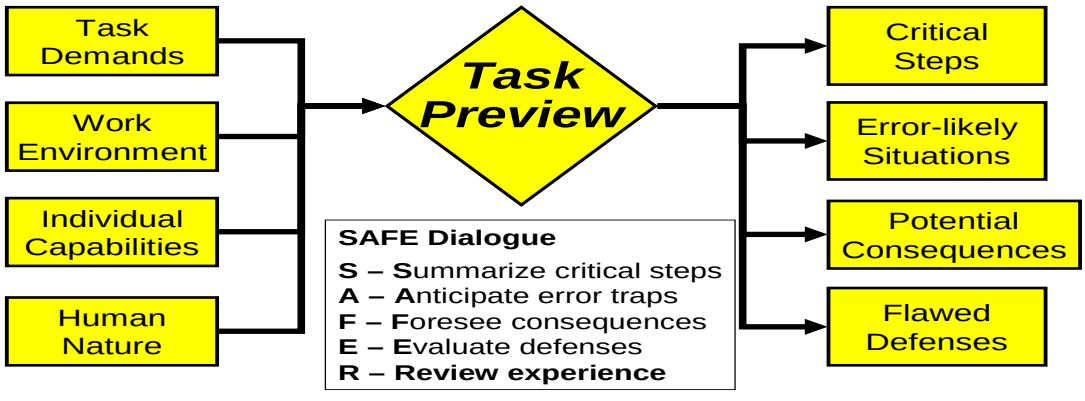
No: P300 Integrated Work Management
Attachment C. Error Precursor Card and Task Preview Work Aids (Page 1 of 1)

Error Precursors

short list

Task Demands	Individual Capabilities
• Time pressure (in a hurry)	• Unfamiliarity w/ task / First time
• High Workload (memory requirements)	• Lack of knowledge (mental model)
• Simultaneous, multiple tasks	• New technique not used before
• Repetitive actions, monotonous	• Imprecise communication habits
• Irrecoverable acts	• Lack of proficiency / Inexperience
• Interpretation requirements	• Indistinct problem-solving skills
• Unclear goals, roles, & responsibilities	• "Hazardous" attitude for critical task
• Lack of or unclear standards	• Illness / Fatigue
Work Environment	**Human Nature**
• Distractions / Interruptions	• Stress (limits attention)
• Changes / Departures from routine	• Habit patterns
• Confusing displays or controls	• Assumptions (inaccurate mental picture)
• Workarounds / OOS instruments	• Complacency / Overconfidence
• Hidden system response	• Mindset ("tuned" to see)
• Unexpected equipment conditions	• Inaccurate risk perception (Pollyanna)
• Lack of alternative indication	• Mental shortcuts (biases)
• Personality conflicts	• Limited short-term memory

Task Preview



No: P300 Integrated Work Management
Attachment D. Integrated Work Management (IWM) Self-Assessment Criteria (Page 1 of 2)

These suggested criteria should be incorporated into organizational self-assessment plans to help managers and supervisors determine the effectiveness of work planning and implementation.

General

Review general work tasks, interview worker, observe work, and check training and authorization records.

1. Is the hazard rating (i.e., low) appropriate for the work?
2. Are controls used to mitigate low-risk hazards (e.g., lifting, moving, sharp objects, slick surfaces, ergonomic issues, hand tools, and uneven surfaces) to an acceptable level?
3. Is work being performed safely?
4. Are Pre-Job Briefs timely and appropriate to work being conducted?

Moderate and High Hazard

Review Integrated Work Document (IWD) and hazard analysis documentation, interview workers, observe Pre-Job Briefs and work, and check training and authorization records.

Scope of Work

1. Is the scope of work sufficiently detailed to clearly identify the following?
    a. Facility and/or location where work is to be performed,
    b. Configuration and use of equipment to be used,
    c. Time frame over which work will occur,
    d. Expected outcome of work, and
    e. Any specific security, safety, or environmental concerns that will impact successful completion of the work.
2. Are task steps identified in sufficient detail to facilitate safe, efficient work?
3. Does the planning process normally include identification and review of resources, including other tasks scheduled to occur in the immediate area during the same time period?
4. Does the planning process normally include identification of initial facility conditions and prerequisites required for work to be accomplished?

Hazard Analysis

1. Is a team approach used to identify and analyze hazards associated with the work activity?
2. Are hazards for the associated work clearly identified in the IWD?
3. Was a hazard analysis conducted and documented (i.e., a team review involving workers, managers, and Subject Matter Experts (SMEs), where appropriate, was conducted)?
4. Are workers involved in the hazards-analysis step?
5. Was the activity walked down as part of the hazards analysis?
6. Did the walk down identify the major steps required to perform the activity?

No: P300 Integrated Work Management
Attachment D. Integrated Work Management (IWM) Self-Assessment Criteria (Cont.) (Page 2 of 2)

7. Has consideration been given to off-normal or unexpected conditions, and contingency steps incorporated?
8. Is the hazard rating (i.e., low) appropriate for the work?

Implement Controls

1. Are risk-graded hazard controls identified and incorporated into the IWD or Work Instruction?
2. Are workers involved in the identification of adequate and appropriate controls for both expected and unexpected conditions?
3. Do workers show knowledge and competency of the necessary controls?
4. Are controls implemented before performing work?

Peer Review

1. Is a peer review conducted?

Perform Work

1. Is a Pre-Job Brief conducted?
2. Does the Pre-Job Brief address the expected activities and any specific cautions for workers to be aware of?
3. Are both the work instructions and the work site reviewed, including walk downs where appropriate, to ensure that the hazards analysis results translate to the actual work environment (i.e., reflect actual conditions) and to verify that all hazards that could potentially affect the safety of workers have been identified and that selected controls are appropriate and adequate?
4. Do workers demonstrate an understanding of the scope of activities, expected outcomes, and required controls (e.g., perform work within the correct scope with required controls implemented)?
5. Do workers demonstrate an understanding of conditions that warrant a work pause or stoppage and a willingness to do so (e.g., pause or stop work if warranted)?

Feedback and Lessons Learned

1. Do workers and supervisors review the effectiveness of work planning for the task and identify improvement actions as needed? (This includes errors and mistakes that are indicators of potential problems or near misses.)
2. Is there evidence that the Feedback Section of the IWD is being used to identify future improvements?
3. Is there evidence that employee feedback is being encouraged?
4. Are previous, similar activities reviewed for applicable Lessons Learned?
5. Is there evidence that identified improvements are being implemented?

References for attributes, best practices, and guidance for effective incorporation of Integrated Safety Management and Quality Assurance:

- *NNSA Activity Level Work Planning and Control Processes*, found on the IWM Toolbox, in the *Guidance Documents* section.

IMPORTANT

If you wish to receive credit for the preceding document you **must** enter the course through *UTrain* **not** the Policy Office website.

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EP-AP-10007, R0

Technical Procedure Development

Effective Date:	8/13/15
Next Review Date:	8/13/18

Classification Review ☐ Unclassified

DC/RO Name	Z#	Signature	Date
Saundra Martinez	106229	/s/ Saundra Martinez	8/12/15

Approval

Name	Z#	Signature	Date

Responsible Line Manager Randy Erickson	091271	/s/ Randy Erickson	8/13/15

REVISION HISTORY

Document Number, Rev	Issue Date	Action	Description
EP-DIR-AP-10007, R.0	10/21/11	New document	This procedure supersedes the following: SOP-4007, *Environmental Programs Directorate, Procedure Development*; EP-DIV-AP-0113; *WDP Procedure Administration, Use, and Compliance*; FOD9-AP-00001, *Procedure Preparation Revision Review, Approval, and Use*. This administrative procedure defines the Environmental Programs (EP) administrative system for the preparation, revision, review, approval, and use of EP procedures generated by the EP organizations.
EP-DIR-AP-10007, R.1	2/13/12	Major Revision	Added new document control SharePoint process for the Procedure Change Request System in Section 6.1; added new Training Form as Attachment 1; deleted Procedure Request Form; incorporated subcontractor and SME review criteria in Attachment 4; added definition of Periodic Review; added Lessons Learned in Section 6.1; and edited as necessary.
EP-DIR-AP-10007, R.2	6/25/13	Minor Revision	Various minor editing/grammar changes. Sec. 5.3: Added responsibilities for writer-editors. Sec. 6.2: Changed designation for major and minor revisions to include an incremental increase for minor revisions as opposed to a whole number increase. Replaced Attachment 1, "UTrain Required Reading/Training Roster Form," with new "Systematic Approach to Training (SAT) Determination Form." Changed Attachment 1, "Document Reviewer Matrix," to Appendix 1. Removed Procedure Writer's Self-Verification Checklist, Procedure Verification Checklist, Procedure Validation Checklist, IPC, and Periodic Review forms (available in P315).
EP-DIR-AP-10007, R2.1	7/22/13	Minor Revision	Changed word in Section 6.4[3] from "useless" to "unless" the procedure falls under a designated unclassified subject area (DUSA). Updated web link to DUSA Manual in Section 6.4[3].
EP-AP-10007, R0	8/13/15	Major Revision	Complete rewrite in response to DOE/IG-0922. Separated document development process with document management process (EP-AP-10001). Revised responsibilities, added requirements section, and incorporated steps within performance sections. Revision is a total rewrite.

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1. PURPOSE

This procedure defines the roles, responsibilities, and process for development of technical procedures used within the Environmental Programs Directorate (ADEP) and Environment Waste Management Operations Division (EWMO), including Subcontractor procedures.

This procedure implements technical procedure development requirements in accordance with SD330, *Los Alamos National Laboratory Quality Assurance Program;* P1020-2, *LANL Document Control Program;* P315, *Conduct of Operation Manual;* and EP-DIR-QAP-0001, *Los Alamos National Laboratory Environmental Programs Directorate Quality Assurance Program Implementation Plan, Attachment B1.6, Requirement 5-Instructions, Procedures, and Drawings.*

2. OBJECTIVE

This procedure is designed to ensure the production of consistent, accurate, complete, and usable procedures that promote safe, compliant, and efficient operations in ADEP organizations, which include the Environmental Remediation Division (ER), LANL Waste Disposition Division (WD), the TRU Waste Facility (TWF), and EWMO.

Core conventions integrated within this procedure include:

- Inclusion of an Integrated Process Control Team (IPCT) to establish and document the technical and regulatory functions for waste remediation and treatment processing procedures,
- Assignment of document responsibility to a Responsible Line Manager (RLM) at an appropriate management level,
- Use of a mandatory Reviewer Matrix to ensure a documented, comprehensive review by appropriate SMEs,
- Engagement of workers and working groups during the development process,
- Distribution of Supplemental Review Packages containing relevant documents, process flow diagrams, and white papers for use during procedure development and review,
- Hazard Analysis and Control development to ensure work can be performed safely,
- Direction for managing communication between personnel involved in the process, and
- Guidance for writing concise, usable procedures.

3. SCOPE

This procedure is applicable to all persons involved in developing, writing, revising, and reviewing technical procedures used within ADEP facilities and in support of operations.

This procedure is not applicable to non-technical procedures.

Specific procedure types included in the broad category of Technical Procedure are Technical Procedures (TP), Detailed Operating Procedures (DOP), Standard Operating Procedures (SOP), Emergency Response Procedures (ER), and Alarm Response Procedures (AR).

4. RESPONSIBILITIES

4.1 Responsible Line Manager

NOTE *The RLM has the responsibility, authority, and accountability for issuing procedures within their scope of work. The RLM will be designated as a Level 4 Manager or higher; assignment of a lower level manager requires written delegation by the Associate Director/Deputy for Environmental Programs.*

- Ensures work activities are planned, validated, coordinated, approved, executed, and closed out in accordance with Integrated Work Management (IWM) and applicable policies; for example,
    - Provides preparers and reviewers with supporting technical information and data.
    - Ensures procedures have the necessary level of detail to ensure safe, consistent, and compliant performance of work, including process steps, materials, and material substitutions.
- Ensures that IWM is applied effectively to all activities for which he or she is responsible; for example,
    - Completes or updates a Hazard Analysis (HA) when procedures are developed or revised.
- Ensures that activities are conducted within the safety envelope of the facility and do not place the public, co-located workers, or the environment at risk, with accountability to the Facility Operations Director (FOD) and Responsible Associate Director (RAD).

- Ensures programmatic work is performed in accordance with P300.

4.2 Facility Operations Director

NOTE *Responsibilities and authorities assigned to the FOD may be assigned to a representative. Where designated representatives are authorized to perform tasks on behalf of the FOD, the FOD will determine the method used to make that designation. In all cases, the FOD remains accountable for the designee's action.*

- Establishes and maintains the facility safety and security envelopes.
- Assigns the RLM for facility-related work in accordance with P300.
- Reviews procedures for other work within the facility to ensure the activity/facility interface is appropriately addressed.
- Designates RLM for facility-related procedures.
- Releases all work.

4.3 Document Control

- Manages the process for performing a document action, including initiation, revision, review, approval, control, and distribution in accordance with EP-AP-10001.
- Assigns document numbers.
- Initiates and coordinates the procedure review cycle.
- Ensures reviewers receive Supplemental Review Packages to assist in technical review.
- Ensures reviewers receive description of procedures changes and technical basis for changes within the review notification.
- Develops and maintains document history files.
- Maintains and updates the Approved Reviewer List.

4.4 Preparer

- Utilizes procedures templates from the Electronic Document Management System (EDMS).
- Collaborates with the RLM to generate the Document Action Request (DAR).
- Assists the RLM, Subject Matter Expert (SME), or Person-in-Charge (PIC) in the development of technical procedures in accordance with P315.
- Reviews Lessons Learned databases for relevant applications.
- Collaborates with SMEs to perform validations and gather technical content necessary to produce accurate, complete, and useable procedures.
- Collaborates with IPCT and reviewers to collect comments, implement dispositioned comments, clarify inconsistencies, perform round-tables, and ensure the production of accurate, complete, and useable procedures.
- Proofs procedures to ensure readability, usability, and the correctness of style, format, grammar, terminology, acronyms, and references.

4.4 Preparer (continued)

- Maintains the working draft of a document during the drafting process, and submits a copy of the formal review draft and the final draft to Document Control for processing.
- Submits all relevant documentation used in the development of the procedure to Document Control for inclusion in the DHF.

4.5 Subject Matter Expert

- Provides input to ensure work is compliant with applicable codes and standards, if appropriate to their area of expertise.
- Provides input on technical content to the preparer to ensure the procedure is accurate, complete, and ready for field use.
- Supports procedure validations in accordance with P315.

4.6 Reviewers

NOTE *Required reviewers are determined by the RLM; minimum reviewers are identified on the Reviewer Matrix (Appendices 1-6) and include personnel from within EWMO or the responsible FOD, such as Industrial Hygiene, Engineering, and Radiation Protection, as well as external organizations, such as Environmental Protection and Central Characterization Project.*

- Provides review and comment during the procedure development process to ensure accuracy, completeness, and usability, and may include comments outside of specific discipline.
- Reviews procedures with a systems approach/big picture view.
- Utilizes discipline-specific checklists ensuring that applicable review criteria for each functional area are met. Minimum required review criteria are included as Attachments 1-11 to this procedure; review scope is not limited to these checklists.
- Ensures potential hazards have been identified and required controls are identified.
- Interacts with RLM and preparer to address review comments.
- Participates in round-table discussions, procedure validations, and comment-resolution meetings, as requested.

4.7 Integrated Process Control Team

NOTE *Use of an IPCT is mandatory in the development of waste remediation and treatment processing procedures. An IPCT may also be established for other procedures as determined by the RLM.*

4.7 Integrated Process Control Team (continued)

- Defines, establishes, and documents the technical and regulatory functions and requirements for those unique or specific processes that require change control.
- Develops baseline process flowchart and approves changes to baseline flowchart.
- Identifies procedures required to support activities identified in the process flowchart.
- Provides discipline-specific review and comment during the development of waste remediation and treatment processing procedures in accordance with the IPCT Charter.
- Interacts with RLM and preparer to address review comments.
- Participates in round-table discussions and comment-resolution meetings, as requested.
- Ensures that technical and safety aspects of procedures are accurate, complete, and useable in the field.
- Completes review of procedure by the assigned due date.
- Notifies RLM if assigned due date is insufficient for adequate review.

4.8 Person-In-Charge

- Supervises the performance of work.
- Performs work in accordance with approved documents.
- Controls and performs activities and work based on organizational assignments.
- Accountable to an RLM.
- Determines, with the RLM, SME engagement and independent worker participation.
- Remains knowledgeable of applicable facility safety basis documentation, such as the DSA, and ensures that the planned activities are within the bounds of these documents.

5. REQUIREMENTS

5.1 Integrated Process Control Team

The IPCT is an entity that brings together the various organizations, disciplines, and levels of management necessary to establish the technical and regulatory compliance functions required to determine the appropriate waste remediation and treatment processing methods for each LANL waste stream.

An IPCT will be established to develop and approve the process baseline for each waste stream. The IPCT will manage changes to the process baseline and associated documents, including process flow sheets, waste processing plans, and technical procedures. The process baseline will include the definition of the process, material specifications, and controls.

The RLM will determine IPCT membership by identifying key disciplines necessary for detailed review of the procedure and will develop a charter to detail specific requirements, expectations, and deliverables, which will include, at a minimum, a process baseline for the waste stream. The charter will be approved by the Associate Director/Deputy for EP.

An IPCT may be established for processes not associated with waste remediation and treatment processing as a good business practice; utilization of an IPCT as a good business practice may be implemented on a graded approach.

5.2 Reviewer Matrix and Approved Reviewer List

The Reviewer Matrix (Appendices 1-6) identifies the minimum required reviewers and/or approvers for ADEP and EWMO procedures.

The functional organizations and SME disciplines identified on the matrix represent the minimum level of review required for development of new procedures and subsequent changes and/or revisions to technical procedures. The RLM is responsible and accountable for augmenting the list of reviewers as necessary to ensure a comprehensive review cycle. The Reviewer Matrix is used in conjunction with the Approved Reviewer List to identify reviewers by name on the DAR. The Reviewer Matrix also identifies when an IPCT is required, as well as other management level review and approval.

The Approved Reviewer List identifies those individuals designated by the functional organization's RLM as SMEs to perform technical procedure reviews. The RLM will designate qualified SMEs based on their training, experience, and technical knowledge. The list will be maintained as a revision-controlled document by ADEP Document Control.

5.3 Supplemental Review Package

During procedure development and procedure review, the preparer, SME reviewers, and IPCT members have access to any information that may be pertinent to the development or review process, such as white papers, waste processing plans, technical references, and process flow diagrams. Prior to procedure revision or development, the RLM identifies those documents to be included as part of the Supplemental Review Package. Additionally, SMEs can identify further documents that need to be added to the Supplemental Review Package and provide them to Document Control. Document Control ensures those documents are provided to the preparers and other personnel involved in the procedure development process. Supplemental Review Package documents should be listed as references in the procedure.

5.4 Review Checklists

Functional organizations involved in technical procedure development or review utilize discipline-specific review checklists that provide guidance for items of consideration during the review. Formal reviews will be completed using these discipline-specific checklists, ensuring that applicable review criteria for each functional area are met. The checklists are the minimum criterion for SMEs to use as review guidance; SMEs are expected to think critically about all aspects of the procedure during their review.

Checklists for typical reviewers are provided as Attachments 1-11 to this procedure.

5.5 Hazards Analysis

New procedures or major revisions to procedures must either develop a new HA or update an existing HA. When answering the hazard grading questions, both activity and work-area hazards must be considered. The PIC/Preparer/IPCT have the responsibility for applying professional and expert judgment to determine if the information is sufficient to identify the hazard level and if not, seek additional assistance and expert resources.

5.5.1 Identify the Hazards

The PIC/Preparer/IPCT must utilize the Work Management System (WMS) to identify hazards. The WMS Tool offers an interface that helps workers identify all the hazards (including security) and has “mouse-over” links showing the requirement and in many cases, links to the actual language of the requirement to be met. Changes to policies will be highlighted within the tool so that each year, the preparer can identify policy changes that might impact how the work is conducted. Future versions will incorporate “Quality” questions, and other policy questions that require compliance for executing work (i.e., a one-stop shop).

5.5.1 Identify the Hazards (continued)

The PIC, IPCT, and workers who will participate in the work (or who could potentially be assigned to do the work) will utilize the hazard output from the WMS Tool to discuss the severity of the hazards associated with the activity and ensure that all hazards associated with the activity are captured and requirements identified.

5.5.2 Analyze the Hazards

Moderate or high hazard activities must be analyzed to determine how harm might be caused and how the hazards will be mitigated. The PIC, workers involved in the activity, and appropriate SMEs (e.g. Industrial Hygiene and Safety, Radiological Control Technicians, etc.) must meet to discuss the hazards and critically review proposed hazard mitigation measures. They should ask the question, "What if the control fails?" to ensure the analysis is complete and effective.

The results of these analyses will be incorporated into the procedure.

5.5.3 Moderate Hazard Activities

For moderate hazard activities, a systematic HA must be conducted. The analysis may be graded based upon the complexity of the activity, ranging from a relatively quick "brainstorming" for simple activities to a formal "what if" or Hazard and Operability Analysis (HAZOP) for more complicated ones. The HA ***shall*** be documented and included in the Document History File.

To facilitate consistent implementation, the controls identified in these HAs are to be incorporated into the procedure, as applicable.

5.5.4 High-Hazard Complex Activities

For High-Hazard/Complex activities, a documented "what if," HAZOP, or other effective analysis technique must be used. This analysis must be performed by a documented Job Hazard Analysis (JHA) team with appropriate depth and breadth of expertise to identify and analyze the hazards thoroughly and to determine how effective hazard mitigation will be achieved. The preparer leads the team and must include workers or a representative set of workers, dependent upon activity scope. Appropriate SME involvement is required to ensure that the analysis is complete and effective. The names of the JHA team participants must be documented.

5.5.5 Develop and Implement Controls

Based on the outcome of the HA, controls are developed to reduce the probability and/or consequence of adverse events. When establishing controls, the following hierarchy is used:

1. Hazard elimination by process modification or substitution of a less hazardous substance,
2. Application of engineering controls,
3. Application of administrative controls (e.g., training, lock-out/tag-out, and procedures),
4. Use of appropriate Personal Protective Equipment (PPE).

If worker training is required to mitigate the hazards presented by the activity, the required training must be developed and documented in accordance with P781-1, *Conduct of Training*. PPE controls must be specific to the hazard to enable the worker to maintain personal safety. "Gloves" is an inadequate PPE descriptor. More complete descriptors for this instance include, "leather gloves, nitrile gloves, welding gloves, etc."; this finer detail will allow the worker to understand the PPE requirements specific to the task at hand.

5.6 Procedure Content

Technical procedures must be as concise and simple to use as possible. In addition to the requirements established in P300 and P315, the following bullets offer guidance for writing, organizing, and consolidating content during the procedure development process.

Major revisions are characterized as changes in the intent, scope, purpose, steps, responsibilities, safety, or technical content described in a document. Inconsequential editorial changes are considered **minor revisions.**

NOTE *The RLM identifies whether proposed changes constitute a major or minor change to the procedure.*

1. Developing or revising a procedure is a significant activity that should only be done for appropriate cause, such as when a procedure cannot be executed as written. Minor changes that do not affect performance should be tabled until a revision is performed, at which time they can be incorporated.
2. Ensure appropriate detail to adequately describe the work, but avoid extraneous content that is not necessary to direct action by the procedure user.
3. Performance sections within a procedure are divided into subsections to describe an activity in manageable segments. Each subsection should not exceed four or five pages in length.

5.6 Procedure Content (continued)

4. Waste remediation and treatment processing procedures should explicitly identify critical steps/elements of the process and documentation requirements.
5. Action steps should be written using simple language that includes all relevant information. Action steps should not exceed two lines across the page.
6. Action steps that take the user beyond the activities described within the procedure should be minimized. In most cases, the following will suffice: "**NOTIFY** supervision of the issue, and **DOCUMENT** guidance on Attachment."
7. **IF/THEN** steps are necessary, but should be used sparingly.
8. Sub-steps within an action (e.g., [A] through [Z]) should be limited to the extent possible.
9. Sub-sub-steps within an action (e.g., [a] through [z]) should be avoided.
10. Symbols denoting requirements (e.g., $, Circle CS, &) should only be used for action steps, and should not appear in the Purpose, Scope, Precautions & Limitations, or Warnings/Cautions/Notes.
11. Approved symbols denoting requirements are:
    - **$** - Technical Safety Requirement or Safety Basis requirement
    - (CS) - Criticality Safety requirement
    - **&** - Environmental regulatory requirements, i.e., RCRA, LANL Hazardous Waste Facility Permit requirement, Consent Order, Individual Permit, etc.
    - **PR** - Processing requirement that is defined in the approved process baseline.

    Changes to steps identified with the approved symbols will be reviewed by the ADEP Change Control Board.
12. Warnings, Cautions, and Notes should not contain directive language. Directives should only be provided in action steps.
13. Prerequisite Actions and Post-Performance Activities should be specific to performance of the procedure.
14. Personnel identified within a procedure should use titles consistent with training qualifications and operations-specific Roles, Responsibilities, Authorities, and Accountability.
15. Consumables, equipment, and materials identified within the procedure should be specific.
16. Attachments and space for recording information within a procedure should be formatted to allow adequate room for record taking, quality reviews, and signatures.
17. Procedures are identified as Use Every Time (UET), Reference, or Mixed. If procedures are Mixed usage the UET portions of the procedure must be attachments; they cannot be embedded in the body of the procedure.
18. Revision History is limited to one page.

6. PERFORMANCE—PROCEDURE DEVELOPMENT

The fundamental elements for developing, maintaining, and revising procedures are described in LANL policy document P315, which includes a working procedure template and explanation of required content. P300 establishes the expectations for defining work, grading hazards, and developing controls within an IWD-equivalent procedure. These documents are used in conjunction with this procedure to produce accurate, complete, and useable procedures that promote safe and efficient operations and formal work authorization by the Responsible Manager.

Procedure development occurs with direct input from the workers that will execute the procedure. Workers are an essential source of information when developing procedures and must be involved throughout the process.

RLM

[1] **INITIATE** a document action in accordance with EP-AP-10001, including completion of the DAR, designation of reviewers using the Reviewer Matrix (Appendices 1-6), and an IPCT requirement determination, and **RECORD** additional reviewers as necessary to ensure a thorough review of the procedure.

[2] **MAKE** usage determination for whether procedure is Reference or UET.

NOTE 1 *A Reference designation is appropriate for activities that can rely on training and expertise for successful performance. The procedure must be readily available, but does not need to be in the user's hand.*

NOTE 2 *UET procedures must be in the user's possession and performance must be verbatim. Usage may be designated for the entire document or for individual sections. For example, the procedure body may be Reference while a checklist attachment is designated UET.*

The UET designation must be considered for a document or document section that

- *has potential for high consequence of error*
- *is complex*
- *is infrequently performed*
- *involves data collection*
- *requires sign-offs*
- *has stringent quality or regulatory documentation requirement*

6. PERFORMANCE—PROCEDURE DEVELOPMENT (continued)

[3] **IF** the procedure is a waste remediation and treatment processing procedure and/or if the RLM determines that and IPCT is appropriate for the procedure,
THEN INVOKE the IPCT.

[4] **IF** a charter for the IPCT has not been established,
THEN DEVELOP the charter to establish the IPCT.

NOTE *The IPCT charter must include, at a minimum:*

- *IPCT membership, by name, organization, and discipline and identification of the Chairperson*
- *Requirements of the IPCT*
- *Expectations of the IPCT*
- *Deliverables from the IPCT, which must include, at a minimum, a process baseline and list of implementing processing procedures.*

[5] **IF** the technical baseline of associated procedures is affected by the change,
THEN INITIATE an appropriate response, such as an additional procedure revision.

[6] **PERFORM** hazard grading and HA in accordance with P300, *Integrated Work Management,* Attachment B, *Hazard Grading Table*.
THEN DOCUMENT results on the DAR.

PIC/Preparer

[7] With input from the IPCT, **ESTABLISH** the scope and content of the work.

[8] **DETERMINE** the activities needed to complete the task, and **ENTER** this information into the Work Management System Tool (WMS).

[9] **DETERMINE** Hazard Category in WMS.

RLM

[10] **DETERMINE** validation requirements and **DOCUMENT** on the DAR; validation is required for all new technical procedures and recommended for major revisions to technical procedures.

NOTE *If the RLM elects to waive validation for a technical procedure, the justification is documented on the DAR.*

6. PERFORMANCE—PROCEDURE DEVELOPMENT (continued)

[11] **IDENTIFY** documents to be included in the Supplemental Review Package for use in developing/revising the procedure.

IPCT Chairperson

[12] **IF** the procedure is identified as requiring an IPCT,
THEN COORDINATE IPCT resources to develop or revise baseline process flow diagrams, review new or revised procedures, and collaborate with the RLM and preparer in accordance with the IPCT Charter.

Preparer

[13] **OBTAIN** the approved procedure template for a new procedure or a controlled copy of the most recent revision of an existing procedure from Document Control or EDMS.

[14] **DEVELOP** the procedure or make updates in accordance with P315 and the criteria provided in Section 5.6 of this procedure.

[15] **COORDINATE** informal reviews as needed of the draft procedure with the RLM, IPCT, or workers who perform roles within the procedure to address discipline-specific concerns throughout the development process.

[16] **PERFORM** a verification of the draft procedure with a worker and/or SME.

NOTE *Verification is a review of the document for technical accuracy and editorial/formatting compliance prior to formal review of the procedure. Verification is documented in accordance with P315; verification form can be obtained in EDMS.*

[17] **PREPARE** review-ready procedure and send the draft to the RLM.

RLM

[18] **REVIEW** the draft for technical accuracy, usability, and compliance with requirements.

[19] **WHEN** document is ready to be sent for formal review,
THEN SUBMIT the review draft to Document Control electronically.

6. PERFORMANCE—PROCEDURE DEVELOPMENT (continued)

Document Control

[20] **PROCESS** the procedure for formal review, comment resolution, and approval in accordance with EP-AP-10001.

Reviewers

[21] **REVIEW** the procedure within area of expertise for accuracy, clarity, and compliance with established requirements.

[22] **COMPLETE** discipline-specific review checklists (included as Attachments 1-11 to this procedure) and comment resolution forms as directed by the review notification.

[23] **IDENTIFY** any comments outside of assigned area of expertise to appropriate SME or RLM.

RLM

[24] **DISPOSITION** comments in conjunction with the preparer, and **DOCUMENT** the comment resolution in accordance with direction provided by Document Control.

[25] **COORDINATE** the procedure validation and **UPDATE** procedure as indicated by the validation, if required.

[26] **IF** revisions resulting from comment resolution or validation substantially change the technical content,
THEN COORDINATE with Document Control to perform another review cycle.

7. RECORDS

Records generated in the course of performing this procedure must be maintained and managed in accordance with EP-AP-10003, *Records Management.*

Record	QA Record	Non-QA Record
Document Action Request	☒	☐
Immediate Procedure Change form	☒	☐
Periodic Review Form	☒	☐
Approved, revised procedure – signed	☒	☐
Revised procedure – redlined	☒	☐
Supplemental Review Package	☒	☐
Reviewer comment spreadsheets, forms, or other documentation with reviewers name, credentials/signature, date, and comment category	☒	☐
Document review markups **without** reviewers name, credentials/signature, date, and comment category	☐	☒
Discipline-Specific Checklists	☒	☐
Verification Checklist	☒	☐
Validation Checklist	☒	☐
Hazards Analysis documentation	☒	☐
Process Flow Diagram	☒	☐
Systematic Approach to Training (SAT) form	☒	☐
Additional email	☒	☒

8. REFERENCES

EP-AP-10001, *Document Control*

EP-AP-10003, *Records Management*

EP-DIR-QAP-0001, *Los Alamos National Laboratory Environmental Programs Directorate Quality Assurance Program Implementation Plan.*

P300, *Integrated Work Management*

P315, *Conduct of Operations Manual*

P781-1, *Conduct of Training Manual*

P1020-2, *LANL Document Control Program*

SD330, *Los Alamos National Laboratory Quality Assurance Program*

Appendix 1
WCRRF Reviewer Matrix

	WCRRF Procedure Classification	IPCT	CCP & Difficult Waste Team	Carlsbad Field Office	EWMO Operations	WD Operations	Operator SME	Engineering	Quality Assurance	Safety Basis	IH&S	Radiation Protection	Criticality Safety	Environmental Protection/DEP	Fire Protection	Maintenance	Waste Management	Chemistry
	Waste Processing & Handling (WO)																	
1A	DOP/AP for sampling or processing waste	√	√	*	√	√	√	√	√	√	√	√	√	√	√	-	√	√
1B	DOP/AP for transporting or receiving waste containers	√	√	*	√	√	√	√	√	√	√	√	√	√	-	-	√	√
1C	DOP/AP for preparing glovebox and waste processing equipment	√	-	-	√	√	√	√	√	√	√	√	-	√	-	√	-	-
	Facility Operations (FO)																	
1D	DOP/AP that implements facility TSRs, including SRs, ISIs, and SACs	-	-	-	√	√	√	√	√	√	√	√	√	√	√	-	-	-
1E	DOP/AP for using and maintaining the ventilation system	-	-	-	√	√	√	√	√	√	√	√	√	√	√	√	-	-
1F	DOP/AP for using and maintaining the fire suppression system	-	-	-	√	-	√	√	√	√	√	-	-	√	√	√	-	-
	General Use																	
1G	Procedures that direct work categorized as a Moderate or High/Complex Hazard AND are <u>not</u> included in Groups A through F.	-	-	-	√	√	√	√	√	√	√	√	√	√	√	-	-	-
1H	Procedures that direct work categorized as a Low Hazard AND are <u>not</u> included in Groups A through F.	-	-	-	√	√	√	√	√	√	√	-	√	√	-	-	-	-
1I	Administrative procedures that are <u>not</u> included in Groups A through F.	-	-	-	√	√	√	√	√	√	√	-	√	√	-	-	-	-

** – as determined by CCP Site Project Manager*

Appendix 2
TA-54 Area G Reviewer Matrix

	TA-54 Area G Procedure Classification	IPCT	CCP & Difficult Waste Team	Carlsbad Field Office	EWMO Operations	WD Operations	Operator SME	Engineering	Quality Assurance	Safety Basis	IH&S	Radiation Protection	Criticality Safety	Environmental Protection/DEP	Fire Protection	Maintenance	Waste Management	Chemistry
	Waste Processing & Handling (WO)																	
2A	DOP/AP for sampling or processing waste, including SSSR and DVS activities	√	√	*	√	√	√	√	√	√	√	√	√	√	√	-	√	√
2B	DOP/AP for transporting or receiving waste containers	√	√	*	√	√	√	√	√	√	√	√	√	√	-	-	-	-
2C	DOP/AP for waste container operations, including OVERPACK or drum prep	√	√	*	√	√	√	√	√	√	√	√	√	√	-	-	-	-
	Facility Operations (FO)																	
2D	DOP/AP that implements facility TSRs, including SRs, ISIs, and SACs	-	-	-	√	√	√	√	√	√	√	√	√	√	-	-	-	-
2E	DOP/AP for completing non-TSR rounds, inspections, and work release	-	-	-	√	√	√	√	√	-	√	-	-	√	-	√	-	-
2F	DOP/AP for inspecting facility structures and equipment	-	-	-	√	-	√	√	√	-	√	-	-	√	√	√	-	-
	General Use																	
2G	Procedures that direct work categorized as a Moderate or High/Complex Hazard AND are <u>not</u> included in Groups A through F.	-	-	-	√	√	√	√	√	√	√	√	√	√	√	-	-	-
2H	Procedures that direct work categorized as a Low Hazard AND are <u>not</u> included in Groups A through F.	-	-	-	√	√	√	√	√	√	√	-	√	√	-	-	-	-
2I	Administrative procedures that are <u>not</u> included in Groups A through F.	-	-	-	√	√	√	√	√	√	√	-	√	√	-	-	-	-

** – as determined by CCP Site Project Manager*

Appendix 3
RANT Reviewer Matrix

	RANT Procedure Classification	IPCT	CCP & Difficult Waste Team	Carlsbad Field Office	EWMO Operations	WD Operations	Operator SME	Engineering	Quality Assurance	Safety Basis	IH&S	Radiation Protection	Criticality Safety	Environmental Protection/DEP	Fire Protection	Maintenance	Waste Management	Chemistry
	Waste Handling (WO)																	
3A	DOP/AP for transporting or receiving waste containers	√	√	*	√	√	√	√	√	√	√	√	√	√	√	-	√	√
3B	DOP/AP for preparing payload for shipment	√	√	*	√	√	√	√	√	√	√	√	√	√	-	-	-	-
3C	DOP/AP for sampling waste containers	-	√	*	√	√	√	√	√	√	√	√	√	√	-	-	-	-
	Facility Operations (FO)																	
3D	DOP/AP that implements facility TSRs, including SRs, ISIs, and SACs	-	-	-	√	-	√	√	√	√	√	√	√	√	-	-	-	-
3E	DOP/AP for using and maintaining site equipment (vehicles, cranes, doors, etc.)	-	-	-	√	√	√	√	√	√	√	-	-	√	-	√	-	-
3F	DOP/AP for using and maintaining the fire suppression system	-	-	-	√	-	√	√	√	√	√	-	-	√	√	√	-	-
	General Use																	
3G	Procedures that direct work categorized as a Moderate or High/Complex Hazard AND are <u>not</u> included in Groups A through F.	-	-	-	√	√	√	√	√	√	√	√	-	√	√	-	-	-
3H	Procedures that direct work categorized as a Low Hazard AND are <u>not</u> included in Groups A through F.	-	-	-	√	-	√	√	√	√	-	-	-	√	-	-	-	-
3I	Administrative procedures that are <u>not</u> included in Groups A through F.	-	-	-	√	-	√	√	√	√	-	-	-	√	-	-	-	-

** – as determined by CCP Site Project Manager*

Appendix 4
TWF Reviewer Matrix

	TWF Procedure Classification	IPCT	CCP & Difficult Waste Team	Carlsbad Field Office	EWMO Operations	WD Operations	Operator SME	Engineering	Quality Assurance	Safety Basis	IH&S	Radiation Protection	Criticality Safety	Environmental Protection/DEP	Fire Protection	Maintenance	Waste Management	Chemistry
	Waste Handling (WO)																	
4A	DOP/AP for transporting or receiving waste containers	√	√	*	√	√	√	√	√	√	√	√	√	√	√	-	√	√
4B	DOP/AP for preparing payload for shipment	√	√	*	√	√	√	√	√	√	√	√	√	√	-	-	-	-
4C	DOP/AP for sampling waste containers	√	√	*	√	√	√	√	√	√	√	√	√	√	-	-	-	-
	Facility Operations (FO)																	
4D	DOP/AP that implements facility TSRs, including SRs, ISIs, and SACs	-	-	-	√	-	√	√	√	√	√	√	√	√	-	-	-	-
4E	DOP/AP for using and maintaining site equipment (vehicles, cranes, doors, etc.)	-	-	-	√	-	√	√	√	√	√	-	-	√	-	√	-	-
4F	DOP/AP for using and maintaining facility systems	-	-	-	√	-	√	√	√	√	√	-	-	√	√	√	-	-
	General Use																	
4G	Procedures that direct work categorized as a Moderate or High/Complex Hazard AND are <u>not</u> included in Groups A through F.	-	-	-	√	√	√	√	√	√	√	√	-	√	√	-	-	-
4H	Procedures that direct work categorized as a Low Hazard AND are <u>not</u> included in Groups A through F.	-	-	-	√	-	√	√	√	√	-	-	-	√	-	-	-	-
4I	Administrative procedures that are <u>not</u> included in Groups A through F.	-	-	-	√	-	√	√	√	√	-	-	-	√	-	-	-	-

** – as determined by CCP Site Project Manager*

Appendix 5
ER Reviewer Matrix

	ER Procedure Classification	Technical Procedure Owner	Technical Leads	Engineering	Quality Assurance	Safety Basis	Environmental Protection	Subcontract Technical Representative	Waste Management	Radiation Protection/DEP	Safety IH	Security	EWMO FOD	Electrical Safety Officer	Pressure Safety Officer	Criticality Safety
	General Use															
5A	Procedures that direct work categorized as a Moderate or High/Complex Hazard	√	√	AR	√	AR	√	AR	√	AR	AR	AR	AR	AR	AR	AR
5B	Procedures that direct work categorized as a Low Hazard	√	√	AR	√	AR	√	AR	√	AR	AR	AR	AR	AR	AR	AR
5C	Administrative procedures (APs, Plans, Guides, QAPP, etc.)	√	√	AR	√	AR	√	AR	AR	AR	AR	AR	AR	AR	AR	AR
	Groundwater															
5D	Procedures that direct work categorized as a Moderate or High/Complex Hazard	√	√	AR	√	AR	√	√	√	AR	AR	AR	AR	AR	AR	AR
5E	Procedures that direct work categorized as a Low Hazard	√	√	AR	√	AR	√	√	√	AR	AR	AR	AR	AR	AR	AR
	Storm Water															
5F	Procedures that direct work categorized as a Moderate or High/Complex Hazard.	√	√	AR	√	AR	√	√	√	AR	AR	AR	AR	AR	AR	AR
5G	Procedures that direct work categorized as a Low Hazard.	√	√	AR	√	AR	√	√	√	AR	AR	AR	AR	AR	AR	AR
	Drilling															
5H	Procedures that direct work categorized as a Moderate or High/Complex Hazard.	√	√	AR	√	AR	√	√	√	AR	AR	AR	AR	AR	AR	AR
5I	Procedures that direct work categorized as a Low Hazard	√	√	AR	√	AR	√	√	√	AR	AR	AR	AR	AR	AR	AR

AR – As Required

Appendix 6
ADEP Reviewer Matrix

	ADEP Procedure Classification	IPCT	CCP & Difficult Waste Team	Carlsbad Office	EWMO Operations	WD Operations	Operator SME	Engineering	Quality Assurance	Safety Basis	IH&S	Radiation Protection/DEP	Criticality Safety	Environmental Protection	Fire Protection	Maintenance	Waste Management	Chemistry
	Directorate Level																	
6A	Procedures that direct work categorized as a Moderate or High/Complex Hazard	-	-	-	-	-	√	√	√	√	√	√	√	√	√	-	√	-
6B	Procedures that direct work categorized as a Low Hazard	-	-	-	-	-	√	√	√	√	√	-	-	√	-	-	-	-
6C	Administrative procedures	-	-	-	-	-	√	√	√	√	-	-	-	√	-	-	-	-
	EWMO/WD Division Level																	
6D	Procedures that direct work categorized as a Moderate or High/Complex Hazard	-	-	-	√	√	√	√	√	√	√	√	√	√	√	-	√	-
6E	Procedures that direct work categorized as a Low Hazard	-	-	-	√	√	√	√	√	√	√	-	-	√	-	-	-	-
6F	Administrative procedures	-	-	-	√	√	√	√	√	√	-	-	-	√	-	-	-	-

ATTACHMENT 1
Page 1 of 1

Procedure Review Checklist – Shift Operations Manager/Environmental Project Manager

Document Number:	Document Title:	Revision:	Draft:

Shift Operations Manager/Environmental Project Manager Review Criteria	Yes	No	N/A
1. Are hazards associated with the activity properly identified and appropriate controls incorporated within the procedure?	☐	☐	☐
2. Are TSRs compliant with facility and activity limits?	☐	☐	☐
3. Are TSR-driven steps clearly written and operationally achievable?	☐	☐	☐
4. Are Criticality Safety steps clearly written and operationally achievable?	☐	☐	☐
5. Are other compliance requirements, such as RCRA and WAC limits, incorporated within the procedure where needed?	☐	☐	☐
6. Are responsibilities clearly defined?	☐	☐	☐
7. Are performer actions within the bounds of current training and access requirements?	☐	☐	☐
8. Are materials, equipment, and facility locations clearly identified? Do they reflect the *exact* field terminology?	☐	☐	☐
9. Have abnormal conditions/situations been identified? Is the detail of guidance provided appropriate?	☐	☐	☐
10. Is the procedure's level of detail suitable when considering complexity of the task, frequency of the activity, and qualification/training of the user?	☐	☐	☐
11. Does the revision comply with existing Standing Orders?	☐	☐	☐
12. Does the procedure correctly speak to other existing procedures related to the activity?	☐	☐	☐

Comments and/or Technical Review Guidance Used:

Shift Operations Manager/Environmental Project Manager review of the procedure has been completed in accordance with the above criteria.

☐ I have no comments. Concurrence with the associated draft is given.

☐ Additional comments are documented and provided through formal means.

_____ / _____ / _____ / _____

Reviewer Name *Signature* *Z Number* *Date*

ATTACHMENT 2
Page 1 of 1

Procedure Review Checklist – Field Operator

Document Number:	Document Title:	Revision:	Draft:

Field Operator Review Criteria		Yes	No	N/A
1.	Are hazards associated with the activity properly identified and clearly communicated and can appropriate controls be implemented?	☐	☐	☐
2.	Can instruction steps be performed as written and in sequence?	☐	☐	☐
3.	Are steps easily read and understood?	☐	☐	☐
4.	Is the level of detail suitable when considering complexity of the task, frequency of the activity, and qualification/training of the user?	☐	☐	☐
5.	Are responsibilities clearly defined?	☐	☐	☐
6.	Are steps attributed to the correct performer?	☐	☐	☐
7.	Are materials, equipment, components, and tools clearly identified? Do they reflect the *exact* field terminology?	☐	☐	☐
8.	Are inspection and acceptance criteria clearly described?	☐	☐	☐
9.	Do Warnings, Cautions, and Notes provide sufficient detail to complete the task safely and efficiently?	☐	☐	☐
10.	Are spaces for recording data adequate?	☐	☐	☐
11.	Are attachments and appendices clearly identified within the procedure and ready for field use?	☐	☐	☐
12.	Does the procedure correctly speak to other existing procedures related to the activity?	☐	☐	☐

Comments and/or Technical Review Guidance Used:

Field Operator review of the procedure has been completed in accordance with the above criteria.

☐ I have no comments. Concurrence with the associated draft is given.

☐ Additional comments are documented and provided through formal means.

_____ / _____ / _____ / _____

Reviewer Name *Signature* *Z Number* *Date*

ATTACHMENT 3
Page 1 of 1

Procedure Review Checklist – Engineering/Technical

Document Number:	Document Title:	Revision:	Draft:

Engineering/Technical Review Criteria		Yes	No	N/A
1.	Does the procedure meet the LANL-specific engineering requirements provided in the Conduct of Engineering Program and procedures?	☐	☐	☐
2.	Are safety concerns adequately controlled within the procedure?	☐	☐	☐
3.	Are technical elements and steps accurate and functional?	☐	☐	☐
4.	Are non-technical elements and information accurate and concise?	☐	☐	☐
5.	Is the level of detail suitable when considering complexity of the task and frequency of the activity?	☐	☐	☐
6.	Are process materials, equipment, and tools specifically identified within the procedure?	☐	☐	☐
7.	Have the appropriate white papers and supporting SME documents been incorporated?	☐	☐	☐
8.	Has necessary interaction with Document Owner, field operations, and other procedure development personnel occurred to fully review sections of the procedure?	☐	☐	☐
9.	Are relevant references incorporated within the procedure?	☐	☐	☐
10.	Does the procedure correctly speak to other existing procedures?	☐	☐	☐

Comments and/or Technical Review Guidance Used:

Engineering/Technical review of the procedure has been completed in accordance with the above criteria.

☐ I have no comments. Concurrence with the associated draft is given.

☐ Additional comments are documented and provided through formal means.

_____ / _____ / _____ / _____

Reviewer Name *Signature* *Z Number* *Date*

ATTACHMENT 4
Page 1 of 1

Procedure Review Checklist – Quality Assurance

Discipline-Specific Review Checklist – *Quality Assurance*			
Document Number:	Document Title:	Revision:	Draft:

Review Criteria	Yes	No	N/A
1. Does the procedure invoke the requirements of SD330?	☐	☐	☐
2. Does the procedure clearly identify lines of authority and responsibility?	☐	☐	☐
3. Does the procedure identify personnel, operators, and supervisors invoked by an approved training implementation matrix (TIM) and/or R2A2?	☐	☐	☐
4. Does the procedure identify consumables, equipment, and materials by specific name?	☐	☐	☐
5. Does the procedure clearly identify design requirements of systems or components?	☐	☐	☐
6. Does the procedure clearly identify performance, inspection, and acceptance criteria?	☐	☐	☐
7. Are work process steps clearly identified and able to be followed?	☐	☐	☐
8. Are hold points and the release process for hold points identified?	☐	☐	☐
8. Are TSR, criticality safety, RCRA, and other regulatory compliance steps clearly identified?	☐	☐	☐
9. Are relevant references incorporated within the procedure?	☐	☐	☐
10. Are forms well designed and adequate for collection of quality assurance data?	☐	☐	☐
11. Does the procedure correctly speak to other existing procedures?	☐	☐	☐
12. Are Document Control, development, and records associated with this procedure clearly identified and disposition guidance provided?	☐	☐	☐
13. Does the procedure identify quality improvement processes?	☐	☐	☐
14. Does the procedure review team include all necessary personnel?	☐	☐	☐
Comments and/or Technical Review Guidance Used:			

Quality Assurance review of the procedure has been completed in accordance with the above criteria.

☐ I have no comments. Concurrence with the associated draft is given.

☐ Additional comments are documented and provided through formal means.

_____ / _____ / _____ / _____

Reviewer Name *Signature* *Z Number* *Date*

ATTACHMENT 5
Page 1 of 2

Procedure Review Checklist – Industrial Hygiene & Safety

Document Number:	Document Title:	Revision:	Draft:

IH&S Review Criteria		Yes	No	N/A
1.	Does the procedure meet the LANL-specific health and safety requirements provided in PD100, *Occupational Safety and Health*?	☐	☐	☐
2.	Have hazards been identified and controls been incorporated in accordance with P300, *Integrated Work Management*?	☐	☐	☐
3.	If activity involves asbestos or other fibers, have requirements for protecting workers from exposure been incorporated?	☐	☐	☐
4.	If activity involves working with beryllium, have controls been incorporated in accordance with the Chronic Beryllium Disease Prevention Program (CBDPP)?	☐	☐	☐
5.	If activity involves hazardous chemicals, including waste and reagents, are requirements included for safe and responsible chemical management? Compatibility?	☐	☐	☐
6.	If activity involves potential exposure to lead or lead compounds, have controls been included to limit exposure?	☐	☐	☐
7.	If activity involves entering confined spaces, having posting and access requirements been incorporated?	☐	☐	☐
8.	If activity involves cranes, hoists, lifting devices, or rigging equipment, have applicable requirements, controls, and safety techniques been incorporated?	☐	☐	☐
9.	If activity involves cryogen operations, have hazards been identified and controlled?	☐	☐	☐
10.	Does the procedure meet the requirements of LANL's Electrical Safety Program?	☐	☐	☐
11.	If procedure involves excavation-related tasks, have soil disturbance requirements and controls been included?	☐	☐	☐
12.	If procedure involves work being performed with the possibility of a greater than 4 ft fall, have fall protection requirements been incorporated?	☐	☐	☐
13.	If activity involves forklifts and powered industrial trucks, have requirements been incorporated for their safe use?	☐	☐	☐
14.	If activity involves interaction with hazardous energy, have Lockout/Tagout requirements been incorporated?	☐	☐	☐
15.	If procedure involves the use of machine shop equipment, then have safe work practices and machine safeguarding been defined?	☐	☐	☐
16.	If activity has the potential to exceed LANL Hearing Conservation/Noise Program limits, have requirements for protecting workers been identified?	☐	☐	☐

ATTACHMENT 5
Page 2 of 2

Document Number:	Document Title:	Revision:	Draft:

IH&S Review Criteria (continued)	Yes	No	N/A
17. If activity involves possible exposure to Non-Ionizing Radiation (NIR), have controls been incorporated to limit exposure?	☐	☐	☐
18. If procedure involves possible penetration operations, have applicable work controls been incorporated?	☐	☐	☐
19. Are supplemental Personal Protective Equipment (PPE) identified within the procedure?	☐	☐	☐
20. If activity involves pressurized systems, have pressure-related hazards been addressed?	☐	☐	☐
21. Have necessary vehicle and pedestrian safety concerns been incorporated?	☐	☐	☐
22. If procedure involves the use of air ventilation/filtration systems, have safety requirements for local exhaust and HEPA systems been included?	☐	☐	☐
23. If procedure involves welding, cutting, or other spark/flame-producing operations, have controls been incorporated so that work may be performed safely?	☐	☐	☐
24. Are required safety signs, tags, and labels identified within the procedure?	☐	☐	☐
25. Are required worker exposure assessments identified within the procedure?	☐	☐	☐

Comments and/or Technical Review Guidance Used:

Industrial Hygiene & Safety review of the procedure has been completed in accordance with the above criteria.

☐ I have no comments. Concurrence with the associated draft is given.

☐ Additional comments are documented and provided through formal means.

_____ / _____ / _____ / _____

Reviewer Name *Signature* *Z Number* *Date*

ATTACHMENT 6
Page 1 of 1

Procedure Review Checklist – Radiological Protection

Document Number:	Document Title:	Revision:	Draft:

Radiological Protection Review Criteria	Yes	No	N/A
1. Does the procedure involve the handling of radioactive material and/or containerized radioactive waste or entry into areas posted and controlled for radiation protection purposes? If yes, an RP SME needs to review the procedure. If no, no review by an RP SME is required, and criteria may be marked N/A.	☐	☐	☐
2. Does the procedure meet the requirements, limits, and controls specified in P121, *Radiation Protection*?	☐	☐	☐
3. Are RP controls documented and clearly described within the procedure?	☐	☐	☐
4. Are the scope of work and bounding limits identified within the procedure?	☐	☐	☐
5. Is the work activity covered in the Facility Radiation Protection Requirements (FRPR) document?	☐	☐	☐
6. Are RP functions, surveys, and hold points adequately addressed within the performance of the procedure?	☐	☐	☐
7. Does the procedure's hazard grading correctly address the requirements of P121-4, Chapter 11, *Radiological Work*?	☐	☐	☐
8. If the hazard grading is High/Complex or Moderate for radiological work performed within the procedure, is a radiological work permit (RWP) in place?	☐	☐	☐
9. Does the procedure correctly speak to existing RP procedures related to the activity?	☐	☐	☐

Comments and/or Technical Review Guidance Used:

Radiological Protection review of the procedure has been completed in accordance with the above criteria.

☐ I have no comments. Concurrence with the associated draft is given.

☐ Additional comments are documented and provided through formal means.

_____ / _____ / _____ / _____

Reviewer Name *Signature* *Z Number* *Date*

ATTACHMENT 7
Page 1 of 1

Procedure Review Checklist – Criticality Safety Officer

Document Number:	Document Title:	Revision:	Draft:

Criticality Safety Officer Review Criteria		Yes	No	N/A
1.	Does the procedure support fissionable material levels that in aggregate are below the mass limits listed in SD130, *Nuclear Criticality Safety Program*? If no, this will be a Fissile Material Operation (FMO) and require a full review. If yes, further Nuclear Criticality Safety (NCS) Officer review is not needed, and criteria may be marked N/A.	☐	☐	☐
2.	Is there an active and approved Criticality Safety Evaluation (CSE) for the proposed process?	☐	☐	☐
3.	Is the proposed FMO process fully consistent with the Process Description in the applicable CSE?	☐	☐	☐
4.	Has the FMO draft process been walked down with a Criticality Safety Analyst?	☐	☐	☐
5.	Do the FMO mass limits (FGEs) fall within the limits established in the CSE?	☐	☐	☐
6.	Co-located FMOs have been reviewed and cannot interfere or produce an additive overmass condition (i.e., exceeds the FGE limits in the CSE).	☐	☐	☐
7.	Are the locations of the proposed FMO consistent with those in the CSE?	☐	☐	☐
8.	There is no possibility for uncontrolled mass accumulation (i.e., holdup) within the bounds of the procedure.	☐	☐	☐
9.	Is the control set specified in the CSE able to be fully implemented?	☐	☐	☐
10.	Is the control set in the CSE accurately embodied in the procedure?	☐	☐	☐
11.	Have required modifications to WCATS or other related procedures been implemented prior to or at same time as the FMO will begin operations?	☐	☐	☐
12.	Site conditions and co-located processes that could impact the suite of potential upsets have not changed since the CSE was developed.	☐	☐	☐

Comments and/or Technical Review Guidance Used:

Criticality Safety Officer review of the procedure has been completed in accordance with the above criteria.

☐ I have no comments. Concurrence with the associated draft is given.

☐ Additional comments are documented and provided through formal means.

_____ / _____ / _____ / _____

Reviewer Name *Signature* *Z Number* *Date*

ATTACHMENT 8
Page 1 of 1

Procedure Review Checklist – Criticality Safety Analyst

Document Number:	Document Title:	Revision:	Draft:

Criticality Safety Analyst Review Criteria		Yes	No	N/A
1.	If the process involves fissile material in excess of the significant quantity thresholds provided in SD130, *Nuclear Criticality Safety Program*, are the appropriate Criticality Safety Evaluation Documents (CSEDs) or Criticality Safety Limit Approvals (CSLAs) referenced in the procedure?	☐	☐	☐
2.	Are referenced CSEDs or CSLAs the most current version applicable to this process?	☐	☐	☐
3.	Does the process defined in the procedure match the process description in applicable CSEDs or CSLAs?	☐	☐	☐
4.	Are all limits and controls established in applicable CSEDs or CSLAs implemented within the procedure?	☐	☐	☐
5.	Are procedure steps that directly implement a CSED or CSLA requirement marked with a circle-CS symbol?	☐	☐	☐
6.	Is the procedure written such that no single, inadvertent failure to follow a step can result in criticality?	☐	☐	☐

Comments and/or Technical Review Guidance Used:

Criticality Safety Analyst review of the procedure has been completed in accordance with the above criteria.

☐ I have no comments. Concurrence with the associated draft is given.

☐ Additional comments are documented and provided through formal means.

_____ / _____ / _____ / _____

Reviewer Name *Signature* *Z Number* *Date*

ATTACHMENT 9
Page 1 of 1

Procedure Review Checklist – Safety Basis

Discipline-Specific Review Checklist – *Safety Basis*			
Document Number:	Document Title:	Revision:	Draft:

Review Criteria	Yes	No	N/A
1. Are the activities described within the procedure compliant with the Technical Safety Requirements (TSRs)?	☐	☐	☐
2. Are the activities described within the procedure consistent with activity descriptions in the associated Basis for Interim Operations (BIO)?	☐	☐	☐
3. Are the activities described within the procedure consistent with the initial conditions assumed in the BIO?	☐	☐	☐
4. Are the hazards introduced by this activity identified in the Hazard ID tables?	☐	☐	☐
5. Are the appropriate TSRs referenced within the performance sections of the procedure?	☐	☐	☐
6. Are performance of TSRs adequately documented within the procedure by the procedure's user (e.g., on Attachments, within WCATS, etc.)?	☐	☐	☐
7. Have required modifications to WCATS or other related procedures been implemented prior to or at same time as the FMO will begin operations?	☐	☐	☐
8. Is the language used when performing steps denoted be a $-symbol consistent with the meaning and intent of the TSRs?	☐	☐	☐
9. If the activity involves Material-at-Risk (MAR), is the MAR adequately controlled?	☐	☐	☐

Comments and/or Technical Review Guidance Used:

Safety Basis review of the procedure has been completed in accordance with the above criteria.

☐ I have no comments. Concurrence with the associated draft is given.

☐ Additional comments are documented and provided through formal means.

_____ / _____ / _____ / _____

Reviewer Name *Signature* *Z Number* *Date*

ATTACHMENT 10
Page 1 of 2

Procedure Review Checklist – Environmental Protection/Deployed

Document Number:	Document Title:	Revision:	Draft:

Environmental Protection/DEP Review Criteria	Yes	No	N/A
1. If the procedure change requires laboratory ENV SME review and interpretation of regulatory requirements, has review/interpretation been completed and incorporated within the procedure?	☐	☐	☐
2. If the procedure change requires modification to existing permits, submittal of new permits, or notifications to external regulatory agencies, have the modification/ submittal/notifications been completed and referenced within the procedure?	☐	☐	☐
3. Has the external regulatory agency approved the permit/notification submittal?	☐	☐	☐
4. If the process described in the procedure involves any discharge (solid/liquid/gas) to the environment, have required environmental monitoring or waste sampling been completed?	☐	☐	☐
5. If the procedure involves waste generation, then is the method by which the waste is generated consistent with the current method *or* has the new method been evaluated in terms of RCRA, CAA, or CWA (NPDES storm water) requirements?	☐	☐	☐
6. If waste will be generated, does the procedure explain how it should be managed?	☐	☐	☐
7. Are applicable RCRA and permit requirements referenced and integrated within the procedure?	☐	☐	☐
8. Are necessary storm water limits incorporated within the procedure?	☐	☐	☐
9. If additional modifications are required to other procedures to remain compliant with NMED permits/notifications, have these modifications been completed?	☐	☐	☐
10. If procedure involves treatment, storage, or disposal of RCRA-related waste, is it Permit compliant have specific criteria been provided?	☐	☐	☐
11. Have required modifications to WCATS or other related procedures been implemented prior to or at same time as the FMO will begin operations?	☐	☐	☐

Comments and/or Technical Review Guidance Used:

ATTACHMENT 10
Page 2 of 2

Environmental Protection review of the procedure has been completed in accordance with the above criteria.

☐ I have no comments. Concurrence with the associated draft is given.

☐ Additional comments are documented and provided through formal means.

_____ / _____ / _____ / _____

Reviewer Name *Signature* *Z Number* *Date*

Deployed Environmental review of the procedure has been completed in accordance with the above criteria.

☐ I have no comments. Concurrence with the associated draft is given.

☐ Additional comments are documented and provided through formal means.

_____ / _____ / _____ / _____

Reviewer Name *Signature* *Z Number* *Date*

ATTACHMENT 11
Page 1 of 1

Procedure Review Checklist – General Use

Document Number:	Document Title:	Revision:	Draft:

Review Criteria	Yes	No	N/A
1. List the discipline specific to this review and the LANL Policy (P), Program Description (PD), or System Description (SD) guiding the review's criteria. _____ / _____ Does the procedure meet the requirements of the listed LANL document?	☐	☐	☐
2. Are safety concerns adequately controlled within the procedure?	☐	☐	☐
3. Are technical elements and steps accurate and functional?	☐	☐	☐
4. Are non-technical elements and information accurate and concise?	☐	☐	☐
5. Is the level of detail suitable when considering complexity of the task and frequency of the activity?	☐	☐	☐
6. Are process materials, equipment, and tools specifically identified within the procedure?	☐	☐	☐
7. Have the appropriate requirements, references, and supporting SME documents been incorporated?	☐	☐	☐
8. Has necessary interaction with Document Owner, field operations, and other procedure development personnel occurred to fully review sections of the procedure?	☐	☐	☐
9. Does the procedure correctly speak to other existing procedures?	☐	☐	☐

Comments and/or Technical Review Guidance Used:

_____ review of the procedure has been completed in accordance with the above criteria.
(Discipline)

☐ I have no comments. Concurrence with the associated draft is given.

☐ Additional comments are documented and provided through formal means.

_____ / _____ / _____ / _____
Reviewer Name *Signature* *Z Number* *Date*

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ENV-CP-AP-200	Revision: 1	Los Alamos NATIONAL LABORATORY EST. 1943
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Environment, Safety, Health Directorate

Environmental Compliance Program

Administrative Procedure

Regulatory Procedure Review of Waste Management Procedures

Document Owner:

Name:	Organization:	Signature:	Date:
Anthony Grieggs	ENV-CP	Signature on File	09-15-2015

Derivative Classifier: ☐ **Unclassified or** ☐ **DUSA ENVPRO**

Name:	Organization:	Signature:	Date:
Gian Bacigalupa	ENV-CP	Signature on File	09-14-2015

Approval Signatures:

Subject Matter Expert:	Organization:	Signature:	Date:
Tony Grieggs	ENV-CP	Signature on File	09-15-2015
Responsible Line Manager:	Organization	Signature:	Date:
Alison Dorries	ENV-DO	Signature on File	09-15-2015

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REVISION HISTORY

Document Number and Revision *[Include revision number, beginning with Revision 0]*	**Effective Date** *[Document Control Coordinator inserts effective date]*	**Description of Changes** *[List specific changes made since the previous revision]*
ENV-CP-AP-200, R0	07/21/2015	New Document
ENV-CP-AP-200, R1	09/15/2015	Updated document to include procedure reviews done electronically in DRS, deleted references to QA Specialist, and updated information on training requirements.

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1.0 INTRODUCTION

Environmental Compliance Programs (ENV-CP) has implemented a formalized approach to conducting procedure reviews to ensure all procedures related to waste generation, management and treatment are compliant with the LANL Hazardous Waste Facility Permit; the New Mexico Hazardous Waste Act; the New Mexico Hazardous Waste Management Regulations and the Resource Conservation and Recovery Act (RCRA).

1.1 Purpose

The purpose of this document is to standardize ENV-CP review process for procedures that address the generation, and management of solid waste, hazardous waste, radioactive waste, mixed solid/radioactive waste, environmental cleanup waste, demolition and disposal (D&D) and investigation derived wastes (IDW).

1.2 Scope and Applicability

The scope of this document encompasses procedures related to waste generation, management, treatment; and, operation of waste management facilities. It includes maintenance of permitted facilities and systems of treatment and control installed or used to achieve compliance with the conditions of the Permit. This procedure review process applies to current procedures, new procedures and procedure reviews initiated internally by ENV-CP outside of an established review cycle.

1.3 Procedure Review Checklist

Due to the complexity of the Permit contents, it would be cumbersome to address all criteria in the "Procedure Review Checklist" (Attachment 1). It will be the responsibility for each reviewer to validate the procedure to the requirements in the Permit.

Question 9 of the checklist is generic in nature, but can address any area of the permit including but not limited to:

- Permit conditions/modification
- Unpermitted conditions
- Design, construction, maintenance and/or operation of the facility (authorized wastes, land disposal restrictions (LDR), inspections, etc.)
- Hazardous waste storage requirements
- Waste characterization requirements
- Preparedness and prevention
- Contingency plans
- Storage in Containers (container condition, compatibility, labeling, free liquids, volatile organic emissions)
- Building specific permit requirements

2.0 Procedure Description Process

1. Perform the review utilizing Attachment 1, "Procedure Review Checklist."
2. Utilize the "Document Review and Concurrence Form" located at:

   http://int.lanl.gov/org/padops/adesh/operations-integration/_assets/docs/doc-review-concurrence-form.pdf

   Provide to the ENV-CP, Point of Contact (POC) to enter comments into the Document Review System (DRS), mark up phase.
3. Review the revised, verification phase or proposed new procedures, or as appropriate, attend review meetings with cognizant Subject Matter Experts (SMEs) to ensure compliance requirements are incorporated and addressed as necessary.

   NOTE: The "disposition" of the comments will be done in DRS by the RLM.

4a. If the procedure requires a revision but does not pose an immediate environmental non-compliance, provide comments to the procedure writer and maintain a history file of the changes pending a formal scheduled procedure review. This information will be maintained in the "Waste Management-RCRA-Treatment Tracking Procedures" spreadsheet.

4b. If the procedure incorrectly addresses a potential or known environmental regulatory compliance issue, and is an active procedure, immediately notify the procedure writer. If the procedure writer is unable to coordinate review of the procedure with potential violations, notify Environmental Compliance Group Leader (ENV-CP GL) for immediate attention to the Responsible Line Manager (RLM).

5. Verify final approved procedure when issued on Documentum.
6. The ENV-CP POC will upload and track Procedure Review Checklists, Document and Concurrence forms, and any other review documents from other reviewers. Copies will be located on the RCRA Server:/RCRA TEAM RECORDS/PERMIT DOCUMENTS/PROCEDURE REVIEWS.

3.0 RESPONSIBILITIES

Any ENV-CP procedure reviewer who determines there may be a non-compliant procedure or regulatory violation that requires a new or revised procedure, shall at a minimum, immediately notify the ENV Compliance Group Leader (ENV-CP GL) and/or RCRA Permitting/ Compliance Team Leader (ENV-CP TL).

3.1 ENV-CP Procedure Reviewer POC

1. Coordinate dissemination of procedures for review.
2. Compile and resolve comments gathered from ENV-CP reviewers.
3. Enter group comments into DRS and participate with other SMEs in resolving comments ensuring that deficiencies pertaining to environmental compliance are addressed.

4. Upload all comment documentation to the RCRA Server: /RCRA TEAM RECORDS/PERMIT DOCUMENTS/PROCEDURE REVIEWS.
5. Maintain Procedure Review Official Documents (PROD) database of all procedures and review status.

3.2 ENV-CP Procedure Reviewers

1. Complete Attachment 1, "Procedure Review Checklist".
2. Complete "Document Review and Concurrence Form" located on the ADESH homepage (referenced in Section 2.1.2 above).
3. Submit Attachments documenting procedure review to ENV-CP Procedure Reviewer POC.
4. Coordinate with other SMEs either internally or externally on areas needing clarification or of concern.

3.3 Environmental Compliance Programs Group Leader/RCRA Permitting/Compliance Team Leader

1. In the event of a notification of a noncompliant procedure or regulatory violation, make necessary notifications to appropriate management and individuals responsible for reporting to external agencies (i.e., DOE, NMED etc.).
2. Raise attention to procedures not up for scheduled review that may contain a potential or known environmental regulatory compliance issue to Responsible Supervisor/Manager.

3.4 Responsible Supervisor/Manager with Procedure with Potential Noncompliance

1. After notification from ENV-CP GL or ENV-CP TL of potential non-compliance initiate necessary action until the procedure is corrected (i.e., stop work or pause in operations).
2. Initiate procedure review and revision process.
3. Approve corrected and revised procedure.

4.0 TRAINING AND OTHER REQUIREMENTS FOR IMPLEMENTATION

The training courses listed in this section are required for all ENV-CP personnel who review procedures for environmental compliance. Personnel working to this procedure must be assigned to Curriculum 5135, complete all applicable training requirements, and be authorized by ENV-CP management. In addition, it may be required to complete other site specific training when reviewing other Non-ENV procedures. The following Conduct of Operations self-study courses are also recommended: #27366, *OS-RTS ConOps, Technical Procedure Writer's Manual*, #24668, *OS-RTS ConOps Briefing, Attachment 16, Technical Procedures* and #24690, *OS-RTS: Use Every Time vs. Reference Procedures*.

4.1 Training Prerequisites

Curriculum 5135, WQ8A030A: *ENV-CP Procedure Review Team*

1. Course 7488, *RCRA Personnel Training*
2. Course 23263, *Waste Generation Overview Live*
3. Course 28582, *RCRA Refresher* (Self-Study) (365-day retraining requirement)

4.2 Non-Training Prerequisites

1. Knowledge of applicable regulatory drivers/requirements
2. RCRA Compliance Briefing, "What is Hazardous Waste Treatment?"

5.0 DEFINITIONS AND ACRONYMS

Secondary job waste – means miscellaneous materials associated with waste processing that may be placed into daughter drums during repackaging or comingled with the primary waste stream. Examples of secondary waste includes gloves, tools, rags, wipes (Kimwipes), plastic labels, tags, personal protective equipment (PPE), plastic sheeting used for contamination control, and original packaging material (e.g., plastic bags, plywood sheathing, rigid liner lids cut into pieces).

For any other definitions refer to:

- RCRA regs (40 CFR 260.10)

http://www.gpo.gov/fdsys/pkg/CFR-2010-title40-vol25/pdf/CFR-2010-title40-vol25-sec260-10.pdf

- LANL Permit (section 1.8, permit page 15)

https://cloud.env.nm.gov/waste/?c=236&k=3c06f97632

or

https://adep.lanl.gov/adepimageslib/WebDocs/Final_LANL_RCRA_Permit_full.pdf

- P409 tool (Glossary)

http://int.lanl.gov/org/padops/adesh/environmental-protection/_assets/docs/rcra/tools/ENV-RCRA-TOOL-101.pdf

http://int.lanl.gov/org/padops/adesh/environmental-protection/_assets/docs/rcra/tools/ADESH-TOOL-700.pdf

- NOTE ALSO: some individual P409 tools contain definitions, e.g., elementary neutralization (901), absorption w/o permit (902), stabilization treatment (903), Permitted Storage Requirements (802), etc.

5.1 Acronyms

See LANL Acronym Master List.

ADESH	Associate Directorate for Environment, Safety and Health
ENV-CP	Environmental Compliance Programs
ENV-CP-GL	Environmental Compliance Group Leader
ENV-CP-TL	RCRA Permitting/ Compliance Team Leader
ENV-QA	Environmental Quality
FOD	Facility Operations Director
LANL or the Laboratory	Los Alamos National Laboratory
NMED	New Mexico Environmental Department
POC	Point of Contact
PROD	Production
RCRA	Resource Conservation and Recovery Act
RM/RLM	Responsible Manager/Responsible Line Manager
SME	Subject Matter Expert
SOM	Shift Operations Manager
SOS	Shift Operations Supervisor
TA	Technical Area

6.0 RECORDS

Records generated by this document will be submitted to Records for document management in accordance with requirements of P1020-1, *Laboratory Records Management Program, P300, Integrated Work Management, P315, Conduct of Operations Manual* and with the ADESH-AP-006, *Records Management Plan*. In addition, the ENV-CP POC will upload all document review paperwork to the ENV-CP share drive.

7.0 REFERENCES

- LANL P315, Conduct of Operations Manual
- P1020-1, Laboratory Records Management
- P300, Integrated Work Management
- ADESH-AP-006, ES&H Records Management Plan
- LANL Hazardous Waste Facility Permit

8.0 ATTACHMENTS OR APPENDICES

- ***Attachment 1:*** *Procedure Review Checklist*

ATTACHMENT 1 – PROCEDURE REVIEW CHECKLIST

Procedure Review Checklist			
Document Number:	Document Title:	Revision	Date:

Procedure Content	
1. Is the purpose and objective of the procedure clearly identified?	☐Yes ☐No ☐NA
2. Is the skill level / training necessary to perform the procedure clearly identified?	☐Yes ☐No ☐NA
3. Does the procedure contain all information and level of detail necessary to perform the activity?	☐Yes ☐No ☐NA
4. Does it appear that necessary PPE, hazards to personnel, special tools, and equipment are identified in the procedure?	☐Yes ☐No ☐NA
5. Are secondary job wastes and control measures described in the procedure?	☐Yes ☐No ☐NA
6. Have steps or information been omitted that are necessary to perform the activity?	☐Yes ☐No ☐NA
7. Are Notes, Cautions or Warning statements clearly distinguishable from the action steps?	☐Yes ☐No ☐NA
8. Does the procedure identify what to do if abnormal conditions or reactions should arise and appropriate action(s) to be taken in the event of an unexpected occurrence?	☐Yes ☐No ☐NA
Permit Compliance	
1. Does any part of the procedure process meet the definition of treatment?	☐Yes ☐No ☐NA
2. Are any of the eight exemptions of the treatment permitting requirements met?	☐Yes ☐No ☐NA
3. (a) Does the procedure include actions for free liquids?	☐ Yes ☐No ☐ NA
(b) Does the procedure require the absorption of free liquids?	☐Yes ☐No ☐ NA
(c) Is a compliant (compatible) absorbent called out in the procedure?	☐Yes ☐No ☐NA
4. Is the process in question being performed in a Permitted Unit?	☐Yes ☐No ☐NA
(a) Does the Permitted Unit have a permit for absorption?	☐Yes ☐No ☐NA
(b) Does the activity involve resizing for waste management purposes and have a permit?	☐Yes ☐No ☐ NA
5. Does the procedure require the neutralization of free liquids?	☐Yes ☐No ☐ NA
6. (a) Does the process meet the definition of elementary neutralization (i.e. only D002 code, process performed in an elementary neutralization unit (ENU))?	☐Yes ☐No ☐NA
(b) Does the Permitted Unit have a permit for neutralization?	☐Yes ☐No ☐NA

Procedure Review Checklist	
7. If the procedure includes treatment of waste, do the attachments include log sheets that sufficiently document the treatment process including, but not limited to: • the waste treated; • beginning & final pH; • treatment method(s); • type and amount of neutralizer or absorbent used; and • product name and manufacturer of all materials added to the waste.	☐Yes ☐No ☐NA
8. Will the procedure require notification to NMED or a modification to the Permit?	☐Yes ☐No ☐NA
9. Are any other actions in the procedure regulated under the permit? What are the actions?	☐Yes ☐No ☐NA
Are they permit compliant and why?	☐Yes ☐No ☐NA
*If a generator is treating waste without interim status or a RCRA permit, ensure it meets one of the treatment standards without a permit.	
10. If the procedure impacts the facility operating record, are the necessary entries, updates, or corrections addressed (e.g. WCATS updates)?	☐Yes ☐No ☐NA
11. Does it appear all organizations that need to review the procedure are on the distribution?	☐Yes ☐No ☐NA
Additional comments:	
ENV-CP review of this procedure has been completed. Reviewer Name _____ Signature _____ Z Number _____ Date _____	

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Document Control

Effective Date:	8/13/15
Next Review Date:	8/13/18

Classification Review ☐ Unclassified

DC/RO Name	Z#	Signature	Date
Saundra Martinez	106229	/s/Saundra Martinez	8/12/15

Approval

Name	Z#	Signature	Date
Responsible Manager Deborah Guffee	118663	/s Debi Guffee	8/12/15

HISTORY OF REVISIONS

Document Number, Rev	Issue Date	Action	Description
EP-DIR-AP-10001, R0	9/21/2010	New Document	• Supersedes EP-DIR-SOP-4001, R.5 IPC-1. Changed from standard operating procedure (SOP) to administrative procedure (AP) based on procedure categories in Rev. 1 of Conduct of Ops Manual, P315. • Removed PCR, incorporated Document Action Request (DAR) form from P315, R1, and updated Verification Checklist per P315, R1.
EP-DIR-AP-10001, R1	12/7/10	Minor Revision	• Changed Sec. 2.2, Precautions, to clarify use of "Working Copy." • Changed Sec. 2.3.18 wording on Working Copy • Added section to DAR and Quality Verification Checklist for superseded documents.
EP-DIR-AP-10001, R.1 IPC-1	12/16/10	IPC	• IPC put DAR back into the document as an attachment rather than a link since the content changed somewhat from DAR in P315 R.1. • Added DC reviewer to DAR form • Modified QVC in order to incorporate process improvements • Rephrased IPC submittal process in section 4.2
EP-DIR-AP-10001, R2	2/15/11	Major Revision	• Removed reference to training documents in Section 4.2.5 on page 6.
EP-DIR-AP-10001, R3	6/6/11	Major Revision	• Document updated to reflect change from Domino to new SharePoint ® Document Control System. • Changed requirement to use the Quality Verification Checklist as required to "use as necessary." • Removed explanation of how to perform Immediate Procedure Changes (IPCs). • Updated Document Action Request (DAR) to include DUSA reviews.
EP-DIR-AP-10001, R4	9/15/11	Major Revision	• Added ADEP to document title, changed document template, updated other definitions • Added Sec. 5, Responsibilities, updated Sec. 6.1, Processing Controlled Documents, revised Sec. 6.3, Controlled Copy Distribution Section, updated Sec. 6.5, Document Periodic Review Notification, added Sec 7., Records Processing
EP-DIR-AP-10001, R5	2/13/12	Major Revision	• Added Procedure Feedback Process instructions • Added PCR# block to DAR in Section 2. • Added submittal process and clarification for efficient control of ADEP IWDs • Added information regarding Shift Operations Manager/Designee responsibilities for Controlled Copies • Added information pertaining to forms protection and filling.

HISTORY OF REVISIONS (continued)

Document No./Revision No.	Issue Date	Action	Description
EP-DIR-AP-10001, R6	6/25/13	Major Revision	• Updated DAR form with P315 DAR changes. • Numerous editorial changes • Clarified Scope
EP-AP-10001, R0	8/12/15	Major Revision	• Complete rewrite in response to DOE/IG-0922. Revised responsibilities, added requirements section, and incorporated steps within performance sections.

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1. PURPOSE

This procedure defines the roles, responsibilities, and process for managing revision controlled documents for the Environmental Programs Directorate (ADEP) and Environment Waste Management Operations (EWMO), including subcontractor procedures used in the execution of ADEP work or within ADEP facilities.

This procedure implements document control requirements in accordance with SD330, *Los Alamos National Laboratory Quality Assurance Program;* P1020-2, *LANL Document Control Program;* EP-DIR-QAP-0001, *Quality Assurance Plan for the Environmental Programs Directorate;* and the control portion of Los Alamos National Laboratory (LANL) P315, *Conduct of Operations Manual, Attachment 16, Local Procedures*. This procedure also implements document control functions identified in the institutional Conduct of Engineering program.

2. SCOPE

This procedure governs the administrative process for initiation, revision, review, approval, distribution, immediate change, suspension, and cancellation of policies, plans, or procedures, to include work instructions, forms, and other documents that prescribe processes or specify requirements and necessitate formal revision control.

Non-procedural technical requirements documents and implementing engineering documents, such as Integrated Work Documents (IWDs), Standing Orders, engineering drawings, and Unreviewed Safety Questions are controlled and made available in the ADEP Electronic Document Management System (EDMS); however, the initiation, development, revision, and/or review are carried out in accordance with the document's governing process or procedure, with the exception noted below.

Excluded from the requirements of this procedure are Documented Safety Analysis and its sub-tier documents, which are developed, managed, and made available by the originating organization.

Documents managed and controlled by the ADEP Document Control Team can be submitted to Document Control via adep-dcrm@lanl.gov.

3. RESPONSIBILITIES

3.1 Responsible Line Manager (RLM)

NOTE *The RLM has the responsibility, authority, and accountability for issuing procedures within their scope of work. The RLM will be designated as a Level 4 Manager or higher; assignment of a lower level manager requires written delegation by the Associate Director/Deputy for Environmental Programs.*

- Approves development of new procedures and the revision or cancellation of existing procedures.
- Identifies branching procedures associated with the procedure being changed to ensure that those branching procedures are evaluated for change.
- Provides a detailed description of procedure changes and the reason for changes on the Document Action Request (DAR).
- Designates the Integrated Process Control Team (IPCT) and develops the charter.
- Identifies Subject Matter Expert (SME) reviewers and provides guidance for these SME reviews.
- Identifies individuals qualified to act in the role of Reviewer and perform procedure reviews on behalf of their area of responsibility.
- Ensures procedures receive adequate review.
- Ensures reviewers receive Supplemental Review Packages containing relevant documents, such as key references and white papers, to assist in technical review.
- Determines whether proposed changes constitute a major or minor change to the procedure.
- Resolves reviewer and IPCT comments and maintains final authority for comment disposition and resolution.
- Ensures procedure is validated by Field Operator SMEs.
- Reviews compiled Document History File (DHF), including disposition comment forms, validation forms, Unreviewed Safety Question (USQ) determinations, and training determinations, and provides final approval of a completed document action.
- Approves and submits procedure to Document Control for issuance and distribution.
- Ensures programmatic work is performed in accordance with P300.

3.2 Facility Operations Director (FOD)

- Establishes and maintains the facility safety and security envelopes.
- Serves as the Responsible Line Manager (RLM) for facility-related work in accordance with P300.
- Reviews procedures for other work within the facility to ensure the activity/facility interface is appropriately addressed.

3.3 Document Control

- Ensures that current document revisions are available on EDMS.
- Manages the process for performing a document action, including initiation, revision, review, approval, control, and distribution.
- Assigns document numbers.
- Initiates and coordinates the procedure review cycle.
- Ensures reviewers receive Supplemental Review Packages to assist in technical review.
- Ensures reviewers receive description of procedures changes and reason for changes within the review notification.
- Tracks reviewer comments and responses and notifies RLM of outstanding reviews.
- Maintains documentation generated during the course of developing or revising a procedure.
- Reviews DHF for completeness.
- Obtains classification review and USQ review, as required.
- Notifies training team when procedure is ready for training review or development.
- Tracks periodic review cycles and notifies RLM of upcoming due dates.
- Maintains and updates the Reviewer Matrix and the Approved Reviewer List.

3.4 Preparer

- Collaborates with Document Control to manage documentation associated with the procedure development process, such as comment-resolution forms, validation checklists, and the DAR.
- Proofs procedures to ensure readability, usability, and the correctness of style, format, grammar, terminology, acronyms, and references.
- Maintains the working draft of a document during the drafting process, and submits a copy of the formal review draft and the final draft to Document Control for processing.
- Submits all relevant documentation used in the development of the procedure to Document Control for inclusion in the DHF.

3.5 Reviewers/Approvers

- Interacts with RLM and preparer to address review comments.
- Participates in roundtable discussions, procedure validations, and comment-resolution meetings as requested.
- Evaluates review documents for overlap, conflicts, and inconsistencies with other documents.
- Ensures that technical and safety aspects of procedures are correct.

3.6 Integrated Process Control Team

NOTE *Use of an IPCT is mandatory in the development of waste remediation and treatment processing procedures. An IPCT may also be established for other procedure types as determined by the RLM.*

- Provides discipline-specific review and comment for waste remediation and treatment processing procedures.
- Interacts with RLM and preparer to address review comments.
- Participates in roundtable discussions and comment-resolution meetings as requested.
- Completes review of procedure by the assigned due date.
- Notifies RLM if assigned due date is insufficient for adequate review.

3.7 Training Specialist

- Supports the RLM to complete the Systematic Approach to Training (SAT) Determination Form for moderate/high hazard work.
- Develops or revises curricula associated with new or revised documents in accordance with P781-1, *Conduct of Training Manual*.

4. REQUIREMENTS

4.1 Supplemental Review Package

During procedure development and procedure review, the preparer, SME reviewers, and IPCT members have access to any information that may be pertinent to the development or review process, such as white papers, solutions packages, technical references, and process flow diagrams. Prior to procedure revision or development, the RLM identifies those documents to be included as part of the Supplemental Review Package. Additionally, SMEs can identify additional documents that need to be added to the Supplemental Review Package and provide them to Document Control. Document Control ensures those documents are provided to the preparers and other personnel involved in the procedure development process. Supplemental Review Package documents should be listed as references in the procedure.

4.2 Review Cycles

Review cycles are established for certain revision controlled documents to ensure the RLM periodically reviews the document for necessity and accuracy. Each document type has a maximum review cycle; the review cycle is calculated from the document's effective date or the date of the last Periodic Review.

Document Category	Maximum Review Cycle
Technical Procedures • Detailed Operating Procedure – DOP • Standard Operating Procedure – SOP • Administrative Procedure – AP	3 years
Emergency Response Procedures	1 year
Alarm Response Procedures	1 year
Plans	3 years
Other	3 years

Maximum review cycles may be extended for 60 days by the RLM to allow time to complete a Periodic Review; IWD-equivalent procedure extensions require concurrence by the FOD. Extensions beyond 60 days may be authorized by the RLM's Associate Director or designee. Extensions may be documented via email.

5. PERFORMANCE—INITIATION OR MAJOR REVISION TO POLICIES, PROCEDURES OR PLANS

The following subsections detail the steps associated with processing a new procedure/plan or a major revision. While the RLM maintains responsibility and final approval for the document action, aspects of the process may be delegated at the RLM's discretion.

Major revisions are characterized as changes in the intent, scope, purpose, steps, responsibilities, safety, or technical content described in a document. Inconsequential editorial changes are considered **minor revisions.**

Appendix 1, Document Action Flow Chart, provides a visual depiction of the document control process described in the following subsections. A working DAR template is provided as Attachment 1 to this procedure. Other forms utilized to process a document action, such as the validation checklist and comment-resolution form, are provided in P315, Conduct of Operations Manual.

5.1 Document Action Initiation

Developing or revising a plan/procedure is a significant activity that should only be done for appropriate cause, such as when a procedure cannot be executed as written. Minor changes that do not affect performance should be deferred until a revision is performed, at which time they can be incorporated.

RLM

[1] **REVIEW** request for document action: new or major revision.

[2] **COMPLETE** Section 1 of the DAR.

[3] **CHECK** (√) "Approved" or "Disapproved" for processing the document action, and **SIGN** Section 1 of the DAR.

[4] **IF** not approved,
THEN SUBMIT the DAR to Document Control, and **EXIT** the procedure.

[5] **IF** the procedure is a waste remediation and treatment processing procedure,
THEN NOTIFY the IPCT Chairperson of the document action and obtain approval to write or revise the procedure.

IPCT Chairperson

[6] **IF** the procedure is a waste remediation and treatment processing procedure,
THEN CHECK (√) "Approved" or "Disapproved" for processing the document action, and **SIGN** Section 1 of the DAR.

RLM

[7] **IDENTIFY** required reviewers in Section 2 of the DAR.

[8] **SUBMIT** the DAR to Document Control.

5.1 Document Action Initiation (continued)

Document Control

[9] **ASSIGN** the DAR number.

[10] **IF** the DAR is not approved,
THEN FILE the DAR and **EXIT** this section of the procedure.

[11] **IF** the request is for a new document,
THEN PROVIDE the RLM with a unique document number, and **RECORD** this number on Section 1 of the DAR.

5.2 Document Development

RLM or Preparer

[1] **OBTAIN** the approved template for a new document or a controlled copy of the most recent revision of an existing document from Document Control or EDMS.

[2] **DEVELOP** in accordance with appropriate template and applicable guidance.

[3] **MAINTAIN** development, review, validation, and/or verification documentation for inclusion in the Document History File.

RLM

[4] **WHEN** document is ready to be sent for formal review,
THEN SUBMIT the review draft to Document Control electronically.

5.3 Document Review and Comment Resolution

The formal review process is essential to ensuring a document is accurate, complete, and ready for use. During the review process, reviewers evaluate the content of the document. Review comments should not be limited to only those related to the reviewer's area of expertise for compliance with established requirements; reviewers also participate in comment resolution of other reviewer's comments that are within their area of expertise.

Major revisions to documents that specify quality requirements shall be reviewed by the same organizations that performed the original review unless specifically designated; additional reviewers may be added. A review is not complete until essential comments are dispositioned. The RLM has the final decision on comment resolution.

Document Control

[1] **FINALIZE** with the RLM the dates for review period and other requirements for review.

[2] **PREPARE** the document for formal review by examining document format, file naming conventions, and draft watermark, as applicable.

[3] **VERIFY** the mandatory reviewers in accordance with the Reviewer Matrix for technical procedures.

[4] **VERIFY** that the Supplemental Review Package has been provided, as required.

[5] **SEND** the document, Supplemental Review Package (as required), and other documents and forms to the personnel identified on the DAR for review, including pertinent information in the review notification, such as:
- Review completion date
- Revision description, if applicable
- Reason for revision, if applicable
- Guidance for documenting review, such as use of comment resolution form
- Contact information for where to send comments/concurrence

[6] **COPY** the RLM, the preparer, and the training specialist on the review notification.

Reviewers

[7] **REVIEW** the document within area of expertise for accuracy, clarity, and compliance with established requirements.

[8] **PROVIDE** formal comments as directed by the review notification by the review completion date.

[9] **COLLABORATE** with the RLM and preparer to resolve comments.

5.3 Document Review and Comment Resolution (continued)

RLM

[10] **DISPOSITION** comments in conjunction with the preparer and **DOCUMENT** the comment resolution.

[11] **IF** additional interaction with reviewers and/or IPCT is required,
THEN HOLD a roundtable discussion or equivalent method to review the revision.

NOTE *Procedure validations are performed by a team composed of at least one validator and one preparer. The validator should be an SME and user of the procedure, and is assigned by the* RLM.

Preparer

[13] **IF** revisions resulting from comment resolution or validation substantially change the technical content,
THEN COORDINATE with Document Control to perform another review cycle.

[14] **WHEN** the document has completed formal review and other conditions listed on the DAR, **THEN:**

[A] **FINALIZE** the draft of the document.

[B] **RECORD** additional documentation on the DAR from the completed review cycle, such as supplementary comments and electronic signatures.

[C] **COMPILE** documentation associated with the review and validation process.

[D] **SUBMIT** the documentation and the final draft to Document Control electronically.

5.4 Final Approval

Final approval of a document is the responsibility of the RLM and is completed by reviewing associated documentation, such as comment resolution forms, reviewer concurrence, validation paperwork, the finalized procedure, and other records included in the DHF, then signing the document.

Document Control

[1] **PERFORM** cursory review of the document for formatting and style, such as header/footer configuration, page numbering, effective date accuracy, and margin and spacing consistency.

[2] **SEND** the signature-ready document to final actionees identified on the DAR:
- USQ Review
- Derivative Classifier
- Training

[3] **UPDATE** the DAR with any outstanding information.

[4] **PROVIDE** the RLM with the signature-ready copy.

RLM

[5] **REVIEW** the compiled DHF and finalized document to ensure it is accurate, complete, and ready for use.

[6] **SIGN** Section 3 of the DAR for final approval.

Training Specialist

[7] **IF** training is required,
THEN COORDINATE training with the RLM and document users.

[8] **NOTIFY** Document Control when training has been completed for necessary selection of target audience.

Document Control

[9] **OBTAIN** Authorized for Use signature or notification from the RLM.

[10] **PLACE** the Effective Date and/or Next Review Date on the document.

[11] **UPLOAD** the approved/authorized document into EDMS.

[12] **PROVIDE** electronic notification of the completed document action.

[13] **ASSEMBLE** the completed DHF.

[14] **UPLOAD** the DHF into EDMS.

6. PERFORMANCE—MINOR REVISIONS TO POLICIES, PROCEDURES OR PLANS

Minor changes, such as inconsequential editorial corrections, do not require that the revised document receive the same review and approval as the original documents.

RLM

[1] **REVIEW** request for a minor revision.

[2] **COMPLETE** Section 1 of the DAR.

[3] **CHECK** (√) "Approved" or "Disapproved" for processing the document action, and **SIGN** Section 1 of the DAR.

[4] **IF** not approved,
THEN SUBMIT the DAR to Document Control, and **EXIT** the procedure.

[5] **IF** the procedure is a waste remediation and treatment processing procedure,
THEN NOTIFY the IPCT Chairperson of the document action to obtain concurrence that the change is minor and approval to revise the procedure.

IPCT Chairperson

[6] **CHECK** (√) "Approved" or "Disapproved" for processing the document action, and **SIGN** Section 1 of the DAR.

Document Control

[7] **ASSIGN** the DAR number.

[8] **IF** the DAR is not approved,
THEN FILE the DAR and **EXIT** this section of the procedure.

RLM or Preparer

[9] **OBTAIN** the most recent revision of existing document from Document Control or EDMS.

[10] **MAKE** minor change, and **SUBMIT** the review draft to Document Control electronically.

Document Control

[11] **OBTAIN** Authorized for Use signature or notification from the RLM.

[12] **PLACE** the Effective Date and/or Next Review Date on the document.

[13] **UPLOAD** the approved/authorized document into EDMS.

[14] **PROVIDE** electronic notification of the completed document action.

[15] **ASSEMBLE** the completed DHF.

[16] **UPLOAD** the DHF into EDMS.

7. PERFORMANCE—IMMEDIATE PROCEDURE CHANGE TO POLICIES, PROCEDURES OR PLANS

An Immediate Procedure Change (IPC) provides a method for expedited processing of document actions. Changes are limited to those required to continue work-in-progress, to support temporary modifications, or for critical activities as identified by the RLM. Developing and processing IPCs shall be performed in accordance with P315; basic process steps are identified below.

RLM

[1] **REVIEW** request for an IPC.

[2] **COMPLETE** the initial sections of the IPC Form provided in P315 in conjunction with the preparer and **IDENTIFY** required reviewers.

Preparer

[3] **MAKE** revisions associated with the IPC either electronically or by hand in accordance with P315.

[4] **WHEN** IPC is ready to be sent for formal review,
THEN SEND the document to the identified reviewers along with pertinent information, such as IPC description, reason for revision, and review completion time.

Reviewers and IPCT (if required)

[5] **REVIEW** the IPC for accuracy, clarity, and compliance with established requirements.

[6] **PROVIDE** formal comments as directed by the review notification by the review completion time.

[7] **COLLABORATE** with the RLM and preparer to resolve comments.

RLM

[8] **DISPOSITION** comments in conjunction with the RLM, and **DOCUMENT** the comment resolution.

Preparer

[9] **WHEN** formal review is complete,
THEN:

[A] **FINALIZE** the draft of the IPC in accordance with P315.

[B] **OBTAIN** other requirements noted on the IPC Form, such as FOD signature, USQ review, and/or Derivative Classification.

[C] **COMPILE** documentation and signatures associated with the review process into a DHF.

[D] **WHEN** all other required approvals have been obtained,
THEN PROVIDE the RLM with the finalized procedure.

7. PERFORMANCE—IMMEDIATE PROCEDURE CHANGE TO POLICIES, PROCEDURES OR PLANS (continued)

RLM

[10] **REVIEW** the compiled DHF and finalized procedure to ensure it is accurate, complete, and ready for field use.

[11] **SIGN** the IPC Form for final approval.

[12] **UPDATE** applicable log books, such as shift turnover and operations center logbook.

[13] **SUBMIT** the final draft and accompanying documentation to Document Control electronically within 3 working days.

Document Control

[14] **UPLOAD** the approved/authorized IPC into EDMS.

[15] **PROVIDE** electronic notification of the completed document action.

[16] **ASSEMBLE** the completed DHF.

[17] **UPLOAD** the DHF into EDMS.

8. PERFORMANCE—CANCELLATION OR DEACTIVATION OF POLICIES, PROCEDURES OR PLANS

Deactivation is the temporary withdrawal of a document from authorized use. Deactivated documents are exempt from periodic review requirements, but must be reviewed before reactivation if the next review date has passed.

Cancellation is the permanent removal of a document from active status. Cancelled documents cannot be reactivated.

RLM

[1] **REVIEW** request for cancellation or deactivation.

[2] **COMPLETE** Section 1 of the DAR.

[3] **CHECK** (√) "Approved" or "Disapproved" for processing the document action, and **SIGN** Section 1 of the DAR.

[4] **IF** not approved,
THEN SUBMIT the DAR to Document Control, and **EXIT** the procedure.

[5] **IF** the procedure is a waste remediation and treatment processing procedure,
THEN NOTIFY the IPCT Chairperson of the document action and obtain approval to cancel or deactivate the procedure.

IPCT Chairperson

[6] **IF** the procedure is a waste processing procedure,
THEN CHECK (√) "Approved" or "Disapproved" for processing the document action, and **SIGN** Section 1 of the DAR.

RLM

[7] **IDENTIFY** required reviewers in Section 2 of the DAR.

[8] **SUBMIT** the DAR to Document Control.

Document Control

[9] **ASSIGN** the DAR number.

[10] **IF** the DAR is not approved,
THEN FILE the DAR and **EXIT** this section of the procedure.

[11] **VERIFY** that the Supplemental Review Package has been provided, as required.

8. PERFORMANCE—CANCELLATION OR DEACTIVATION TO POLICIES, PROCEDURES OR PLANS (continued)

[12] **SEND** the document, Supplemental Review Package (as required), and other documents and forms to the personnel identified on the DAR for review.

[13] **INCLUDE** pertinent information in the review notification such as:
- Review completion date
- Reason for cancellation or deactivation
- Guidance for documenting review, such as use of comment resolution form
- Contact information for where to send comments/concurrence

[14] **COPY** the RLM, the preparer, and the training specialist on the review notification.

Reviewers

[15] **REVIEW** the document within area of expertise to ensure the cancellation or deactivation will not affect safety basis, quality, regulatory requirements, or the safety/security of personnel using the document.

[16] **COLLABORATE** with the RLM and preparer to resolve issues or concerns associated with cancellation/deactivation of the document.

Document Control

[17] **OBTAIN** approval signature from RLM to cancel/deactivate.

[18] **UPDATE** the cancelled/deactivated document in EDMS to reflect new status.

[19] **PROVIDE** electronic notification of the completed document action.

[20] **ASSEMBLE** the completed DHF.

[21] **UPLOAD** the DHF into EDMS.

9. PERFORMANCE—PERIODIC REVIEW OF POLICIES, PROCEDURES OR PLANS

Periodic reviews are conducted to ensure the document is still required and accurately implements current technical and administrative requirements.

Document Control

[1] **NOTIFY** the RLM of an upcoming review.

RLM

[2] **CONDUCT** review of document.

[3] **COMPLETE** the Periodic Review Form.

[4] **IF** the document is still required and is accurate,
THEN UPLOAD the Periodic Review Form into EDMS and **RESET** the effective date of the document.

[5] **IF** the document is still required but needs to be revised,
THEN:

[A] **UPLOAD** the Periodic Review Form into EDMS.

[B] **RESET** the effective date of the document.

[C] **GO TO** Section 5 for major revisions or Section 6 for minor revisions to revise the document.

[6] **IF** the document is no longer required,
THEN GO TO Section 8 to deactivate or cancel the document.

10. PERFORMANCE—PROCESSING OF TECHNICAL REQUIREMENTS OR IMPLEMENTING ENGINEERING DOCUMENTS

Non-procedural technical requirements and implementing engineering documents are made available in the ADEP EDMS upon final approval or issuance.

Document Control

[1] **VERIFY** the document received is complete and applicable metadata has been provided by the submitter.

[2] **UPLOAD** the document into EDMS, utilizing submitter instructions as provided.

11. RECORDS

Records generated in the course of performing this procedure must be maintained and managed in accordance with EP-AP-10003, *Records Management.*

Record	QA Record	Non-QA Record
Document Action Request	☒	☐
Immediate Procedure Change form	☒	☐
Periodic Review Form	☒	☐
Approved, revised procedure – signed	☒	☐
Revised procedure – redlined	☒	☐
Supplemental Review Package	☒	☐
Reviewer comment spreadsheets, forms, or other documentation with reviewers name, credentials/signature, date, and comment category	☒	☐
Document review markups **without** reviewers name, credentials/signature, date, and comment category	☐	☒
Discipline-Specific Checklists	☒	☐
Verification Checklist	☒	☐
Validation Checklist	☒	☐
Hazards Analysis documentation	☒	☐
Process Flow Diagram	☒	☐
Systematic Approach to Training (SAT) form	☒	☐
Additional email	☒	☒

12. REFERENCES

AP-341-403, *Master Document List*

EP-AP-10003, *Records Management*

EP-DIR-QAP-0001, *Quality Assurance Plan for the Environmental Programs Directorate*

P204-1, *Controlled Unclassified Information*

P300, *Integrated Work Management*

P315, *Conduct of Operations Manual*

P781-1, *Conduct of Training Manual*

P1020-2, *Laboratory Document Control Program*

ATTACHMENT 1
Document Action Request

Document Action Request

Section 1 – Originator Request

Document No.:			Revision No.:
Title:			Page ___of ___
Description of requested action (Attach numbered additional sheets if needed.)			
Originator Name (print):	Z#:	Organization:	Date:

Section 2 – Responsible Manager Approval for Processing (see P315, Att. 16, Section 16.5.1.c)

☐ New Document ☐ Minor Revision ☐ Deactivation ☐ Major Revision ☐ Cancellation ☐ Perform Concurrent Periodic Review?

☐ Approved ☐ Disapproved (return to originator) Comments:

Signature	Print Name, Title	Z#	Date
RLM Concurrence Signature	Print Name, Title	Z#	Date

Section 3 – Hazard Grading (see P315, Att. 16, Section 16.5.1.f)

Hazard Determination: ☐ Low ☐ Moderate ☐ High/Complex ☐ N/A

Document is authorized to serve as IWD? ☐ Part I only ☐ Full IWD ☐ N/A

Section 4 – Required Reviews (see P315, Att. 16, Section 16.5.3)

Discipline	Name	Signature	Date

Validation Required? ☐ Yes ☐ No ☐ Waive Comment:

Scope of Validation: ☐ Entire Procedure ☐ Change Only Validation Method: ☐ Walkdown ☐ Simulation ☐ Tabletop

Training Determination Completed: ☐ Yes ☐ N/A Completed By:

USQ/USI Number (if needed):	Signature	Z#	Date

Section 5 – Final Approvals (see P315, Att. 16, Section 16.5.4)

☐ Release ☐ Hold Details:

Responsible Manager Signature	Print Name, Title	Z#	Date
Additional Approval Signature	Print Name, Title	Z#	Date

EXAMPLE
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Environment, Safety, Health Directorate

Waste Management Division

Administrative Procedure

Waste Characterization and Processing Review

Subject Matter Expert:

Name:	Organization:	Signature:	Date:
Gregg Geisinger	WM-SVS	*Signature on file*	2/18/2016

Derivative Classifier: ☐ **Unclassified or** ☒ **DUSA ENVPRO**

Name:	Organization:	Signature:	Date:
Ellena Martinez	OIO-DO	*Signature on file*	2/17/2016

Approval Signatures:

Quality Assurance Reviewer:	Organization:	Signature:	Date:
Larry Maassen	QPA-IQ	*Signature on file*	2/16/2016
Responsible Line Manager:	Organization:	Signature:	Date:
John McCann	EPC-DO	*Signature on file*	2/17/2016
Responsible Line Manager:	Organization:	Signature:	Date:
Andy Montoya	WM-DO	*Signature on file*	2/16/2016

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WM-AP-0005, Rev. 1	2/18/2016	Major Revision. Clarification of responsibilities, membership appointment, and communication processes.
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1.0 INTRODUCTION

On December 6, 2014 the New Mexico Environment Department (NMED) issued an Administrative Compliance Order (ACO), HWB-14-20, for violations of the Hazardous Waste Act and the Hazardous Waste Facility Permit to Los Alamos National Laboratory (LANL). The ACO calls for a Communication System within and between appropriate LANL organizations to ensure that waste stream profile acceptable knowledge (AK) documentation is accurate, sufficient, and updated.

This administrative procedure provides the frame work for the Waste Characterization and Processing Review, including the communication system methods and the engagement of LANL subject matter experts (SMEs) to participate in reviews on complex waste management issues. The reviews will include issues related to ensuring that waste stream profile AK documentation is accurate, sufficient and updated. In addition, this administrative procedure will also be made available to external SMEs to facilitate their participation in the Waste Characterization and Processing Review and to enhance communication between organizations. The Waste Characterization and Processing Review is only one aspect that LANL has instituted to address the ACO and enhance communication.

1.1 Purpose

This administrative procedure provides the frame work for the Waste Characterization and Processing Review established by the Waste Management Division with documentation for the communication methods, members, scope, and decision making. The Waste Characterization and Processing Review is chartered to enhance Resource Conservation and Recovery Act (RCRA) compliance, reduce hazards, improve safety associated with LANL waste processing and management, and to review and provide compliant resolution on complex waste issues related to waste characterization and processing.

1.2 Scope

The Waste Characterization and Processing Review is invoked when a complex waste management and/or processing issue surfaces and is best resolved with multi-discipline SMEs from within and potentially external to LANL for a comprehensive and thorough evaluation and safe and compliant resolution. The Waste Characterization and Processing Review will be applied to waste characterization, waste management procedures related to waste characterization and processing, and other complex waste issues. The Waste Management (WM) Division Leader has the responsibility to determine which waste management and processing issues are complex; and therefore, invoke the Waste Characterization and Processing Review.

1.3 Applicability

This administrative procedure is applicable to all LANL SMEs engaged to participate in the Waste Characterization and Processing Review established by the Waste Management Division. In addition, this administrative procedure will also be made available to external SMEs for informational purposes. The Waste Characterization and Processing Review website lists internal and external subject matter experts available to participate.

2.0 PRECAUTIONS AND LIMITATIONS

This administrative procedure is applicable to all LANL SMEs engaged to participate in the Waste Characterization and Processing Review. The procedure is also made available to external SMEs to facilitate their participation in the Waste Characterization and Processing Review, enhance communication, and for informational purposes. LANL can only request and encourage, not require, external membership participation in Waste Characterization and Processing Review.

3.0 RESPONSIBILITIES

An effective multi-disciplinary Waste Characterization and Processing Review is dependent upon participants serving their intended functions as described below.

3.1 Waste Management (WM) Division Leader

- Serve as chair for the Waste Characterization and Processing Review meetings and interactions
- Provide leadership to the Waste Characterization and Processing Review in waste management services for support of the LANL mission
- Invoke the Waste Characterization and Processing Review for complex waste issues
- Champion waste management process changes to strengthen use of waste stream documentation that is accurate, sufficient, and updated
- Identify agenda items for the Waste Characterization and Processing Review
- Support sustainability of the Waste Characterization and Processing Review
- Encourage broad engagement of diverse SMEs to address a variety of complex waste management and processing issues to enhance RCRA compliance, reduce hazards, and improve safety associated with LANL waste streams
- Resolve disputes when SMEs cannot reach consensus
- Adopt and support a process for local-level waste management procedure review
- Determine the appropriate mechanism to implement and communicate decisions from the Waste Characterization and Processing Review

3.2 Environmental Protection and Compliance (EPC) Division Leader

- Provide leadership to the Waste Characterization and Processing Review on environmental protection and compliance services, especially in reference to RCRA, to anticipate and manage environmental risk in support of the LANL mission
- Enhance RCRA compliance, reduce hazards, and improve safety associated with LANL waste streams
- Provide guidance and procedures to facilitate hazardous waste management, storage, and treatment (where permitted) in accordance with the Los Alamos National Laboratory Hazardous Waste Permit and RCRA regulations

- Provide support for implementing the formal communication process for applicable Waste Characterization and Processing Review decisions with interested parties external and internal to LANL per P402, *Environmental Communication Procedure*

3.3 Waste Characterization and Processing Review Facilitator

- Manage the communication with the SMEs
- Track membership appointments for the SMEs
- Document Waste Characterization and Processing Review decisions
- Organize meetings, preparation materials, work assignments, and agendas
- Complete meeting minutes and maintain the website

3.4 Internal Subject Matter Experts

- Offer input and recommendations related to area of expertise on complex waste management and processing issues in the manner prescribed and by scheduled deadlines
- Appoint a qualified backup when not available for Waste Characterization and Processing Review obligations
- Apply expertise to enhance compliance with requirements, reduce hazards, and improve safety associated with LANL waste streams
- Lead and serve on subcommittees

3.5 External Subject Matter Experts

- Offer input and recommendations related to area of expertise on complex waste management and processing issues in the manner prescribed and by scheduled deadlines
- Establish a method of interaction with the Waste Characterization and Processing Review in a manner aligned with applicable interface agreements or subcontracts
- Apply expertise to enhance compliance with requirements, reduce hazards, and improve safety associated with LANL waste streams
- Interface with the DOE National Transuranic (TRU) Waste Corporate Board, as appropriate

3.6 Associate Directorate for Environmental Management (ADEM) and Associate Directorate for Environment, Safety, and Health (ADESH) Subcontractor Technical Representatives (STRs)

- Ensure the flow down of waste management requirements to subcontractors
- Reinforce performance expectations for subcontractors related to environmental compliance and waste management documented in applicable contracts and Exhibit F
- Formally communicate decisions from the Waste Characterization and Processing Review to the Responsible Division Leader with waste management subcontractors for proper implementation of appropriate waste management procedures applicable to the subcontractors

- Offer input and recommendations for complex waste management and processing issues that will be consistent with applicable contracts and Exhibit F requirements and implementable for contractors
- Resolve conflicts between the subcontractor and the institution through the official mechanism described in P850, *Subcontract Technical Representative Procedure*, and specified in the applicable contract

3.7 Chemistry Subject Matter Experts

- Offer input and recommendations related to area of expertise on complex waste management and processing issues in the manner prescribed and by scheduled deadlines
- Appoint a qualified backup when not available for Waste Characterization and Processing Review obligations
- Participate in waste stream profile discussions to address difficult waste stream issues (e.g. process description communication; waste compatibility determinations; characterization methodologies; identification of ignitable, corrosive, and reactive wastes)

3.8 Radiological Subject Matter Experts

- Offer input and recommendations related to area of expertise on complex waste management and processing issues in the manner prescribed and by scheduled deadlines
- Appoint a qualified backup when not available for Waste Characterization and Processing Review obligations
- Participate in waste stream profile discussions to address difficult waste stream issues (e.g. process description communication; waste compatibility determinations; characterization methodologies; identification of ignitable, corrosive, and reactive wastes)
- Apply expertise for management and characterization of complex waste streams

3.9 Waste Certification Officials

- Communicate decisions from the Waste Characterization and Processing Review to offsite treatment, storage, and disposal (TSD) facilities for low-level waste (LLW) and mixed low-level waste (MLLW) waste related issues
- Offer input and recommendations for waste management and processing issues that will be consistent with applicable requirements for receipt of LANL waste at offsite TSD facilities

4.0 QUALIFICATION PREREQUISITE

The Waste Characterization and Processing Review engages technical support to review and make recommendations on complex waste management and processing issues; develop position papers; and review procedural issues, generator documents, waste stream profile technical issues, and waste generating processes. This technical support is provided by a diverse group of individuals recognized

as experts in their field based on formal training, education, and/or experience in a wide variety of technical disciplines, program areas, regulatory standards, and/or processes.

Each individual is carefully selected based upon their proven skill set and appointed to support Waste Characterization and Processing Review. Appointment of SMEs for participation in the Waste Characterization and Processing Review will be coordinated with the SME's manager to ensure availability of the SME for participation in the reviews. Factors considered during appointment and selection include management nominations, representation of the institutional cross section, and the need for expertise, at a minimum, of waste compliance, waste management, waste generation and waste characterization. Factors considered prior to SME engagement, those not appointed, include management nomination, representation of the institutional cross section, certifications and qualifications, and the need for expertise (e.g. waste compliance, waste management, waste generation and waste characterization).

5.0 PROCESS SUMMARY

The Waste Characterization and Processing Review is chartered to enhance RCRA compliance, reduce hazards, and improve safety associated with LANL waste management. To achieve the chartered mission, the Waste Characterization and Processing Review uses a variety of communication methods to engage multi-discipline SMEs for reviewing and providing compliant resolution on complex waste issues. The complex waste issues may include Waste Stream Profiles (WSPs) and supporting AK documentation, new and revised waste management and processing procedures, and compatibility analyses.

The Waste Characterization and Processing Review will employ the described methods to engage multi-discipline SMEs for review and to recommend compliant resolution on a variety of complex waste management and processing issues to minimize hazards and ensure compliance with all applicable requirements. The methods of engagement are designed to ensure sustainable interactions between participants and timely resolution of complex waste issues to facilitate compliant waste management and processing activities.

5.1 Website

The Waste Characterization and Processing Review has a dedicated website available to participants. At a minimum the website is maintained with the following:

- links to waste management reference materials and tools
- list of SMEs
- meeting minutes
- meeting attendance logs

Action: *Refer to the designated website to stay informed of the Waste Characterization and Processing Review progress at LANL and applicable work assignments.*

5.2 Meetings

Waste Characterization and Processing Review meetings are scheduled on a monthly basis and held as needed. Meeting announcements with date, time, and location will be communicated via email and Microsoft Outlook or similar calendar management tool. Meeting preparation materials may include but are not limited to: agenda; previous meeting minutes; draft procedures proposed for SME review; applicable assessments and investigations; draft waste stream profiles proposed for review; and waste metrics. Preparation materials will be made available prior to the meeting.

Attendance will be recorded for each meeting and the attendance logs will be posted on the Waste Characterization and Processing Review website. An effective Waste Characterization and Processing Review is dependent upon participants serving their intended functions.

Meeting minutes will be recorded, documented, and subject to approval by the Waste Characterization and Processing Review participants at a following meeting. Minutes will reflect decisions made, content of technical discussion, and outstanding actions with responsible individuals and due dates. Meeting minutes will be posted on the website.

Decisions will be made by consensus. If the Waste Characterization and Processing Review cannot reach consensus, the Chair is responsible for the final decision. Final decisions as well as dissenting opinions will be documented in meeting minutes.

Action: *Attend and participate in Waste Characterization and Processing Review meetings.*

5.3 WCATS Work Flow

The Waste Compliance and Tracking System (WCATS) is a software application that has been specifically designed to support LANL's waste management from cradle to grave. WCATS supports the generation, characterization, processing, and shipment of all waste types generated at LANL. Regulatory drivers include RCRA hazardous waste regulations, and Department of Transportation (DOT) shipping, National Nuclear Security Agency (NNSA) nuclear material control and accountability, DOE nuclear safety, LANL Hazardous Waste Facility Permit, and DOE Order 435.1 Radioactive Waste Management requirements.

WCATS serves as one element of LANL's facility operating record. LANL waste management and processing activities are expected to be tracked in WCATS. If subcontractors are generating or managing waste, they too are expected to use, to be trained on and to be given access to WCATS.

AK information is maintained in and communicated through WCATS. The waste streams are described and documented in Waste Stream Profiles (WSPs) and supported with sampling and analysis data and/or AK documentation. The process is designed to accurately and completely capture and record the necessary information required to compliantly store, treat, and dispose of waste items.

The Waste Characterization and Processing Review was created to support and facilitate compliance with applicable requirements, reduce hazards, and improve safety associated with LANL waste streams with an emphasis on complex issues. Thus, Waste Characterization and Processing Review participants may review WSPs to evaluate waste characterization for accuracy, sufficiency, and currency (i.e., up-to-date); to verify the identification of ignitable, corrosive, reactive, and toxicity characteristic wastes; and to determine if the identification and segregation of incompatible waste items is sufficient.

The Waste Management Division WSP reviewer signs and approves the WSP after confirming that the characterization information is correct, complete, and properly entered. Endorsing a waste stream declares that all forms were fully reviewed and certifies that all information is complete, accurate, and compliant with requirements. The Waste Characterization and Processing Review may be invoked by the Waste Management Division WSP reviewer at any time additional SME input is needed.

Waste Stream Profiles not approved will be revoked. A comment regarding the revoking action can be entered into the comment log of the Waste Stream Profile. WCATS automatically notifies the waste generator and the waste management coordinator on each WSP action for approval and disapproval.

The WCATS User's Manual describes the review and signature of waste streams in section 4.2.1.24 "Reviewers/Signatures".

Action: *Participate in waste stream technical discussions. Raise potential complex WSP and waste management issues for discussion and resolution.*

5.4 Procedure Review

The Waste Characterization and Processing Review may be invoked for procedure review when waste generators choose to operate to additional local-level procedures for waste management activities; to satisfy P409 *LANL Waste Management* requirements; and to review and propose processes that facilitate Waste Generator compliance by engaging SMEs in the planning stage for all waste and potential waste streams.

Action: *Participate in reviews as assigned and provide comments for compliance issues and best waste management practices. Raise potential complex compliance and waste management issues for discussion and resolution.*

5.5 Subcommittee Recommendations

As issues are raised for Waste Characterization and Processing Review, the participants will assess the priority levels. For the highest priorities, subcommittees will be established with representation of applicable SMEs. The subcommittees will work in parallel to explore their assigned issues, suggest recommendations, and present their findings at Waste Characterization and Processing Review meetings.

As subcommittees investigate issues and propose recommendations, the points of consideration should include following:

- Impact to compliance;
- Impact to the waste generator;
- Resources necessary to implement the suggestions (staff, funding, system changes (for example WCATS), and others);
- Venues for dissemination of pertinent information to affected and potentially affected LANL and subcontract workers and managers;
- Sustainability of the recommendation; and

- Impact to the treatment or storage facility

Action: *Lead and participate on subcommittees to address highest priority Waste Characterization and Processing Review issues, explore options, develop recommendations, and present findings at Waste Characterization and Processing Review meetings.*

5.6 Waste Characterization and Processing Review Processes

Over time the Waste Characterization and Processing Review will mature and the work processes will evolve. Participants will be called upon to enhance the review processes and ensure their effectiveness and sustainability.

Action: *Lead and participate on subcommittees to define highest priority Waste Characterization and Processing Review processes, explore options, develop recommendations, and present findings at Waste Characterization and Processing Review meetings.*

5.7 Decision Making

As complex waste management and processing issues are thoroughly explored, participants will be encouraged to maintain questioning attitudes, participate in open dialog, listen respectfully, and work toward consensus for compliant, safe, and technically sound paths forward. Should consensus not be reached in a timely fashion, the issues will be assigned to a subcommittee for further evaluation. The subcommittee will then present resolution and recommendations as applicable. Conflicting or dissenting comments that cannot be resolved by the subcommittee will be presented to the WM Division Leader for resolution. Comment resolution and recommendations will be documented.

Issues and their resolution will be communicated to the affected and potentially affected LANL and subcontract workers and managers using established LANL communication venues (e.g. policies, procedures, training, Lessons Learned, WCATS webpage announcements). The formal process for communicating environmental matters with interested parties external and internal to LANL is documented in P402, *Environmental Communication Procedure*.

Actions: [1]**Enable the Mission AND protect the Laboratory** by maintaining questioning attitudes, speaking openly, listening respectfully, and working toward compliant, safe, and technically sound paths forward for complex waste management and processing issues.

Communicate issues and their resolution to affected and potentially affected LANL and subcontract workers and Managers.

[1] Craig Leasure, PADOPS-all-employee email, June 29, 2015.

6.0 DEFINITIONS AND ACRONYMS

6.1 Definitions

Communication System is the variety of methods (including meetings, website content availability, email and outlook notifications, discussions, etc.) that allow multiple SMEs to engage in complex and informed decision making processes.

Complex waste management and/or processing issues are those best resolved with multi-discipline SMEs from within and potentially external to LANL for a comprehensive and thorough evaluation and safe and compliant resolution. The process is engaged for exploration of options, development of recommendations and presentation of findings to ensure safe and compliant resolution of the complex issues. Characterization of wastes for corrosivity and the application of D002 RCRA codes is an example of a complex waste management issue being addressed by the Waste Characterization and Processing Review.

Waste Characterization and Processing Review is the process acknowledged and adopted by Waste Management Division for the review and resolution of complex technical waste issues.

6.2 Acronyms

ACO	Administrative Compliance Order
ADEM	Associate Directorate of Environmental Management
ADESH	Associate Directorate of Environment, Safety, and Health
AK	Acceptable Knowledge
CCP	Central Characterization Project
DOE	Department of Energy
DOT	Department of Transportation
EPC	Environmental Protection and Compliance
LANL	Los Alamos National Laboratory
LLW	Low-Level Waste
MLLW	Mixed Low-Level Waste
NMED	New Mexico Environment Department
NNSA	National Nuclear Security Administration
RCRA	Resource Conservation and Recovery Act
SME	Subject Matter Expert
STR	Subcontractor Technical Representative
TRU	Transuranic
TSD	Treatment, Storage, and Disposal
WCATS	Waste Compliance and Tracking System
WM	Waste Management
WSP	Waste Stream Profile

7.0 RECORDS

Records generated by this document will be posted on the designated website and provided and accessible to the Operations Integration Office (OIO) Records Management team for document management in accordance with P1020-1, *Laboratory Records Management* and with the ADESH-AP-006, *Records Management Plan*.

Records include the following:

- meeting minutes
- meeting attendance logs

- subcommittee recommendations

8.0 REFERENCES

- ADESH-AP-006, *Records Management Plan*
- P402, *Environmental Communication Procedure*
- P409, *LANL Waste Management*
- P850, *Subcontract Technical Representative Procedure*
- P1020-1, *Laboratory Records Management*
- MAN-5004, *WCATS User's Manual*
- 2010 LANL Hazardous Waste Facility Permit
- DESH-AP-TOOL-111, *Waste Characterization*
- DOE Order 435.1, *Radioactive Waste Management*

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Environment, Safety, Health Directorate

Instruction Guideline

Waste Management Glossary

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Name:	Organization:	Signature:	Date:
Gian Bacigalupa	ENV-CP	Signature on File	12-10-2015

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WASTE MANAGEMENT GLOSSARY

absorb: Take in or soak up by chemical or physical action.

absorption: The process or action by which one thing absorbs or is absorbed by another.

acceptable knowledge (AK): A waste stream characterization method that can be used to meet all or part of the waste analysis requirements appropriate for the waste media. The method may include documented process knowledge (PK) (i.e. knowledge of process; KOP), additional characterization data, and/or facility records of analysis (EPA, 1994A).

accumulated speculatively: When a material is accumulated before being recycled. A material is not accumulated speculatively, however, if the person accumulating it can show that the material is potentially recyclable and has a feasible means of being recycled; and that during the calendar year (commencing on January 1), the amount of material that is recycled, or transferred to a different site for recycling, equals at least 75 percent by weight or volume of the amount of the material accumulated at the beginning of the period. In calculating the percentage of turnover, the 75 percent requirement is to be applied to each material of the same type (e.g., slags from a single smelting process) that is recycled in the same way (i.e., from which the same material is recovered or that is used in the same way). Materials accumulating in units that would be exempt from regulation under 40 CFR §261.4(c) are not to be included in making the calculation. (Materials that are already defined as solid wastes also are not to be included in making the calculation.) Materials are no longer in this category once they are removed from accumulation for recycling.

active portion: That portion of a facility where treatment, storage, or disposal operations are being or have been conducted after the effective date (09/21/1984) of 40 CFR 261 and which is not a closed portion as defined in 40 CFR §260.10.

acute hazardous waste: Discarded commercial chemical products, manufacturing chemical intermediates, off-specification commercial chemical products, or technical grades of the chemical that are identified in 40 CFR §261.33(e) as acute hazardous waste or hazardous wastes with a hazard code of “P”, or meet the definition in 40 CFR §261.11(1)(2) or any of the following "F" codes: F020, F021, F022, F023, F026, and F027 identified in 40 CFR §261.31(a). These wastes are subject to stringent quantity standards for accumulation and generation.

administratively controlled waste: Waste that is nonhazardous and nonradioactive that may not be disposed of at a commercial or municipal solid waste landfill. This includes, but is not limited to, classified waste, sensitive waste, certain New Mexico Special Wastes, and empty containers greater than 30 gallons.

adsorb (of a solid): To hold (molecules of a gas or liquid or solute) as a thin film on the outside surface or on internal surfaces within the material.

adsorption: The adhesion of atoms, ions, or molecules from a gas, liquid, or dissolved solid to a surface. This process creates a film of the adsorbate on the surface of the adsorbent.

ampule: An airtight vial made of glass, plastic, metal, or any combination of these materials.

ancillary equipment: Any device including, but not limited to, such devices as piping, fittings, flanges, valves, and pumps, that is used to distribute, meter, or control the flow of hazardous waste from its point of generation to a storage or treatment tank(s), between hazardous waste storage and treatment tanks to a point of disposal onsite, or to a point of shipment for disposal off-site.

aquifer: A geologic formation, group of formations, or part of a formation capable of yielding a significant amount of groundwater to wells or springs.

area of concern (AOC): Any area that may have had a release of hazardous waste or hazardous constituents, which is not from a solid waste management unit.

As Low As Reasonably Achievable (ALARA): An approach to radiological control to manage and control exposures (individual and collective) to the work force and to the general public at levels that are as low as is reasonable, taking into account social, technical, economic, practical, and public policy considerations.

asbestos containing material, regulated (RACM): RACM that contains more than 1% asbestos as determined using the method specified in the Code of Federal Regulations (CFR), Title 40, Appendix A, Part 763, Section 1, Polarized Light Microscopy (PLM) and includes:

- **asbestos waste:** Waste that contains more than 1% of any of the following naturally occurring crystalline minerals: chrysotile, amosite, crocidolite, tremolite, actinolite, and anthrophyllite; may be friable or non-friable.
- **friable asbestos material:** Any material containing more than 1 percent asbestos, that, when dry, can be crumbled, pulverized, or reduced to powder by hand pressure;
- **category I non-friable asbestos containing material:** Asbestos containing packings, gaskets, resilient floor covering, and asphalt roofing products containing more than 1 percent asbestos;
- **category II non-friable asbestos containing material:** Any material, excluding category I non-friable asbestos containing material, containing more than one percent asbestos, that, when dry, cannot be crumbled, pulverized , or reduced to powder by hand; and
- **regulated asbestos waste:** Friable asbestos material; category I non-friable asbestos containing material that has become friable; category I non-friable asbestos containing material that will be or has been subjected to sanding, grinding, cutting or abrading; or category II non-friable asbestos containing material that has a high probability of becoming or has become broken, crumbled, pulverized, or reduced to powder by the forces expected to act on the material in the course of excavation, renovation, demolition, storage, transportation, or while exposed during disposal operations.

ash: Ash that results from the incineration or transformation of solid waste and includes both fly ash and bottom ash, and ash from the incineration of densified-refuse-derived fuel and refuse-

derived fuel, but does not include fly ash waste, bottom ash waste, slag waste and flue gas emission control waste generated primarily from the combustion of coal or other fossil fuels and wastes produced in conjunction with the combustion of fossil fuels that are necessarily associated with the production of energy and that traditionally have been and actually are mixed with and are disposed of or treated at the same time with fly ash, bottom ash, boiler slag or flue gas emission control wastes from coal combustion.

assessment: When used as a quality assurance term for the purposes of this document, P409, and other tools associated with P409, includes audits, surveillances, and inspections.

- **audit/evaluation**: A planned, documented activity performed to determine by investigation, examination, or evaluation of objective evidence the adequacy of and compliance with established procedures, instructions, drawings, and other applicable documents, and the effectiveness of implementation.
- **inspection:** An assessment of waste-related items, e.g. containers, labels, tags, waste areas, documents.
- **surveillance:** An assessment of waste-related activities, e.g. waste accumulation, placement in containers, container movement. Surveillance may also include systems and items when these are involved in the activity being surveilled.

Atomic Energy Act (AEA) of 1954: United States federal law that covers the laws for the development, regulation, and disposal of nuclear materials and facilities in the United States. It made it possible for the government to allow private companies to gain technical information (Restricted Data) about nuclear energy production and the production of fissile materials, allowing for greater exchange of information with foreign nations, and reversed certain provisions in the 1946 law which had made it impossible to patent processes for generating nuclear energy or fissile materials.

battery: A device consisting of one or more electrically connected electrochemical cells which is designed to receive, store, and deliver electric energy. An electrochemical cell is a system consisting of an anode, cathode, and an electrolyte, plus such connections (electrical and mechanical) as may be needed to allow the cell to deliver or receive electrical energy. The term battery also includes an intact, unbroken battery from which the electrolyte has been removed.

Biennial Report: A report (Form 8700-13A/B), per Section 3002(a)(6) of the Resource Conservation and Recovery Act (RCRA), submitted by generators of hazardous waste, which is due March 1 of even numbered years. The report includes the nature, quantities, and disposition of hazardous waste generated by the activities during the previous calendar year. In addition, section 3004(a)(2) of RCRA requires treatment, storage and disposal facilities (TSDFs) to submit a report on the wastes that they receive from off-site. The form includes information such as the facility's EPA ID number, the name and address of the facility, the quantity of hazardous waste sent to each TSDF in the U.S. and the manner in which the waste was treated during the previous year.

by-product: A material that is not one of the primary products of a production process and is not solely or separately produced by the production process. Examples are process residues such as slags or distillation column bottoms. The term does not include a co-product that is produced for the general public's use and is ordinarily used in the form it is produced by the process.

capacitor: A device for accumulating and holding an electric charge and consisting of conducting surfaces separated by a dielectric.

- **large, high voltage capacitor:** a capacitor that contains 1.36 kg (3 lb) or more of dielectric fluid and which operates at 2,000 volts (ac or dc) or higher.
- **large, low voltage capacitor:** a capacitor that contains 1.36 kg (3 lb) or more of dielectric fluid and which operates below 2,000 volts (ac or dc).
- **small capacitor:** a capacitor that contains less than 1.36 kg (3 lb) of dielectric fluid.

cathode ray tube (CRT): A vacuum tube, composed primarily of glass, which is the visual or video display component of an electronic device. A used, intact CRT means a CRT whose vacuum has not been released. A used, broken CRT means glass removed from its housing or casing whose vacuum has been released.

characteristic hazardous waste: Wastes characterized in any one of the four categories used in defining hazardous waste: ignitability, corrosivity, reactivity, and toxicity.

characterization: The determination of a waste's physical, chemical, and radiological characteristics with sufficient accuracy to permit proper segregation, treatment, storage, and disposal according to the final treatment, storage, or disposal facility's (TSDF's) waste acceptance criteria (WAC).

chelating agent: Any of the amine polycarboxylic acids (e.g., EDTA, DTPA), hydroxycarboxylic acids, and polycarboxylic acids (e.g. citric acid, carbolic acid, and glucinic acid). (10 CFR §61.2)

chemical compatibility: A measure of how stable a substance is when mixed with another substance. If substances mix and do not change they are considered compatible. If substances mix and change or do not mix at all they are considered incompatible.

Class C Waste: Low-level waste that must meet rigorous waste form and stability requirements specified in 10 CFR 61 for land disposal and also requires additional measures to ensure the protection of inadvertent intruders.

classified waste: Classified matter determined by a generating group to be a waste that may include, but is not limited to, documents, film, parts or assemblies, safe or vault locking devices, computer tape, degaussed magnetic tape, metal parts, or classified shapes.

clean fill: Broken concrete, brick, rock, stone, glass, reclaimed asphalt pavement, or uncontaminated soil generated from construction and demolition activities. Reinforcement materials, which are an integral part of the fill, such as rebar, are included. Clean fill must not contain other solid waste or hazardous waste. Some construction and demolition debris may be considered clean fill, provided waste documentation exists, such as documented process knowledge, acceptable knowledge, or an approved Waste Stream Profile (WSP).

closed portion: That portion of a facility which an owner or operator has closed in accordance with the approved facility closure plan and all applicable closure requirements.

commercial hauler: A person transporting solid waste for hire by whatever means for the purpose of transfer, processing, storing, or disposing of the solid waste in a solid waste facility, except that

the term does not include an individual transporting solid waste generated on or from his residential premises for the purpose of disposing of it in a solid waste facility.

commercial solid waste: Includes all types of solid waste generated by stores, offices, restaurants, warehouses, and other nonmanufacturing activities, excluding residential, household, and industrial wastes. These wastes may be disposed at commercial or municipal solid waste facilities.

compactible waste: Materials that are capable of undergoing volume reduction, such as paper, plastic, and glass.

compatibility: Hazardous/mixed waste can be safely mixed with sorbent material and may not result in any of the following potential reactions: heat generation, fire or explosion, gas and flammable gas generation, fume or flammable fume generation, toxic dusts or mists, or corrosion or decay of the container, including the inner liner.

compressed gas – non liquefied: A gas, which when packaged under pressure for transportation is entirely gaseous at −50°C (−58°F) with a critical temperature less than or equal to −50°C (−58°F), is considered to be a non-liquefied compressed gas.

compressed gas – liquefied: A gas, which when packaged under pressure for transportation is partially liquid at temperatures above −50°C (−58°F), is considered to be a liquefied compressed gas. A liquefied compressed gas is further categorized as follows:

- *High pressure liquefied gas* which is a gas with a critical temperature between −50°C (−58°F) and + 65°C (149°F), and
- *Low pressure liquefied gas* which is a gas with a critical temperature above + 65°C (149°F).
- *Compressed gas in solution.* A *compressed gas in solution* is a non-liquefied compressed gas which is dissolved in a solvent.

Consent Order: The March 1, 2005 Compliance Order on Consent issued to the Permittees pursuant to the New Mexico Hazardous Waste Act (HWA) and the New Mexico Solid Waste Act requiring the Permittees to conduct Facility-wide investigations and cleanups of contaminants released to the environment.

construction and demolition debris: Materials generally considered to be not water soluble and nonhazardous in nature including, but not limited to, steel, glass, brick, concrete, asphalt roofing materials, pipe, gypsum wallboard, lumber and other materials discarded during the construction or destruction of a structure or project. It also includes rocks, soil, tree remains, trees, and other vegetative matter that normally results from land clearing.

corrosivity (D002): A solid waste exhibits the characteristic of corrosivity if it is: (1) aqueous and has a pH of less than or equal to 2 or greater than or equal to 12.5 as determined by a pH meter using Method 9040C in “Test Methods for Evaluating Solid Waste, Physical/Chemical Methods” (SW-846), or (2) it is a liquid and corrodes steel (SAE 1020) at a rate greater than 6.35mm (0.250 inch) per year at a test temperature of 55 C (130 F) as determined by Method 1110A in SW-846.

contact-handled radioactive waste: Packaged waste with an external surface dose rate not exceeding 200 mrem/hr.

container: Any portable device in which a material is stored, transported, treated, disposed of, or otherwise handled.

containment building: A hazardous waste management unit that is used to store or treat hazardous waste under the provisions of subpart DD of 40 CFR 264 or 40 CFR 265.

contingency plan: A document setting out an organized, planned, and coordinated course of action to be followed in case of a fire, explosion, or release of hazardous waste or hazardous waste constituents which could threaten human health or the environment.

Corrective Action Management Unit (CAMU): An area within a facility that is designated by the Regional Administrator under 40 CFR 264 subpart S, for the purpose of implementing corrective action requirements under 40 CFR §264.101 and RCRA section 3008(h). A CAMU shall only be used for the management of remediation wastes pursuant to implementing such corrective action requirements at the facility.

debris: Solid material exceeding a 60 mm particle size that is intended for disposal and that is: A manufactured object; or plant or animal matter; or natural geologic material. However, the following materials are not debris: any material for which a specific treatment standard is provided in Subpart D, 40 CFR 268, namely lead acid batteries, cadmium batteries, and radioactive lead solids; process residuals such as smelter slag and residues from the treatment of waste, wastewater, sludges, or air emission residues; and intact containers of hazardous waste that are not ruptured and that retain at least 75% of their original volume. A mixture of debris that has not been treated to the standards provided by 40 CFR §268.45 and other material is subject to regulation as debris if the mixture is comprised primarily of debris, by volume, based on visual inspection.

decommissioning: The permanent removal from service of surface facilities or equipment.

decontamination: The removal of unwanted material (e.g., radioactive material) from personnel, equipment, or areas.

Department: The New Mexico Environment Department and any successor and predecessor agencies.

discharge: Spilling, leaking, pumping, pouring, emitting, emptying, or dumping into water or in a location and manner where there is a reasonable probability that the discharged substance will reach surface or subsurface water. Discharges may be accidental or intentional.

disposal: The discharge, deposit, injection, dumping, spilling, leaking, or placing of any solid waste or hazardous waste into or on any land or water so that such solid waste or hazardous waste or any constituent thereof may enter the environment or be emitted into the air or discharged into any waters, including groundwaters.

disposal unit: Any unit at which hazardous waste is intentionally placed into or on any land or water and at which waste will remain after closure. The term disposal unit does not include corrective action management units into which remediation wastes are placed.

electronic waste (E-Waste): A term loosely applied to consumer and business electronic equipment that is near or at the end of its useful life. It includes, computers, computer peripherals, telephones, answering machines, radios, stereo equipment, tape players/recorders, phonographs,

video cassette players/recorders, compact disc players/recorders, calculators, and some appliances. Certain components of some electronic products contain materials that render them hazardous, depending on their condition and density.

elementary neutralization: Neutralizing (treatment) hazardous/mixed waste bearing ONLY the characteristic of corrosivity per 40 CFR §262.22 (i.e., it bears the D002 EPA Hazardous Waste Number only) and neutralization must occur in a tank, tank system, container, transport vehicle or vessel (as defined in 40 CFR §260.10).

elementary neutralization unit: A device which:

- Is used for neutralizing wastes that are hazardous only because they exhibit the corrosivity characteristic defined in 40 CFR §261.22, or they are listed in subpart D of 40 CFR 261 only for this reason; and
- Meets the definition of tank, tank system, container, transport vehicle, or vessel as defined in 40 CFR §260.10.

Eligible Naturally Occurring and/or Accelerator produced Radioactive Material (NARM): NARM that is eligible for the Transportation and Disposal Conditional Exemption. It is a NARM waste that contains RCRA hazardous waste, meets the waste acceptance criteria of, and is allowed by State NARM regulations to be disposed of at a low-level radioactive waste disposal facility (LLRWDF) licensed in accordance with 10 CFR 61 or NRC Agreement State equivalent regulations.

environmental restoration: A term used by the DOE to describe cleanup of DOE facilities and lands.

EPA hazardous waste number: As defined by regulations promulgated under the RCRA and New Mexico HWA, the number assigned by the Environmental Protection Agency (EPA) to each type of hazardous waste listed in 40 CFR 261, Subparts C and D.

EPA identification number: The number assigned by EPA to each generator, transporter, and treatment, storage, or disposal facility.

Exception Report: A report that must be submitted to EPA by generators who send their waste off-site, if they fail to receive a copy of the manifest, signed and dated by the TSD facility within 45 days of the date the initial transported accepted the waste if they are a large quantity generator or within 60 days if they are a small quantity generator.

facility:

- All contiguous land, and structures, other appurtenances, and improvements on the land, used for treating, storing, or disposing of hazardous waste, or for managing hazardous secondary materials prior to reclamation. A facility may consist of several treatment, storage, or disposal operational units (e.g., one or more landfills, surface impoundments, or combinations of them).
- For the purpose of implementing corrective action under 40 CFR §264.101 or §267.101, all contiguous property under the control of the owner or operator seeking a permit under Subtitle C of RCRA. This definition also applies to facilities implementing corrective action under RCRA Section 3008(h).

- Notwithstanding the above paragraph of this definition, a remediation waste management site is not a facility that is subject to 40 CFR §264.101, but is subject to corrective action requirements if the site is located within such a facility.
- Per LANL permit: The Los Alamos National Laboratory site comprised of approximately 40 square miles, located on the Pajarito Plateau in Los Alamos County in north central New Mexico, approximately 60 miles north-northeast of Albuquerque and 25 miles northwest of Santa Fe, and owned by the United States Department of Energy.

Federal Facility Compliance Act (FFCA): The law passed by Congress (Pub. L. 102-386 (1992), codified at 42 U.S.C. §§ 6903, 6924, 6927, 6939c, 6961, and 6965) that specifies that federal facilities, like the Facility, are subject to all civil and administrative penalties and fines, regardless of whether such penalties or fines are punitive or coercive in nature. These penalties and fines may be levied by the EPA, an authorized state such as New Mexico, or a court of competent jurisdiction. Further, it is the FFCA that requires federal facilities that generate or store mixed waste to submit a Site Treatment Plan (STP) for developing treatment capacities and

technologies to treat all the facility's mixed waste to the standards required for waste subject to the land disposal prohibitions set forth in § 3004 of RCRA, regardless of the time the waste was generated.

Federal Facility Compliance Order (FFCO): The Order dated October 4, 1995 issued by the Department to the Permittees requiring compliance with a Site Treatment Plan (STP) to provide for the treatment and off-site disposal of mixed wastes. It also exempts such wastes from the mandated regulatory one-year storage limitation.

FIFRA: The Federal Insecticide, Fungicide, and Rodenticide Act (7 U.S.C. 136-136y).

fissile gram equivalent (FGE): The amount of fissile material that yields the same number of fission events as a gram of Pu-239.

fissile isotope: An isotope capable of undergoing fission by interacting with a slow neutron.

fissionable isotope: An isotope capable of undergoing fission by any process.

fluorescent light ballast: A device that electrically controls fluorescent light fixtures and includes a capacitor containing 0.1 kg or less of dielectric fluid.

free liquids: Liquids which readily separate from the solid portion of a waste under ambient temperature and pressure.

functionally equivalent component: A component which performs the same function or measurement and which meets or exceeds the performance specifications of another component.

general storage area: A PCB storage area that meets specific record-keeping and construction requirements, including secondary containment, for up to 90-day, on-site storage of PCB waste.

generator: Any person, by site, whose act or process produces hazardous waste identified or listed in 40 CFR 261 or whose act first causes a hazardous waste to become subject to regulation.

groundwater: Water below the land surface in a zone of saturation.

hazardous debris: Debris that contains a hazardous waste listed in subpart D of 40 CFR 261, or

that exhibits a characteristic of hazardous waste identified in subpart C of 40 CFR 261. Any deliberate mixing of prohibited hazardous waste with debris that changes its treatment classification (i.e., from waste to hazardous debris) is not allowed under the dilution prohibition in 40 CFR §268.3.

hazardous secondary material: A secondary material (e.g., spent material, by-product, or sludge) that, when discarded, would be identified as hazardous waste under 40 CFR 261.

hazardous secondary material generator: Any person whose act or process produces hazardous secondary materials at the generating facility. **Generating facility** means all contiguous property owned, leased, or otherwise controlled by the hazardous secondary material generator.

hazardous waste: A solid waste that is: 1) not excluded from regulation under 40 CFR §261.4(b); and 2) is either listed in 40 CFR 261, Subpart D, exhibits any of the characteristics identified in 40 CFR 261, Subpart C, or is a mixture of solid waste and one or more hazardous wastes listed in 40 CFR 261, Subpart D.

For purposes of corrective action, **"hazardous waste"** shall have the meaning set forth in the HWA, Section 74-4-3(K).

Hazardous waste may be a "**mixed waste**," which means it is waste that contains hazardous waste subject to the HWA and RCRA, and source, special nuclear, or byproduct material subject to the Atomic Energy Act, 42 USC § 2011, *et seq.*

hazardous waste constituent or hazardous constituent: means: 1) any constituent identified in 40 CFR 261 Appendix VII that caused EPA to list a hazardous waste in 40 CFR 261 Subpart D; or 2) any constituent identified in 40 CFR 261, Appendix VIII. For purposes of closure, post-closure, or corrective action, "hazardous constituent" and "hazardous waste constituent" also means any constituent identified in 40 CFR 264 Appendix IX, perchlorate, and nitrates.

hazardous waste determination: Method generators must undertake to determine if their solid waste is hazardous waste using the following method:

- Determine if the waste is excluded from regulation under 40 CFR §261.4.
- Determine if the waste is listed as a hazardous waste in subpart D of 40 CFR 261.11
- For purposes of compliance with 40 CFR 268, or if the waste is not listed in subpart D of 40 CFR 261, the generator must then determine whether the waste is identified in subpart C of 40 CFR 261 by either:
- Testing the waste according to the methods set forth in subpart C of 40 CFR 261, or according to an equivalent method approved by the Administrator under 40 CFR §260.21; or
- Applying knowledge of the hazard characteristic of the waste in light of the materials or the processes used.

hazardous waste management: The systematic control of the collection, source separation, storage, transportation, processing, treatment, recovery, and disposal of hazardous waste.

Hazardous Waste Management Unit: A contiguous area of land on or in which hazardous waste is placed, or the largest area in which there is significant likelihood of mixing hazardous waste

constituents in the same area. A container alone does not constitute a unit; the unit includes containers and the land or pad upon which they are placed. At the Facility, hazardous waste management units include both permitted units and interim status units.

Hazardous Waste Operations and Emergency Response (HAZWOPER): Training provided to personnel who participate in

- Clean-up operations conducted at uncontrolled hazardous waste sites;
- Corrective actions involving clean-up operations at sites covered by the Resource Conservation and Recovery Act of 1976 (RCRA) as amended (42 U.S.C. 6901 et seq.);
- Voluntary clean-up operations at sites recognized by federal, state, local, or other governmental body as uncontrolled hazardous waste sites;
- Operations involving hazardous wastes that are conducted at treatment, storage, and disposal facilities regulated by Title 40 Code of Federal Regulations Parts 264 and 265 pursuant to RCRA, or by agencies under agreement with U.S. Environmental Protection Agency to implement RCRA regulations; or
- Emergency response operations for releases of or substantial threats of releases of hazardous substances regardless of the location of the hazard.

high explosive (HE) waste: Any waste containing material having an amount of stored chemical energy that starts a violent reaction when initiated by impact, spark, or heat. This violent reaction is accompanied by a strong shock wave and the potential for propelling high- velocity particles.

high-level waste (HLW): The highly radioactive waste material resulting from the reprocessing of spent nuclear fuel, including liquid waste produced directly in reprocessing and any solid material derived from such liquid waste that contains fission products in sufficient concentrations, and other highly radioactive material that is determined, consistent with existing law, to require permanent isolation.

incompatible waste: means a hazardous waste which is unsuitable for:

- Placement in a particular device or facility because it may cause corrosion or decay of containment materials (e.g., container inner liners or tank walls); or
- Commingling with another waste or material under uncontrolled conditions because the commingling might produce heat or pressure, fire or explosion, violent reaction, toxic dusts, mists, fumes, or gases, or flammable fumes or gases.

industrial solid waste: Solid waste generated by manufacturing or industrial processes that is not hazardous waste regulated under Subtitle C of RCRA. Such waste may include, but is not limited to, waste resulting from the following processes: electric power generation; fertilizer/agricultural chemicals; food and related products/by-products; inorganic chemicals; iron and steel manufacturing; leather and leather products; nonferrous metals manufacturing/foundries; organic chemicals, plastics and resins manufacturing; pulp and paper industry; rubber and miscellaneous plastic products; stone, glass, clay, and concrete products; textile manufacturing; transportation equipment, and water treatment. This term does not include mining waste or commercial solid waste.

industrial wastewater: Includes radioactive waste, chemical waste, high explosives waste, and other industrial waste that is not acceptable for discharge into the SWWS Plant.

infectious materials:

- The following human body fluids: semen, vaginal secretions, cerebrospinal fluid, synovial fluid, pleural fluid, pericardial fluid, peritoneal fluid, amniotic fluid, saliva (in dental procedures), any body fluid that is visibly contaminated with blood, and all body fluids in situations where it is difficult or impossible to differentiate between body fluids; or other potentially infectious material that may result from the performance of the employee's duties
- Any unfixed tissue or organ (other than intact skin) from a human, either living or dead
- HIV-containing cell or tissue cultures, organ cultures, and HIV- or HBV-containing culture medium or other solutions; and blood, organs, or other tissues from experimental animals infected with HIV or HBV

infectious waste: A limited class of substances that carry a ***probable risk of transmitting disease to humans,*** including but not limited to:

- Microbiological laboratory wastes including cultures and stocks of infectious agents from clinical research and industrial laboratories and disposable culture dishes and devices used to transfer, inoculate, and mix cultures
- Pathological wastes including human or animal tissues, organs, and body parts removed during surgery, autopsy, or biopsy
- Disposable equipment, instruments, utensils, and other disposable materials that require special precautions because of contamination by highly contagious diseases
- Human blood and blood products including waste blood, blood serum, and plasma
- Used sharps including used hypodermic needles, syringes, scalpel blades, Pasteur pipettes, and broken glass
- Contaminated animal carcasses, body parts, and bedding, especially those intentionally exposed to pathogens in research, in the production of biologicals or the "in vivo" testing of pharmaceuticals

inner liner: A continuous layer of material placed inside a tank or container which protects the construction materials of the tank or container from the contained waste or reagents used to treat the waste.

Interim Status Unit: Any hazardous waste management unit that was in operation before the effective date of the statutory or regulatory amendments that caused the unit to become subject to permitting requirements, that meets the requirements for interim status under § 3005(e) of RCRA, 42 U.S.C. § 6925(e), for which interim status has not been terminated pursuant to section 3005(e)(2) of RCRA, 42 U.S.C. § 6925(e)(2), and that has not been issued a permit by EPA or the Department.

investigation-derived waste (IDW): Waste generated from environmental restoration and monitoring or decontamination and demolition, including potentially contaminated soil, environmental samples, monitoring-well-produced water, rubble, and other construction debris.

knowledge of process (KOP): See "process knowledge (PK)"

lamp, also referred to as "universal waste lamp": The bulb or tube portion of an electric lighting device. A lamp is specifically designed to produce radiant energy, most often in the ultraviolet, visible, and infra-red regions of the electromagnetic spectrum. Examples of common universal waste electric lamps include, but are not limited to, fluorescent, high intensity discharge, neon, mercury vapor, high pressure sodium, incandescent and metal halide lamps.

land disposal: Placement of waste in or on the land, except in a corrective action management unit or staging pile, and includes without limitation, placement in a landfill such as a pit or a trench, surface impoundment, waste pile, or land treatment facility, or placement in a concrete vault or a shaft intended for disposal purposes.

Land Disposal Restriction (LDR) Treatment Standards: Treatment standards, under 40 CFR 268, that a RCRA hazardous waste must meet before it can be disposed of in a RCRA hazardous waste land disposal unit.

landfill: A disposal facility or part of a facility where hazardous waste is placed in or on land and which is not a pile, a land treatment facility, a surface impoundment, an underground injection well, a salt dome formation, a salt bed formation, an underground mine, a cave, or a corrective action management unit.

Large Quantity Handler of Universal Waste: A universal waste handler (as defined in this section) who accumulates 5,000 kilograms or more total of universal waste (batteries, pesticides, mercury-containing equipment, or lamps, calculated collectively) at any time. This designation as a large quantity handler of universal waste is retained through the end of the calendar year in which the 5,000 kilogram limit is met or exceeded.

less than 90-day (<90-day) accumulation area: A designated space for accumulating hazardous or mixed waste in containers or tanks; the waste may not remain in the accumulation area longer than 90 days.

liquid waste: A waste material that is determined to contain free liquids, defined by the Paint Filter Test, described in "Test Methods for Evaluating Solid Waste" (Subsection C of NMAC 9.8.11).

listed hazardous waste: Wastes listed as hazardous under RCRA but which have not been subjected to the Toxic Characteristics Listings Process because the dangers they present are considered self-evident.

low-level radioactive waste (LLW): Radioactive waste that is not high- level waste, spent nuclear fuel, transuranic waste, byproduct material (as defined in section 11e.(2) of the Atomic Energy Act of 1954, as amended), or naturally occurring radioactive material.

major radionuclides: Radionuclides that are listed in a facility's WAC and that will be reported with specified accuracy when characterizing radioactive waste because they are important to that facility's performance assessment and/or safety analysis report.

manifest: The shipping document EPA Form 8700-22 (including, if necessary, EPA Form 8700-22A), or the electronic manifest, originated and signed in accordance with the applicable requirements of 40 CFR 262 through 265.

manifest tracking number: The alphanumeric identification number (*i.e.*, a unique three letter suffix preceded by nine numerical digits), which is pre-printed in Item 4 of the Manifest by a registered source.

mercury-containing equipment: A device or part of a device (including thermostats, but excluding batteries and lamps) that contains elemental mercury integral to its function.

military munitions: All ammunition products and components produced or used by or for the U.S. Department of Defense or the U.S. Armed Services for national defense and security, including military munitions under the control of the Department of Defense, the U.S. Coast Guard, the U.S. Department of Energy (DOE), and National Guard personnel. The term military munitions includes: confined gaseous, liquid, and solid propellants, explosives, pyrotechnics, chemical and riot control agents, smokes, and incendiaries used by DOD components, including bulk explosives and chemical warfare agents, chemical munitions, rockets, guided and ballistic missiles, bombs, warheads, mortar rounds, artillery ammunition, small arms ammunition, grenades, mines, torpedoes, depth charges, cluster munitions and dispensers, demolition charges, and devices and components thereof. Military munitions do not include wholly inert items, improvised explosive devices, and nuclear weapons, nuclear devices, and nuclear components thereof. However, the term does include non-nuclear components of nuclear devices, managed under DOE's nuclear weapons program after all required sanitization operations under the Atomic Energy Act of 1954, as amended, have been completed.

mixed waste: Any waste containing hazardous waste and source, special nuclear, or by-product materials subject to the Atomic Energy Act of 1954. The use of the generic term “mixed waste” shall refer to both mixed LLW waste and mixed TRU waste.

municipal solid waste: Household solid waste, commercial solid waste, and industrial solid waste or petroleum contaminated soils that are not a special waste.

municipal solid waste landfill: A solid waste facility that receives household waste and may also receive commercial solid waste, industrial solid waste, and construction and demolition debris, depending upon its permit.

Naturally Occurring and/or Accelerator-produced Radioactive Material (NARM): Radioactive materials that:

- Are naturally occurring and are not source, special nuclear, or byproduct materials (as defined by the AEA or
- Are produced by an accelerator. NARM is regulated by the States under State law, or by DOE (as authorized by the AEA) under DOE orders.

New Mexico Special Waste: The following types of Solid waste have unique handling, transportation, or disposal requirements to assure protection of the environment, public health, welfare, and safety: treated formerly characteristic hazardous waste; packing house and killing plant offal; asbestos waste; ash; infectious waste; sludge, except compost that meets the

provisions of 40 CFR §503; industrial Solid waste; spill of a chemical substance or commercial product; dry chemicals that when wetted become characteristically hazardous; and petroleum-contaminated soils.

newly-generated TRU waste: Waste generated after the development, approval, and implementation of a transuranic (TRU) waste characterization program that meets the requirements outlined in the Transuranic Waste Characterization Quality Assurance Program Plan. Newly generated TRU waste also includes any previously generated waste (retrievable stored waste) that undergoes any form of treatment, processing, or repackaging in accordance with the LANL Quality Assurance Project Plan.

no free liquids: Solvent-contaminated wipes may not contain free liquids as determined by Method 9095B (Paint Filter Liquids Test), included in "Test Methods for Evaluating Solid Waste, Physical/Chemical Methods" (EPA Publication SW-846), which is incorporated by reference, and that there is no free liquid in the container holding the wipes. No free liquids may also be determined using another standard or test method as defined by an authorized state.

no-known-owner waste: Sometimes designated as "orphan waste," this is any material or waste with an unknown origin, history, generator, or process that does not have a defined owner.

non-compactible waste: Materials not capable of being compacted or undergoing volume reduction, such as solid metal materials with minimum void space and metal bricks.

nonhazardous waste: Any waste that is not regulated as a hazardous waste by RCRA/HSWA but that may present a threat to human health or the environment and requires special administrative controls.

noninfectious biological waste: A biological waste that cannot be classified as an infectious substance or a regulated medical waste and is not subject to federal or state regulations on infectious waste, is not classified as an infectious substance or a regulated medical waste, and is not subject to federal or state regulations on infectious waste.

non-PCB transformer: Any transformer that contains less than 50 ppm PCBs. Any transformer that has been converted from a PCB transformer or a PCB-contaminated transformer cannot be categorized as a non-PCB transformer until it has been formally reclassified in accordance with the requirements of 40 CFR §761.30.

non-putrescent: Not allowed to rot or decay due to the breakdown of organic matter.

non-routine waste: Waste that is generated or occurs on an unscheduled basis or is of unpredictable quantity and/or characteristics. Because of its unpredictable nature, this waste cannot be trended over an extended period of time.

NRC: The U. S. Nuclear Regulatory Commission.

off-site waste: Any hazardous waste transported to the Facility from off-site but does not include intra-Facility waste.

open burning: The combustion of any material without the following characteristics:

- Control of combustion air to maintain adequate temperature for efficient combustion,

- Containment of the combustion-reaction in an enclosed device to provide sufficient residence time and mixing for complete combustion, and
- Control of emission of the gaseous combustion products.

operator: The person(s) responsible for the overall operation of all or any portion of a solid waste facility.

orphan waste: See "no-owner waste."

overpack: A container used by a single shipper to provide protection or convenience in handling a package or to consolidate two or more packages.

owner: The person who owns a facility or part of a facility.

package: Packaging and its contents

packaging: A receptacle and any other components or materials necessary for the receptacle to perform its intended containment function in conformance with the minimum packing requirements of the Department of Transportation (DOT).

partial closure: The closure of a hazardous waste management unit in accordance with the applicable closure requirements of 40 CFR §264 and 40 CFR §265 at a facility that contains other active hazardous waste management units. For example, partial closure may include the closure of a tank (including its associated piping and underlying containment systems), landfill cell, surface impoundment, waste pile, or other hazardous waste management unit, while other units of the same facility continue to operate.

PCB article container: Any package, can, bottle, bag, barrel, drum, tank, or other device used to contain PCB articles or equipment, the internal and external surfaces of which has not been in direct contact with PCBs.

PCB articles: Any manufactured articles (other than PCB containers) that may contain or have been in direct contact with PCBs, e.g., capacitors, transformers, electric motors, pumps, and pipes.

PCB bulk remediation waste: Bulk remediation waste is any non-liquid waste or debris generated as a result of any "historical" PCB spill cleaned up under 40 CFR §761.61, including soil, sediments, dredged materials, sewage sludge, and industrial sludge.

PCB containers: Any package, can, bottle, bag, barrel, drum, tank, or other device that contains PCBs or PCB articles, the surface of which has been in direct contact with regulated PCBs.

PCB equipment: Any manufactured item (other than a PCB container or a PCB article container), which contains a PCB article or other PCB equipment. Examples: Microwave ovens, electronic equipment, and fluorescent light ballasts and fixtures.

PCB item: Any PCB article, article container, container, or equipment, any part of which deliberately or unintentionally contains or is contaminated with PCBs.

PCB leaking container: Any instance in which PCB articles, containers, or equipment have any PCBs on any portion of their external surfaces.

PCB storage area, temporary: A PCB storage area subject to an approved SPCC plan, designated for up to 30-day, on-site storage of PCB waste.

PCB transformer: Any transformer that contains 500 ppm PCBs or greater.

PCB waste: A waste containing the biphenyl molecule that has been chlorinated. PCB waste is regulated if the concentration of PCBs in the source material is greater than or equal to 50 ppm.

PCB-contaminated electrical equipment: Any electrical equipment that contains equal to or greater than 50 ppm but less than 500 ppm PCBs including but not limited to: transformers, capacitors (see **capacitor**), circuit breakers, reclosers, voltage regulators, switches, electromagnets, and cables. Oil-filled electrical equipment other than circuit breakers, reclosers, and cable whose PCB concentration is unknown must be assumed to be PCB-contaminated electrical equipment.

PCB-contaminated transformer: A transformer that contains equal to or greater than 50 ppm but less than 500 ppm PCBs.

performance assessment (PA): A systematic analysis of the potential risks posed by waste management systems to the public and environment, and a comparison of those risks to established performance objectives.

performance objectives (POs): Radiological standards that will be met by all DOE low-level radioactive waste treatment, storage, and disposal facilities (TSDFs) to protect public health and safety.

permitted unit: A hazardous waste management unit: 1) that is not an interim status unit; and 2) that is authorized by this Permit and listed in Attachment J (*Hazardous Waste Management Units*), Table J-1 (*Active Portion of the Facility*), or Table J-2 (*Permitted Units Undergoing Post-Closure Care*).

person: An individual, trust, firm, joint stock company, Federal Agency, corporation (including a government corporation), partnership, association, State, municipality, commission, political subdivision of a State, or any interstate body.

personnel or facility personnel: All persons who work at, or oversee the operations of, a hazardous waste facility, and whose actions or failure to act may result in noncompliance with the requirements of 40 CFR 264 or 265.

pesticide: Any substance or mixture of substances intended for preventing, destroying, repelling, or mitigating any pest, or intended for use as a plant regulator, defoliant, or desiccant, other than any article that:

- Is a new animal drug under the *Federal Food, Drug, and Cosmetic Act (*FFDCA) section 201(w), or
- Is an animal drug that has been determined by regulation of the Secretary of Health and Human Services not to be a new animal drug, or
- Is an animal feed under FFDCA section 201(x) that bears or contains any substances described in the above two paragraphs.

pharmaceutical-controlled substance: A drug or substance regulated by the New Mexico Controlled Substance Act that has a high potential to be abused by the human population and can lead to substance dependency.

pile: Any non-containerized accumulation of solid, nonflowing hazardous waste that is used for treatment or storage and that is not a containment building.

Pollution Prevention (P2): Source reduction, or preventing pollution at its source, before it is generated. It includes any practice that reduces the quantity and/or toxicity of pollutants entering a waste stream prior to recycling, treatment, or disposal. Examples include equipment or technology modifications, reformulation or redesign of products, substitution of less toxic raw materials, improvements in work practices, maintenance, worker training, and better inventory control.

Polychlorinated biphenyls (PCBs): Halogenated organic compounds defined in accordance with 40 CFR §761.3.

portable container: Any moveable container, other than a tanker truck, used for transporting waste.

process knowledge (PK): Includes information about the process used to generate the waste, material inputs to the process, and the time period during which the waste was generated. PK is described in 40 CFR §264.13(a)(2) as data developed under 40 CFR 261 and existing published or documented data on a specific hazardous waste or hazardous waste generated from similar processes. PK may include off-site facility waste characterization data pertaining to a specific waste and laboratory analysis data performed prior to the effective date of applicable RCRA regulations.

pyrophoric material: A material that, under normal conditions, is liable to cause fires through friction or retained heat from manufacturing or processing, or that can be ignited readily and when ignited burns so vigorously and persistently as to create a serious transportation, handling, or disposal hazard.

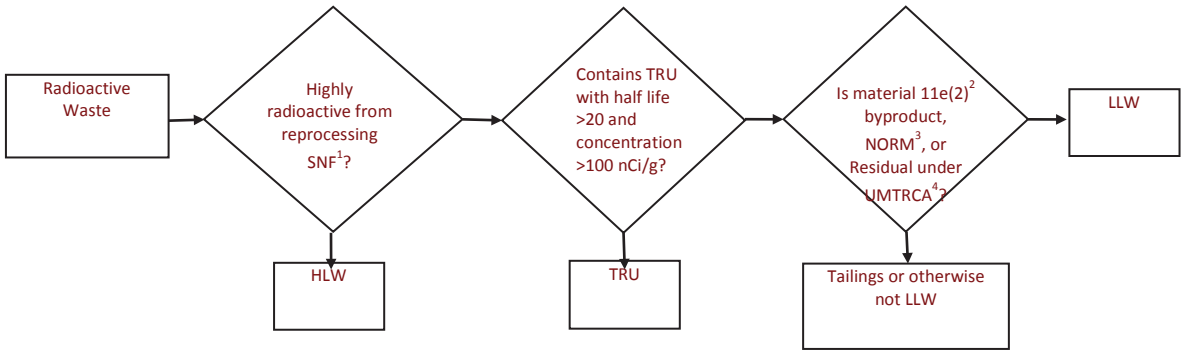
Radioactive Liquid Waste Collection System (RLWCS): A network of underground pipelines and associated equipment that carry radioactive liquid waste from Laboratory sites to the Radioactive Liquid Waste Treatment Facilities (RLWTF). The RLWCS was formerly referred to as the Acid or Industrial Waste Line.

Radioactive Liquid Waste Treatment Facility (RLWTF): The radioactive liquid waste treatment plants managed and operated by the FWO-RLW: the Main Plant at TA-50-1; the Pretreatment Plant in Room 60 and 60A at TA-50-1; and the pretreatment plant at TA-21-257 (DP-257).

Radioactive Waste Management Basis (RWMB; form, continuation sheet): Identifies physical and administrative controls for radioactive waste facilities, operations, and activities to ensure the protection of workers, the public, and the environment. The RWMB shall reference or define the conditions under which the facility may operate.

radioactive waste: Waste that has been determined to contain added radioactive material or activation products or concentrated naturally occurring radioactive material (NORM) by either monitoring and analysis, acceptable knowledge, or both; or does **not** meet radiological release criteria.

Radioactive Waste Definition Logic



1. Spent nuclear fuel.
2. Section 11e.(2) of the Atomic Energy Act governs the tailings or wastes produced by the extraction or concentration of uranium or thorium from any ore processed primarily for its source material content.
3. Naturally occurring radioactive material.
4. Uranium Mill Tailings Radiation Control Act.

radiolysis: The chemical breakdown of materials as a result of exposure to radiation.

reclaimed: When a material is processed to recover a usable product, or if it is regenerated. Examples are recovery of lead values from spent batteries and regeneration of spent solvents. In addition, for purposes of 40 CFR §§261.2(a)(2)(ii), 261.4(a)(23), and 261.4(a)(24) smelting, melting and refining furnaces are considered to be solely engaged in metals reclamation if the metal recovery from the hazardous secondary materials meets the same requirements as those specified for metals recovery from hazardous waste found in 40 CFR §266.100(d)(1)-(3), and if the residuals meet the requirements specified in 40 CFR §266.112.

recyclable materials: Materials that would otherwise become solid waste if not recycled and that can be collected, separated, processed, reclaimed or composted and placed in use in the form of raw materials, products or densified-refuse-derived fuels.

recycled: A material that is used, reused, or reclaimed. A material is reclaimed if it is processed to recover usable products or if it is regenerated. A material is used or reused if it is either employed as an ingredient in an industrial process to make a product or employed in a particular function or application as an effective substitute for a commercial product.

release: Any accidental or intentional spilling, leaking, pouring, emitting, emptying, discharging, injecting, pumping, escaping, leaching, or dumping of any hazardous waste or hazardous constituents inside a permitted unit or from a permitted unit to the environment, including the abandonment or discarding of barrels, containers, and other closed receptacles containing hazardous waste or hazardous constituents.

remediation waste: All solid and hazardous wastes, and all media (including ground water, surface water, soils, and sediments) and debris, that are managed for implementing cleanup.

remediation waste management site: A facility where an owner or operator is or will be treating, storing or disposing of hazardous remediation wastes. A remediation waste management site is not a facility that is subject to corrective action under 40 CFR §264.101, but is subject to corrective action requirements if the site is located in such a facility.

remote-handled (RH) radioactive waste: Packaged waste with an external surface radiation dose rate exceeding 200 mrem/hr.

representative sample: A sample of a universe or whole (*e.g.*, waste pile, lagoon, groundwater) which can be expected to exhibit the average properties of the universe or whole.

residual liquid as applicable only to WIPP bound waste: Liquids in quantities of less than 1 volume percent of the waste container that result from liquid residues remaining in well-drained internal containers, condensation of moisture, and liquid separations resulting from sludge/resin settling.

retrievable transuranic (TRU) waste: Waste that is not classified by the DOE as permanently buried and that has been generated before the development and implementation of a TRU waste characterization program that meets the requirements outlined in the Transuranic Waste Characterization Quality Assurance Program Plan and that has been identified by the DOE as a candidate waste for retrieval.

routine waste: Waste produced from (1) any type of production operation, analytical and/or research and development laboratory operations; (2) treatment, storage, and disposal operations "work for others"; or (3) any other periodic and recurring work that is considered ongoing in nature. Such wastes arise from activities that occur regularly and that generate a waste stream of a predictable quantity and characterization and are not part of the Laboratory's environmental restoration activities.

run-off: Any rainwater, leachate, or other liquid that drains over land from any part of a facility.

run-on: Any rainwater, leachate, or other liquid that drains over land onto any part of a facility.

Safety Analysis Report (SAR): A report required by DOE Order 5480.1B or 5480.1B or that summarizes the hazards associated with the operations at a nonnuclear facility or a nonreactor nuclear facility, respectively, used to define minimum safety requirements.

sampling and analysis by approved methods: Sampling and analysis methods approved by the regulating agency and/or the TSDF.

sanitary waste: "Municipal solid waste" generated at a private household that may be disposed at a municipal solid waste landfill. No waste generated at the Laboratory is "municipal solid waste": items normally classified as sanitary waste at home are commercial solid waste (see definition above) if generated at the Laboratory.

sanitary wastewater: Human excreta and water-carried wastes from typical plumbing fixtures and activities, including, but not limited to, wastes from toilets, sinks, water fountains, bath fixtures, clothes-and dish-washing machines, and floor drains. Water-carried waste from non- residential type sources shall be considered sanitary wastewater if the composition and concentrations of waste do not differ from typical domestic waste. Includes bathroom waste, kitchen waste, janitorial waste from non-rad areas, and de minimus quantities of cooling and boiler blowdown from equipment rooms and from other sources is acceptable for discharge into the SWWS Plant.

satellite accumulation area: A designated space for accumulating hazardous and mixed waste where the volume of hazardous waste may not exceed 55 gallons or the volume of acutely hazardous waste may not exceed one quart. The accumulation area must be located at or near the point of generation and be under the control of the generator/operator of the process generating the waste.

saturated zone: That part of the earth's crust in which all voids are filled with water.

scrap metal: Bits and pieces of metal parts (e.g.,) bars, turnings, rods, sheets, wire) or metal pieces that may be combined together with bolts or soldering (e.g., radiators, scrap automobiles, railroad box cars), which when worn or superfluous can be recycled. Types of scrap metal include:

- **excluded scrap metal:** Processed scrap metal, unprocessed home scrap metal, and unprocessed prompt scrap metal.
- **processed scrap metal:** Scrap metal which has been manually or physically altered to either separate it into distinct materials to enhance economic value or to improve the handling of materials. Processed scrap metal includes, but is not limited to scrap metal which has been baled, shredded, sheared, chopped, crushed, flattened, cut, melted, or separated by metal type (i.e., sorted), and, fines, drosses and related materials which have been agglomerated. (Note: shredded circuit boards being sent for recycling are not considered processed scrap metal. They are covered under the exclusion from the definition of solid waste for shredded circuit boards being recycled (40 CFR §261.4(a)(14)).
- **home scrap metal:** Scrap metal as generated by steel mills, foundries, and refineries such as turnings, cuttings, punchings, and borings.
- **prompt scrap metal:** Scrap metal as generated by the metal working/fabrication industries and includes such scrap metal as turnings, cuttings, punchings, and borings. Prompt scrap is also known as industrial or new scrap metal.

secondary job waste: Miscellaneous materials associated with waste processing that may be placed into daughter containers during repackaging or comingled with the primary waste stream.

secondary material: Miscellaneous materials associated with waste processing that are placed into primary or daughter drums during packaging or repackaging. Examples of secondary waste includes gloves, tools, rags, wipes (Kimwipes), plastic labels, tags, Personal Protective Equipment (PPE), plastic sheeting used for contamination control, and original packaging material (e.g., plastic bags, plywood sheathing, rigid liner lids cut into pieces).

segregate: To separate waste from nonwaste materials; to sort waste according to type, such as sorting radioactive from nonradioactive waste or hazardous from nonhazardous waste.

sludge: Waste in a solid, semi-solid, or liquid physical form generated from a municipal, commercial, or industrial wastewater treatment plant, water supply treatment plant, or air pollution control device. Sludge does not include treated effluent from these plants/devices.

sludge: Any solid, semi-solid, or liquid waste generated from a municipal, commercial, or industrial wastewater treatment plant, water supply treatment plant, or air pollution control facility exclusive of the treated effluent from a wastewater treatment plant.

soil: Unconsolidated earth material composing the superficial geologic strata (material overlying bedrock), consisting of clay, silt, sand, or gravel size particles as classified by the U.S. Natural Resources Conservation Service, or a mixture of such materials with liquids, sludges or solids which is inseparable by simple mechanical removal processes and is made up primarily of soil by volume based on visual inspection. Any deliberate mixing of prohibited hazardous waste with soil that changes its treatment classification (i.e., from waste to contaminated soil) is not allowed under the dilution prohibition in 40 CFR §268.3.

solid waste: As defined by regulations promulgated under the Resource Conservation and Recovery Act (RCRA) and the HWA, unless otherwise excluded, is any discarded material, either abandoned, recycled, or inherently waste-like, including liquids, solids, semisolids, and contained gases. Solid waste can be simply Solid or special, hazardous, nonhazardous, radioactive (including transuranic), or mixed waste. Waste consisting solely of source, special nuclear, or byproduct material, as defined by the Atomic Energy Act, is exempt from the Solid waste regulations as defined by RCRA. Environmental media (for example soil or water) is not Solid waste unless it is destined for disposal. For the more extensive definition under regulations promulgated under the New Mexico Solid Waste Act, refer to 20 NMAC 9.1.105BV. Solid waste ***does not*** include:

- Drilling fluids, produced waters, and other nondomestic wastes associated with the exploration, development or production, transportation, storage, treatment or refinement of crude oil, natural gas, carbon dioxide gas or geothermal energy
- Fly ash waste, bottom ash waste, slag waste and flue gas emission control waste generated primarily from the combustion of coal or other fossil fuels and wastes produced in conjunction with the combustion of fossil fuels that are necessarily associated with the production of energy and that traditionally have been and actually are mixed with and are disposed of or treated at the same time with fly ash, bottom ash, boiler slag or flue gas emission control wastes from coal combustion
- Waste from the extraction, beneficiation and processing of ores and minerals including phosphate rock and overburden from the mining of uranium ore, coal, copper, molybdenum, and other ores and minerals
- Agricultural waste including, but not limited to, manure and crop residues returned to the soil as fertilizer or soil conditioner
- Cement kiln dust waste
- Sand and gravel
- Solid or dissolved material in domestic sewage; or solid or dissolved materials in irrigation return flows or industrial discharges that are point sources subject to permits under Section 402 of the Federal Water Pollution Control Act, 33 U.S.C. Section 1342; or source, special nuclear or by-product material as defined by the Atomic Energy Act of 1954, 42 U.S.C. Section 2011 et seq.
- Densified-refuse-derived fuel
- Material except petroleum contaminated soils, regulated by Subtitle C or Subtitle I, 42 U.S.C. Section 6901 et seq. of the federal RCRA of 1976; substances regulated by the

federal Toxic Substances Control Act (TSCA), 7 U.S.C. Section 136 et seq.; or low-level radioactive waste

- Source, special nuclear, or by-product materials subject to the Atomic Energy Act of 1954

solid waste dumpster: Large containers, which are designed to hold large volumes of consolidated trash. These containers are located outside buildings at the Laboratory.

Solid Waste Management Unit (SWMU): Any discernable unit at which solid waste has been placed at any time and from which the New Mexico Environment Department determines there may be a risk of a release of hazardous waste or hazardous waste constituents, irrespective of whether the unit was intended for the management of solid or hazardous waste. Such units include any area at LANL at which solid wastes have been routinely and systematically released; they do not include one-time spills (*see* 61 Fed. Reg. 19431, 19442-43 (May 1, 1996)).

solvent-contaminated wipe:

- A wipe that, after use or after cleaning up a spill, either:

  (i) Contains one or more of the F001 through F005 solvents listed in 40 CFR §261.31 or the corresponding P- or U- listed solvents found in 40 CFR §261.33;

  (ii) Exhibits a hazardous characteristic found in 40 CFR §261 subpart C when that characteristic results from a solvent listed in 40 CFR §261; and/or

  (iii) Exhibits only the hazardous waste characteristic of ignitability found in 40 CFR §261.21 due to the presence of one or more solvents that are not listed in 40 CFR §261.

- Solvent-contaminated wipes that contain listed hazardous waste other than solvents, or exhibit the characteristic of toxicity, corrosivity, or reactivity due to contaminants other than solvents, are not eligible for the exclusions at 40 CFR §261.4(a)(26) and 40 CFR §261.4(b)(18).

sorb: To either adsorb or absorb, or both.

sorbent: A material that is used to adsorp or absorb free liquids.

special waste landfill: A landfill that receives solid waste other than household waste. This includes, but is not limited to, commercial solid wastes or New Mexico Special Wastes as defined in 20 NMAC 9.2. A construction and demolition landfill is not a Special Waste landfill.

spent material: Any material that has been used and as a result of contamination can no longer serve the purpose for which it was produced without processing.

staging (radioactive waste): The accumulation of radioactive waste to facilitate transportation, treatment, and/or disposal. The staging start date begins when the final container for the waste has been filled and sealed as long as this is done in a timely manner. Staging must not exceed 90 days.

staging area (radioactive waste): A registered area designated for the routine staging of radioactive waste prior to transport to a storage area or treatment, storage and disposal facility (TSDF).

start date:

- Less Than 90 Day Area - The first date on which any amount of hazardous waste begins to accumulate in the container (i.e. the date waste was first placed in the container).
- Universal Waste Area - The earliest date that any universal waste in the container became a waste or was received.
- Permitted Storage Area - The start date for containers in permitted storage unit is the date the container is placed in storage at the permitted unit, if that is the first permitted unit it has been placed in.

storage area (radioactive waste): A registered area where certified waste containers are stored for up to one year. The temporary holding of radioactive waste for transfer to treatment, storage, or disposal elsewhere. Waste must be packaged for shipment in accordance with the LANL WAC.

supplemental sampling and analysis: Sampling and analysis methods that provide quality information but are not performed in accordance with approved methods.

suspect radioactive waste: Waste that is generated in an area where radioactive materials are present but that cannot be practicably verified as being nonradioactive.

tank: A stationary device, designed to contain an accumulation of hazardous waste which is constructed primarily of non-earthen materials (e.g., wood, concrete, steel, plastic) which provide structural support.

tank system: A hazardous waste storage or treatment tank and its associated ancillary equipment and containment system.

Technical Safety Requirements (TSRs): The requirements (such as operating limits, surveillance requirements, administrative controls, and use and application instructions) that defines the conditions, safe boundaries, and management or administrative controls necessary to ensure the safe operation of a nuclear facility. {DOE 1992}

thermostat: A temperature control device that contains metallic mercury in an ampule attached to a bimetal sensing element, and mercury-containing ampules that have been removed from these temperature control devices in compliance with the requirements of 40 CFR §273.13(c)(2) or 40 CFR §273.33(c)(2).

transport vehicle: A motor vehicle or rail car used for the transportation of cargo by any mode. Each cargo-carrying body (trailer, railroad freight car, etc.) is a separate transport vehicle.

transportation: The movement of hazardous waste by air, rail, highway, or water.

transporter: A person engaged in the offsite transportation of hazardous waste by air, rail, highway, or water.

transuranic (TRU) waste: Radioactive waste containing more than 100 nanocuries (3700 becquerels) of alpha-emitting transuranic isotopes per gram of waste, with half-lives greater than 20 years, except for: (1) high-level radioactive waste; (2) waste that the Secretary of Energy has determined, with the concurrence of the Administrator of the Environmental Protection Agency, does not need the degree of isolation required by the 40 CFR 191 disposal regulations; or (3) waste

that the Nuclear Regulatory Commission has approved for disposal on a case-by-case basis in accordance with 10 CFR 61 (DOE O 435.1).

transuranic (TRU) waste (LANL Permit): Waste of more than 100 nanocuries of alpha-emitting transuranic isotopes per gram of waste, with half-lives greater than 20 years, except for: 1) high-level radioactive waste; 2) waste that the DOE Secretary has determined, with the concurrence of the EPA Administrator, does not need the degree of isolation required by the disposal regulations; or 3) waste that the Nuclear Regulatory Commission (NRC) has approved for disposal on a case-by-case basis in accordance with 10 CFR Part 61 (*see* Pub. L. 102-579, § 2(18) (1992)).

treatability study: A study in which a hazardous waste is subjected to a treatment process to determine: (1) Whether the waste is amenable to the treatment process, (2) what pretreatment (if any) is required, (3) the optimal process conditions needed to achieve the desired treatment, (4) the efficiency of a treatment process for a specific waste or wastes, or (5) the characteristics and volumes of residuals from a particular treatment process. Also included in this definition for the purpose of the §261.4 (e) and (f) exemptions are liner compatibility, corrosion, and other material compatibility studies and toxicological and health effects studies. A "treatability study" is not a means to commercially treat or dispose of hazardous waste.

treatment: Any method, technique, or process, including neutralization, designed to change the physical, chemical, or biological character or composition of any hazardous waste so as to neutralize such waste, or so as to recover energy or material resources from the waste, or so as to render such waste non-hazardous, or less hazardous; safer to transport, store, or dispose of; or amenable for recovery, amenable for storage, or reduced in volume.

treatment, storage, and disposal facilities (TSDFs)**:** As defined by RCRA in 40 CFR 264 and 265, a TSDF is a permitted or interim status hazardous waste management unit where hazardous or mixed waste may be stored or treated prior to disposal. There are no active RCRA hazardous or mixed waste disposal units at the Laboratory. Waste subject to land disposal restrictions (40 CFR 268) will generally be subject to enforcement under the Federal Facilities Compliance Act if stored for more than one year.

universal waste: Certain of the following types of hazardous waste are subject to the universal waste requirements of 40 CFR 273 and 20 NMAC 4.1.1000; for example, batteries, pesticides, aerosol cans and mercury thermostats. The universal waste requirements ease some of the regulatory requirements for collecting and managing these common waste types.

universal waste handler: A generator of universal waste or the owner or operator of a facility, including all contiguous property, that receives universal waste from other universal waste handlers, that accumulates universal waste and sends universal waste to another universal waste handler or to a destination facility or to a foreign destination.

unknown waste: See "no-owner waste."

used or reused: If a material is either:

- Employed as an ingredient (including use as an intermediate) in an industrial process to make a product (for example, distillation bottoms from one process used as feedstock in another process). However, a material will not satisfy this condition if distinct

components of the material are recovered as separate end products (as when metals are recovered from metal-containing secondary materials); or

- Employed in a particular function or application as an effective substitute for a commercial product (for example, spent pickle liquor used as phosphorous precipitant and sludge conditioner in wastewater treatment).

used oil: Any oil that has been refined from crude oil, or any synthetic oil, that has been used and as a result of such use is contaminated by physical or chemical impurities.

used oil generator: Any person, by site, whose act or process produces used oil or whose act first causes used oil to become subject to regulation.

vadose zone: Earth material below the land surface and above ground water, or in between bodies of ground water.

verification sampling and analysis: The process of sampling and analysis performed for the purpose of establishing the validity of AK.

vessel: Includes every description of watercraft, used or capable of being used as a means of transportation on the water.

waste acceptance criteria (WAC): Criteria that must be met before a waste is accepted for treatment, storage, or disposal. Waste acceptance criteria may involve the physical form of a waste, a waste's container, its radioactivity, packaging, labeling, etc.

waste certification program: A systematic, documented approach, used by a waste generator organization to ensure that waste is managed in a manner that provides reasonable assurance that the treatment, storage, and disposal facilities/ waste acceptance criteria are met.

waste characterization: The determination of a waste's physical, radiological, and chemical characteristics with sufficient accuracy to permit proper classification and management.

waste generators: Individuals and their line management (for example, research scientists or project managers) having direct responsibility for operations that generate waste. A waste generator may be a member of the organization responsible for the facility or site where the waste was generated. Waste generators have the responsibility for waste minimization, characterization, storage, and disposal of the waste they generate.

waste management coordinator (WMC): The individual responsible for coordinating waste management activities on behalf of waste generators, line managers, facility managers, field project leaders, waste management groups, and other Laboratory organizations. This individual also coordinates resolution of waste management issues on behalf of his/her waste-generating organization and reviews documents pertaining to the management of waste.

waste management: The planning, coordination, and direction of those functions related to generation, handling, treatment, storage, transportation, and disposal of waste, as well as associated surveillance and maintenance activities.

waste minimization: The use of source reduction and/or environmentally sound recycling methods prior to energy recovery, treatment, or disposal of wastes. EPA's preferred hierarchical

approach to materials management includes source reduction, recycling, energy recovery, treatment, and finally, disposal.

waste reduction: See waste minimization.

waste stream: Each waste material generated from a single process or from an activity that is similar in the materials from which it was generated, similar in its physical form and hazardous constituents, and distinguishable from other wastes by EPA Hazardous Waste Numbers and Land Disposal Restriction (LDR) status.

wipe: A woven or non-woven shop towel, rag, pad, or swab made of wood pulp, fabric, cotton, polyester blends, or other material.

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Gian Bacigalupa	ENV-CP	Signature on File	12-3-2015

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Quality Assurance Reviewer:	Organization:	Signature:	Date:
Doris Quintana	QPA-IQ/OIO	Signature on File	12-3-2015
Responsible Line Manager:	Organization:	Signature:	Date:
Raeanna Sharp-Geiger	ADESH	Signature on File	12-15-2015

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This document has been DC reviewed and is unclassified.

1.0 INTRODUCTION

The purpose of this document is to provide requirements for Waste Characterization. This document is managed and owned by the Associate Directorate Environment, Safety and Health and provides instructions on the applicability of the requirement.

1.1 Purpose

This document summarizes the requirements in 40 CFR 262.11 (hazardous waste determination), 40 CFR 261.20(c), Appendix I (representative samples) of 40 CFR 261, 40 CFR 264.13.b and Attachment C of LANL's Hazardous Waste Facility Permit (Waste Analysis Plan).

1.2 Scope

This document applies to any LANL employee, contractor, or sub-contractor who has been identified as a waste generator.

Note: Treatment and Storage Facility (TSF) workers become "Waste Generators" when activities at the TSF (e.g., repackaging, sorting, and segregation) lead to the generation of regulated waste or trigger re-characterization of the waste stream as described within this section.

2.0 PRECAUTIONS AND LIMITATIONS

This document cannot establish new requirements; it may only summarize the requirements in federal or state statutes/regulations/permits, DOE Orders, and authorized Laboratory policies.

3.0 WASTE CHARACTERIZATION DESCRIPTION

Waste must be characterized by using direct sampling and analysis of the waste, acceptable knowledge (AK), or a combination of the two methods.

The characterization method must be defined for the type of waste and be in accordance with the receiving facility's waste acceptance criteria.

Note: The characterization must demonstrate chemical stability and compatibility to ensure that the waste, once generated, will not create an unwanted reaction (i.e. harmful gasses, vapors, liquids, explosive conditions, etc.).

3.1 Acceptable Knowledge

Acceptable Knowledge (AK) is a method used by the waste generator to document characterization of wastes in lieu of approved sampling and analysis. Sampling and analysis by approved methods is the most defensible means of waste characterization; however, AK may be substituted for analytical data if complete and properly documented.

3.2 Sources and Examples of AK

Examples of AK documentation used at the Laboratory may include, but are not limited to, the following:

- Process design documents.
- Final safety analysis reports (SARs), unreviewed safety questionnaire determinations (USQDs), and technical safety requirements (TSRs).
- Standard Operating Procedures (SOPs), Hazard Control Plans (HCPs), Activity Hazard Analysis (AHAs), and/or Detailed Operating Procedures (DOPs).
- Other documented knowledge of processes that lists raw materials or reagents, describe the process/experiment which uses the materials, and describe how the waste streams are generated and handled.

  Examples of this type of AK:

  Waste streams that are highly similar to previously characterized waste streams **if** the differences in the proposed generating process are well understood and documented and the nature of the waste stream from the proposed process can be predicted with a high level of confidence and the previously characterized waste stream is itself well characterized via data/AK.

  Waste streams that contain hazardous constituents from specific, well-documented processes such as Resource Conservation and Recovery Act (RCRA) K-listed waste generating process.

  Generator/ SME clarification or characterization statements, e.g., statement that waste with residual explosive material is non-explosive, therefore non-RCRA-reactive although associated with a High Explosive (HE) process.

  Note: Integrated Work Documents (IWDs) regularly cover a facility or number of processes, and are typically too broad and general to provide specific process descriptions and waste descriptions.
- Waste packaging logs completed when wastes are placed in containers.
- Test plans or research project reports that describe the reagents and other raw materials used in an experiment.
- Laboratory notebooks that detail the research processes and materials used in an experiment and the by-products and end-products generated.

  Note: AK documents that cannot be attached entirely to the Waste Stream Profile in WCATS must be traceable and specifically referenced under the profile.

  Note: Applicable log book pages or excerpts may be attached to Waste Disposal Requests in lieu of attaching to the WSP record. However, it should be noted in the WSP if this practice is to be used.
- Site databases (e.g., chemical inventory database for Superfund Amendments and Reauthorization Act [SARA] Title III).
- Documented site personnel interview information.

- Correspondence such as memoranda, letters, telephone logs.
- Previous analytical data relevant to the waste stream, such as fingerprint analysis, spot-check procedures, or routine waste stream verification sampling and analysis data.
- Safety Data Sheets/Material Safety Data Sheets (MSDSs), product labels, and other product packaging information, particularly for trade-name or proprietary products (e.g., "WD-40");

  Example of this type of AK:

  Waste streams consisting of discarded commercial chemical products, reagents, or chemicals of known physical and chemical composition (e.g., RCRA P-listed and U-listed wastes).
- Documented visual inspections that can be used to identify or confirm the physical characteristics and packaging of a waste (e.g., visual inspection forms, which can be explicit in the type of information to be collected, or detailed procedures on how these observations are recorded).

  Example of this type of AK:

  Characterizing waste streams that contain heterogeneous materials, where the physical nature of the waste stream does not lend itself to taking a representative sample (e.g., laboratory PPE).
- Documentation that demonstrates that surrogate materials accurately reflect the characteristics of the waste stream in question.

3.3 AK Documentation

AK should include, at a minimum:

- A description of the waste generating process, to include:
  - A general description of physical/chemical process(s) generating the waste;
  - What materials or inputs are used in the process(s); and
  - How are the materials/reagents used (i.e., are organics used for their solvent properties, or as ingredients).
- A physical, chemical, and regulatory description of the waste produced.
- A basis for how the waste constituents and contaminants are identified and bounded (e.g., how their min-max ranges are determined).
- A description of the process controls that are in place to ensure generated waste remains within the bounds of the waste stream profile (WSP).

Ensure the AK documentation is relevant and traceable to a waste stream and not merely a list of information sources for a particular process operation. Document information that is accurate, sufficient, current (i.e., updated), and relevant to the waste stream's generation, characterization, and management.

Consider including the following information for each waste stream, or related waste stream:

- The specific location of the waste-generating process/operation.
- The time period of generation.
- The person or persons responsible for the process operations and for waste management, including organization and point of contact information (i.e., the Waste Management Coordinator [WMC]).

Any assumptions made should be identified and documented.

3.4 Sampling and Analysis

Sampling and analysis must be conducted in accordance with the Hazardous Waste Permit Section 2.4.2. If sampling and analysis is not conducted in accordance with Section 2.4.2, the data will be considered acceptable knowledge.

- If sampling and analysis is used:
  - The methods must be consistent with requirements in permits and regulations (such as the Environmental Protection Agency's SW-846 Manual).
  - The samples must be representative of the waste, and must provide confidence that the results describe the entire waste stream (the DQO process is designed to ensure these criteria are met).
  - Personnel performing sampling must have a sampling and analysis plan (SAP).
  - Sampling may be used to confirm, supplement, or bound AK (e.g., pH testing to confirm pH range, or Toxicity Characteristic metals analysis to determine ranges of known contaminants).

To submit samples or request sampling and analysis, WMCs must complete a Request for Analysis. WM-SVS sampling and analysis subject matter experts can provide guidance in designing a sampling plan for non-homogeneous wastes. Such wastes can include—but are not limited to—decontamination and demolition debris, construction debris, excavation debris, and concrete rubble from interior remodeling projects.

3.5 LANL's Waste Analysis Plan

Waste streams designated for transfer to permitted on-site storage areas may require characterization—which is specified in one of the three bullets below. Contact Luciana Vigil-Holterman at 5-3435 for assistance.

Attachment C to LANL's Hazardous Waste Permit is the Waste Analysis Plan (WAP) which includes the following three tables for appropriate characterization methods:

- Table C-16 provides the appropriate characterization methods for hazardous waste.
- Table C-17 provides the appropriate characterization methods for mixed low level waste.

- Table C-18 provides the appropriate characterization methods for mixed transuranic waste.

The LANL WAP from the Hazardous Waste Permit issued November 2010 will be used by all generators except for the Interim Status Units. The Interim Status Units will use the WAP from the most recent application.

3.6 Re-characterization of Waste Stream

Waste Generators must update waste characterization based on the following:

- after an annual re-evaluation, if there is any change to the waste;
- there is a change to the waste-generating processes or operations;
- analytical results indicate a change in the waste stream;
- new characterization information becomes available;
- a waste container is opened and secondary material is added to the container;
- waste is repackaged and secondary material is added during this process;
- there is a change in the ownership of a WSP; or
- the Waste Generator is notified that waste received at an off-site facility does not match a pre-approved waste analysis certification or accompanying shipping documentation.

The Waste Generators must contact the WM-DO in the event it is required to update waste characterization information described above. WM-DO will work through appropriate subject matter experts to assess the identified changes in the waste characterization and recommend actions.

3.7 Re-characterization at Treatment and Storage Facilities

Under the LANL Hazardous Waste Facility Permit, TSFs must update their waste characterization when the following occurs:

- a Waste Generator determines one or more of the above conditions in Section 3.6 has occurred;
- TSF workers have reason to believe that the process or operation generating the waste has changed;
- waste is repackaged and no longer matches the characterization in its WSP (e.g. changed matrix; different EPA Hazardous Waste Numbers);
- waste is repackaged and secondary material is added during this process;
- annual notification of AK waste streams indicates the waste does not match the waste

specified by the waste generator;

- waste received at an off-site facility does not match a pre-approved waste analysis certification or accompanying shipping documentation; or
- an inspection reveals that the waste does not match the identity of the waste specified by the Waste Generator or a manifest on a shipping paper.

4.0 COMPATIBILITY

See ADESH-AP-TOOL-115 for guidance.

5.0 EXCEPTIONS

N/A

6.0 DEFINITIONS AND ACRONYMS

See LANL *Definition of Terms*.

See LANL Acronym Master List.

7.0 RECORDS

Records generated by this document will be submitted for records management in accordance with P1020-1, *Laboratory Records Management* and if applicable, with the ADESH-AP-006, *Records Management Plan*.

- WSPs and supporting documentation will be maintained in WCATs. When security prohibits inclusion of this documentation, a unique identifier will be used.

8.0 REFERENCES

40 CFR Section 260 through 264

P409, “LANL Waste Management”

LANL Hazardous Waste Facility Permit

9.0 ATTACHMENTS OR APPENDICES

N/A

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Environment, Safety, Health Directorate

Administrative Procedure

Waste Compatibility Determinations

Document Owner/Subject Matter Expert:

Name:	Organization:	Signature:	Date:
Geri Martinez	ENV-CP	Signature on File	01-11-16

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Name:	Organization:	Signature:	Date:
Gian Bacigalupa	ENV-CP	Signature on File	01-11-16

Approval Signatures:

Quality Assurance Reviewer:	Organization:	Signature:	Date:
Doris Quintana	QPA-IQ/OIO	Signature on File	01-12-16
Responsible Line Manager:	Organization:	Signature:	Date:
Raeanna Sharp-Geiger	ADESH	Signature on File	01-14-16

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This document has been DC reviewed and is unclassified.

1.0 INTRODUCTION

The purpose of this document is to provide requirements for Waste Compatibility Determinations. This document is managed and owned by the Associate Directorate Environment, Safety and Health and provides instructions on the applicability of the requirement.

Generators and Treatment and Storage Facilities (TSFs) must collect characterization data and/or Acceptable Knowledge (AK) for generated and/or managed wastes and perform a compatibility determination on their wastes in order to prevent reactions or the potential for reactions between incompatible constituents, secondary job wastes, additives, waste streams and between the wastes and the packaging materials used to contain the wastes. Incompatible materials are materials which, when mixed, result in undesirable reactions that generate heat, fire, explosion, pressure, violent reaction, and/or toxic or flammable gasses, fumes, or dusts. Combining a waste with incompatible packaging materials can lead to the undesirable reactions listed above as well as degradation of the containers holding the waste. These potential reactions can occur instantaneously or slowly, over a period of time, and can be cumulative (i.e. a buildup of pressure or heat in a container or rust-through in a metal drum).

Three types of compatibility are of concern during management of wastes:

- Mixing of incompatible materials within a container is an important concern any time a generator is packaging wastes from different batches, sources, or processes into the same container, introducing other materials used to treat the waste such as neutralizers or sorbents, or adding secondary waste materials to a drum to prevent potential reactions that would be harmful to human health or the environment.
- Compatibility of waste with its packaging when waste is placed in a container. The waste must be compatible with inner and outer containers and liners, cushioning materials, bags, or any other materials used to package the waste. Waste must not be placed in an unwashed container that previously held an incompatible waste or material to ensure integrity of containers is maintained.
- Containers with incompatible waste materials must be segregated from each other in storage to prevent potential reactions that would be harmful to human health or the environment in the event of a leak or breach of the container(s).

Generators and TSFs must document all of the information used in making the compatibility determinations.

1.1 Purpose

The purpose of this document is to provide requirements and guidance for determining compatibility of hazardous waste for safe and compliant management and documenting the determination.

1.2 Scope

This document applies to any LANL employee, contractor, or sub-contractor who has been identified as a waste generator, is responsible for maintaining a waste storage area, or is responsible for packaging or repackaging waste.

2.0 PRECAUTIONS AND LIMITATIONS

This document cannot establish new requirements; it may only summarize the requirements in federal or state statutes/regulations/permits, DOE Orders, and authorized Laboratory policies.

3.0 GENERAL REQUIREMENTS

The general process for making a waste compatibility determination consists of (1) collecting the data needed to perform the determination, (2) performing the determination, and then (3) documenting the results.

3.1 Data Collection

The generator must characterize the waste and prepare the waste characterization documentation as required by ADESH-AP-TOOL-111. Characterization data and AK should provide enough information to perform the compatibility determination or at least identify the chemicals involved. Some information needed to make compatibility determinations is generic to the chemicals making up the waste. Such generic chemical data can be obtained from the following sources:

- Material Safety Data Sheet (MSDS) or Safety Data Sheet (SDS) for the chemicals and/or products from which the waste is derived – available from the manufacturer, multiple online sources, or the LANL MSDS search page (from the LANL Homepage go to Safety/Industrial Hygiene and Safety/Chemical Safety/ Chemical Capability Tools/Material Safety Data Sheets Online)
- Online chemical information sources such as CAMEO (http://www2.epa.gov/cameo) or WISER (http://wiser.nlm.nih.gov)
- Standard industry references such as *Hawley's Condensed Chemical Dictionary* and *Sax's Dangerous Properties of Industrial Materials*

Data used in compatibility determinations can also come from analysis of waste streams. Testing used in compatibility determinations may include, for example, determining water reactivity, oxidation-reduction potential, testing for cyanides and sulfides, and pH determinations, among others.

Documentation obtained for the compatibility determination should be placed in the characterization record (i.e. as Acceptable Knowledge per ADESH-AP-TOOL-111 or as separate documentation per Section 3.5)

3.2 Compatibility of Materials in the Same Container

All wastes and other materials mixed or placed within a container must be compatible with each other to avoid potential reactions that could create hazards to people or the environment. Other materials mixed in waste containers could include neutralizers or absorbents added in accordance with ADESH-AP-Tools 901 and 902 as well as any secondary material added during treatment or processing of the waste. LANL Permit requirements (Section 2.8.2) and EPA Regulations (40 CFR 264.177) adopted by NMED do not allow mixing of incompatible wastes in containers unless certain conditions (40 CFR 264.17) are met. The following methods of performing inner-container compatibility determinations are recommended:

- 40 CFR 264 Appendix V or 40 CFR 265 Appendix V detail a method to classify waste materials into chemical groups and then compare the groups for adverse reactions listed in the groups. The records generated should include a listing of the chemical groups identified in a waste container and potential consequences of mixing identified, if any.

- EPA guidance document, *A Method for Determining the Compatibility of Hazardous Wastes* (EPA 600-2/80-076, at http://www.epa.gov/wastes/hazard/tsd/permit/tsd-regs/wap-refs/compat-haz-waste.pdf), which provides the complete guidance on how to use this chart for qualitative evaluation of the compatibility of various waste types. The record generated is the worksheet from the method.
- For uncomplicated mixtures with only several components, a direct comparison of data may suffice but should still be documented as a note or memo to file.

NOTE: Chemical compatibility determinations involving radiological constituents is no different than non-radiological chemical constituents, however, compatibility due to radiolysis may require involvement of an SME.

3.3 Waste and Packaging Compatibility

Waste must be compatible with packaging materials to prevent potential reactions and to maintain the integrity of the containers to avoid releases during storage and transportation. Packaging includes not only outer packaging such as drums, boxes, or sacks, but also inner packaging such as bags, boxes, cans, fiberboard containers and any cushioning or filler materials. Most manufacturers of packaging materials can provide chemical compatibility information for their products. The EPA guidance document above, *A Method for Determining the Compatibility of Hazardous Wastes* (EPA 600-2/80-076) can also be used to provide packaging compatibility information. Records should include any manufacturer documentation obtained and the determination documentation.

3.4 Container Segregation

EPA storage regulations 40 CFR 264.177 adopted by NMED and LANL Permit requirements Section 2.8.2 require segregation of incompatible materials in containers during storage. Segregation is required to prevent commingling of incompatible wastes during storage or in the event of a release or spill and requires that incompatible wastes are not stored within or on the same secondary containment structure or are not stored so that a release or spill of these wastes might commingle in a fire suppression water holding area or tank. The LANL Permit incorporates the segregation and compatibility requirements from Department of Transportation (DOT) Regulations at 49 CFR 177.848. Records for a compatibility determination under the DOT method should include documentation of the class or division of the materials and the segregation table designation, if any.

3.5 Documentation

EPA regulations at 262.40 and 264.73, as adopted by NMED and LANL's hazardous waste permit require that compatibility determinations be documented. When applicable the documentation should include:

- MSDSs or SDSs for the product or chemicals making up the waste
- Copies of pages from standard references with chemical data for the chemical constituents
- Printouts of chemical data from online chemical information sources
- Manufacturer information or cut sheets for the products
- Analytical data for the materials

- Copies of pertinent portions of procedures used to produce the waste that describe the waste or reactions and/or processes that generated the waste
- Written notes on composition, reactions, or processes that generated the waste
- Any other AK documentation available for the waste stream
- Completed charts and results from determination methods described above

Documentation should include manufacturer or supplier names, model or product numbers, and specific quantities or other identifying descriptors as available. The documentation should be complete enough so that an independent auditor can re-create the compatibility determination without obtaining any additional information or data. Documentation that shows compatibility within a container and with the packaging materials should be included in WCATS. If the determination can be shown with simple statement, it should be included as text in the Waste Description panel or Additional Information Panel of WCATS. If the determination involves stand-alone documents, the documents should be uploaded into the Documentation Panel of WCATS. Compatibility documentation for segregation of different containers in storage should be accessible at the storage area during inspections and/or audits.

4.0 DEFINITIONS AND ACRONYMS

Compatibility – means that waste, including secondary job waste, can be safely mixed with materials and the resultant waste mixture will not react in a manner that produces effects which are harmful to human health and the environment including: heat or pressure, fire, explosions, or violate reactions; uncontrolled toxic mists, dusts, fumes, or gases in sufficient quantities to pose a risk of fire or explosions; or damage the structural integrity of the container, including the inner liner, in a manner that can cause corrosion or decay (see 40 CFR §264.17 and §264.172).

See LANL *Definition of Terms*.

See LANL Acronym Master List.

5.0 RECORDS

Records generated by this document will be submitted for records management in accordance with P1020-1, *Laboratory Records Management* and if applicable, with the ADESH-AP-006, *Records Management Plan*.

Forms provided in the determination method or, at a minimum, user-generated documentation of the compatibility determination must be uploaded into the WCATS system where it will be maintained as part of the operating record.

6.0 TRAINING

See Waste Management Procedure P409, Section 6.0.

7.0 REFERENCES

Larranaga, Michael D., and Richard J. Lewis Sr. and Robert Lewis, *Hawley's Condensed Chemical Dictionary*, 15th ED, Wiley and Sons.

Los Alamos National Laboratory, *P409 LANL Waste Management.*

Los Alamos National Laboratory, *ADESH-Tool-111 Waste Characterization.*

Los Alamos National Laboratory, *ADESH-AP-Tool-206.2 Management of Hazardous Waste by Generators.*

Los Alamos National Laboratory, *ADESH-Tool-802 Permitted Storage Requirement,* Los Alamos National Laboratory, *Hazardous Waste Permit.*

Los Alamos National Laboratory – MSDS Online, MSDS Search, <int.lanl.gov/safety/industrial_hygiene_and_safety/Chemical-safety/chemical-capability-tools.shtml>

New Mexico State University, Example Compatibility Chart, <int.lanl.gov/safety/industrial_hygiene_and_safety/Chemical-safety/chemical-capability-tools.shtml>

Princeton University, Chemical Compatibility, <int.lanl.gov/safety/industrial_hygiene_and_safety/Chemical-safety/chemical-capability-tools.shtml>

Richard J. Lewis Sr., *Sax's Dangerous Properties of Industrial Materials*, John Wiley and Sons, U.S. Department of Transportation, 49 CFR 177.848, *Segregation of Hazardous Materials*

U.S. Environmental Protection Agency, 40 CFR 264 Appendix V and 265 Appendix V, *Examples of Potentially Incompatible Waste*

U.S. Environmental Protection Agency, 40 CFR 264.177, *Special Requirements for Incompatible Wastes*

U.S. Environmental Protection Agency, 40 CFR 264.17, *General Requirements for Ignitable, Reactive, and Incompatible Wastes*

U.S. Environmental Protection Agency, *A Method for Determining the Compatibility of Hazardous Wastes,* EPA 600-2/80-076

U.S. Environmental Protection Agency, Computer Aided Management of Emergency Operations (CAMEO), <http://www2.epa.gov/cameo>

U.S. National Library of Medicine, Wireless Information System for Emergency Responders, <http://wiser.nlm.nih.gov>

8.0 ATTACHMENTS OR APPENDICES

None

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Author(s):	Martinez, Geraldine Emily
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Effective Date: 12/15/2015	Next Review Date: 12/15/2018	

Environment, Safety, Health Directorate

Administrative Procedure

Management of Hazardous Waste by Generators

Document Owner/Subject Matter Expert:

Name:	Organization:	Signature:	Date:
Geri Martinez	ENV-CP	Signature on File	12-3-2015

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Name:	Organization:	Signature:	Date:
Gian Bacigalupa	ENV-CP	Signature on File	12-3-2015

Approval Signatures:

Quality Assurance Reviewer:	Organization:	Signature:	Date:
Doris Quintana	QPA-IQ/OIO	Signature on File	12-3-2015
Responsible Line Manager:	Organization:	Signature:	Date:
Raeanna Sharp-Geiger	ADESH	Signature on File	12-15-2015

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REVISION HISTORY

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This document has been DC reviewed and is unclassified.

1.0 INTRODUCTION

The purpose of this document is to provide requirements for Hazardous Waste, Universal Waste and Used Oil for generators. This document is managed and owned by the Associate Directorate Environment, Safety and Health and provides instructions on the applicability of the requirement.

1.1 Purpose

This document summarizes the requirements in 40 CFR 260 through 265, 273 and 279 and New Mexico Administrative Code, 20 NMAC 4.1.

1.2 Scope

This document applies to any LANL employee, contractor, or sub-contractor who has been identified as a waste generator.

2.0 PRECAUTIONS AND LIMITATIONS

This document cannot establish new requirements; it may only summarize the requirements in federal or state statutes/regulations/permits, DOE Orders, and authorized Laboratory policies.

3.0 GENERAL REQUIREMENTS

This document contains generator requirements for hazardous wastes including universal wastes and used oil.

3.1 Characterization

The generator must characterize their waste and prepare the waste characterization documentation (See ADESH-AP-TOOL-111). If sampling and analysis of waste is required, samples must be taken by qualified and experienced personnel with specialized training. Sampling services can be requested by submitting a Request for Analysis. Contact your WMC for assistance.

Laboratory-wide Waste Stream Profile (WSP) number 15651 (Universal Waste Batteries, see Lab-Wide WSP) may be used for batteries. If this WSP is not applicable, complete a new WSP in accordance with WSP instructions provided by Waste Services. Laboratory-wide Waste Stream Profile (WSP) #34645 (Universal Waste Lamps generated throughout LANL) can be used for most mercury lamps. Laboratory-wide WSP #34647 can be used for incandescent bulbs.

4.0 HAZARDOUS WASTE

A hazardous waste is solid waste that:

- exhibits any of the defined characteristics of hazardous waste (ignitability, corrosivity, reactivity, or toxicity), or
- is a listed hazardous waste (F, K, P or U), or
- is a mixture of solid waste and hazardous waste, or
- is derived from a listed hazardous waste.

5.0 UNIVERSAL WASTE

Universal wastes are wastes that meet the hazardous waste criteria but have less stringent requirements. Universal wastes include batteries, lamps/bulbs, mercury containing equipment, pesticides, and aerosol cans. Universal Waste must have no radioactive or chemical contamination.

5.1 Batteries

A battery is a device consisting of one or more electrically connected electrochemical cells, which is designed to receive, store, and deliver electric energy. An electrochemical cell is a system consisting of an anode, cathode, and an electrolyte, plus such connections (electrical and mechanical) as may be needed to allow the cell to deliver or receive electrical energy. The term “battery” also includes an intact, unbroken battery from which the electrolyte has been removed. See Table 3 below for waste area and labeling requirements.

The most common types of batteries found at LANL are:

Lead Acid Batteries (e.g., automobile batteries) have a core of elemental lead that uses a liquid acid electrolyte. Acid-based batteries often use sulfuric acid as the major component of the electrolyte. These batteries are hazardous wastes that are characteristic for lead and corrosivity.

Gel Cell Batteries are sealed lead acid batteries. A gel cell battery's electrolyte is in a gelatin form and is absorbed into the plates. The battery is then sealed with epoxy. These batteries are hazardous wastes that are characteristic for lead.

Silver Oxide Batteries use silver oxide as the positive electrode and zinc as the negative electrode, with an electrolyte of either sodium or potassium hydroxide. They are mainly used in low-drain applications.

Mercuric Oxide Batteries are a type of alkaline primary cell with a positive electrode of mercuric oxide (often with manganese dioxide), a negative electrode of metallic zinc and either potassium or sodium hydroxide as electrolyte.

Lithium-ion Batteries use a negative electrode of lithium-cobalt dioxide and a positive electrode of carbon (coke or graphite), with an electrolyte of a lithium salt dissolved in an organic solvent.

Nickel-Cadmium (NiCad) Batteries use nickel hydroxide as the positive electrode, cadmium/cadmium hydroxide as the negative electrode and potassium hydroxide as the electrolyte.

Nickel-Metal Hydride (Ni-MH) Batteries are rechargeable power sources often used in portable computers. The nickel metal hydride battery has nickel and metal hydride plates with potassium hydroxide as the electrolyte.

Note: Lead Acid and Gel Cell batteries can be recycled under 40 CFR 266, Subpart G. See ADESH-IG-TOOL-703 for more information.

Remove batteries from equipment and reuse them, if possible. If they cannot be reused:

- Segregate batteries from other types of batteries and other materials.
- Ensure that each battery cell is not breached and that it remains intact and closed. If the cell is breached it needs to be in a closed plastic container.

- Although it is not recommended, electrolyte may be removed from batteries. Cells that are opened to remove electrolyte must be immediately closed after fluid removal. The electrolyte and other solid waste generated as a result of this process will be newly generated and must be characterized. If hazardous, it must be managed as a hazardous waste.

5.2 Lamps

Universal Waste Lamps are the bulb or tube portion of electric lighting devices that have a hazardous component (usually mercury and occasionally lead). Examples of common universal waste electric lamps include, but are not limited to, fluorescent lights, high intensity discharge lamps, neon, mercury vapor, high pressure sodium, and metal halide lamps. See Table 3 below for waste area and labeling requirements.

Note: It is suggested, although not required, that non-hazardous lamps also be managed as universal waste. This will ensure that hazardous lamps are not inappropriately identified as non-hazardous.

Note: Crushing of lamps/bulbs is not permitted at the Laboratory.

5.3 Mercury Containing Equipment

Mercury-Containing Equipment (MCE) includes devices, items, or articles that are hazardous waste (D009) due to the presence of elemental mercury. The mercury must be "integral" to the function of the equipment. Integral means that the mercury must be part of the function of the device. Some commonly recognized MCE are thermostats, barometers, manometers, flow meters, thermometers, pressure gauges, relays, and switches. Batteries and lamps are not MCE. Equipment containing mercury should be handled as Universal Waste. Table 1 lists some typical MCE. See Table 3 below for waste area and labeling requirements.

The following are guidelines for identifying Universal Waste MCE:

- If equipment has been contaminated by an external source of mercury, it is not Universal Waste MCE.
- If the equipment is contaminated by a leak from an internal source of mercury, it can qualify as Universal Waste MCE if the entire piece of equipment is containerized. However, if the piece of equipment is large, it should be decontaminated rather than treating it as MCE. Materials generated from the cleanup of equipment are not MCE.
- MCE does not include any mercury or waste generated from cleaning up spills or leaks, equipment contaminated from an outside source of mercury, and/or other mercury wastes.

Contact the Geri Martinez at 667-6259 for assistance in determining whether your equipment meets the definition of MCE.

An ampule is an airtight vial made of glass, plastic, metal, or any combination of these materials. There is no requirement to remove ampules/housings containing mercury; the entire piece of equipment can be managed as MCE. However, generators may remove ampules or other housings (which must be immediately sealed) containing mercury and manage them as Universal Waste MCE. Uncontaminated

equipment from which the ampule/housing has been removed would no longer be considered MCE. Once the mercury is removed, the remaining equipment is no longer MCE and the generator must make a waste determination whether it is hazardous for a characteristic or listed constituent other than mercury and manage it accordingly.

There are a number of requirements identified in 40 CFR 273.33 that apply to generators removing ampules/housings, including:

- Secondary containment
- Spill clean-up systems
- Ventilation requirements
- Emergency procedures
- Ampule/housing sealing, storage, and packing.

To ensure these provisions are adequately implemented, the generator must call 667-6259 before beginning removal operations.

TABLE 1. TYPICAL UNIVERSAL WASTE MCE

Category	Example of Equipment/Devices	Reported Mercury Content (grams/device)
Thermo-meters	Clinical thermometers (oral/rectal/baby and basal temperature), laboratory thermometers, industrial air/water temperature thermometers, veterinary thermometers, Mason's Hygrometers, sling psychrometers	2 – typical 0-5-0.61 – fever 2.25 – basal 3-10 – laboratory 5 – veterinary 5.56-19.78 – industrial
Switches and Relays	Tilt, float switches, silent light switches, mercury reed switches, metal switches, telephone switches, glass switches, alarm switches, limit switches, mercury-wetted relays, displacement plunger relays, reed relays, flame sensors, pilot sensors, gas safety valves, rectifiers, ignition tubes, G-sensors, oscillators, phanatrons, proximity sensors, capacitors	3.5 – typical 2.6 – silent light 3.5-3,600 – industrial 1 – float 0.5-1 – automotive light 2 – chest freezer light 2 – washing machine light 3 – anti-lock brake 1-2 – ride control system 0.14-3 – mercury reed 160 – displacement relay 2.5 – flame sensor

Gages and Meters	Manometer, barometer, sphygmomanometers, vacuum meters, flow, temperature gages, pressure relief gauges, water treatment pressure gages, regulators, airway controllers, permeters, 330 –hagenmeters, ring balances	330 – sphygmomanometer 395 – barometer 85-355 – typical manometer 91,000 – large manometer
Other equipment or devices	Tubes/dilators (gastrointestinal tubes, esophageal tubes, cantor tubes, Miller Abbot tubes, feeding tubes) recoil suppressors, variable force counterweight wheels, printed circuit boards	170 – recoil suppressor 1,000 – dilator
Sources: Lake Michigan Forum (1999), Michigan Mercury Pollution Prevention Task Force (1996), The Pollution Prevention Partnership and the Milwaukee Metropolitan sewerage District (1997), EAIC and RTI (1999), US EPA (1992), US EPA (1997), WSQAG (1995), and Wisconsin Department of Natural Resources (1997)		

5.4 Aerosol Cans

Aerosol cans are containers in which gas under pressure is used to aerate and dispense any material through a valve in the form of a spray or foam. See Table 3 below for waste area and labeling requirements.

If either the contents of a discarded aerosol can or its propellant are hazardous, it must be managed as a hazardous waste. If an aerosol can is “empty” (i.e., all the liquid contents have been removed by spraying), the can may still contain hazardous propellant; therefore, the hazardous contents and/or propellant must be removed from the aerosol cans before the drained and depressurized can is disposed of or sent for scrap metal recycling as a non-hazardous waste.

Note: Puncturing/venting aerosol cans that contain product or propellant is considered generator treatment and cannot be performed under the universal waste regulations. For guidance on generator treatment see ADESH-AP-TOOL-906.

An aerosol can is considered empty when:

- It has not held a P- listed material
- The can is in good working order (i.e. proper nozzle present and not plugged), and it passes the following two tests:

1. After shaking the can; if the nozzle is depressed and there is no discharge of aerosol or propellant from the can, then it can be determined there is no internal pressure (i.e. the can is at atmospheric pressure) and
2. While shaking the can if there is no evidence of liquid remaining (i.e. the generator cannot hear or feel liquid moving in the can) then it can be determined there is no discernable liquid remaining in the can.

Note: Empty aerosol cans cannot be place in trash receptacles unless they are punctured and drained.

Note: Contact Geri Martinez at 667-6259 before puncturing empty aerosol cans. Empty aerosol cans cannot be punctured until you receive approval from ENV-CP.

If a generator has chosen to handle empty aerosol cans as universal waste, the Laboratory-wide Waste Stream Profile #15618 should be applied. For new and unused product (aerosol cans with product), the Laboratory-wide WPF #40711 should be used.

5.5 Pesticides

Pesticide is a substance used for preventing, destroying, repelling, or mitigating any pest, or used as a plant regulator, defoliant or desiccant. It does not include new animal drugs or animal feed that contains pesticides. See Table 3 below for waste area and labeling requirements.

Waste pesticides should never be disposed in the sanitary landfill trash. They may be hazardous waste if they are listed or characteristic hazardous wastes, universal waste if the pesticides have been recalled, or New Mexico Special Waste (See ADESH-AP-Tool 111 "Waste Characterization"). If you have waste pesticides, contact your Waste Management Coordinator (WMC) or call 667-6259 for assistance in determining how the pesticides are regulated.

6.0 USED OIL FOR RECYCLE

Used Oil is "any oil that has been refined from crude oil or any synthetic oil that has been used and as a result of such use is contaminated by physical or chemical impurities." See Table 3 below for waste area and labeling requirements.

Used oils intended for recycle may include:

- Oils drained or removed from equipment
- Used oils mixed with characteristic-only hazardous wastes if the mixture is not characteristic
- Materials (e.g. rags, absorbents, wipes, scrap metal, etc.) that are contaminated with visible signs of free-flowing oil
- Used oils mixed with fuels (even if not used for energy recovery)
- Oil filters that have not been drained

Materials NOT covered by the used oil definition because they cannot be recycled include:

- Unused oil
- Oil or oil-contaminated material that will not be recycled
- Oil containing, contaminated with, or mixed with:
- >1000 parts per million (ppm) halogens (e.g., chlorinated solvents)
- Fuels not mixed with used oil
- >1% asbestos

- Vegetable or food oils
- > 2 ppm polychlorinated biphenyls (PCBs)
- Radioactive materials or listed hazardous waste
- Characteristic-only hazardous wastes, if the oil/waste mixture is characteristic
- Non-oils such as solvents, kerosene, antifreeze, fuel storage, tank bottoms, etc.

Unless generators can show otherwise, oils with concentrations of more than 1000 ppm halogens are considered hazardous wastes because they are assumed to have been mixed with F-listed chlorinated solvents. Hazardous wastes, must be managed per Table 2 mentioned below. If oils are contaminated by halon-containing refrigerants, there are some exemptions from the definition of hazardous waste. For more details, see ADESH-AP-Tool 713 "Refrigerant – Containing Equipment."

Contact your Waste Management Coordinator (WMC) or call 667-6259 for assistance in determining whether you have a Used Oil or whether other waste requirements apply.

7.0 STORAGE

Table 2. SAA and <90-Day Accumulation Area Requirements

	SAA	<90-Day Accumulation Area
Controls	To be considered "under the control of the operator of the process generating the waste". • The area must be at or near the points of generation, have on-going process associated with it and serves a room or a suite of rooms that are adjacent or across a hallway from each other; one SAA cannot serve rooms on different floors. • To determine if an SAA outside is at or near the point of generation please call Geri Martinez 667-6259. • SAAs must be posted "Satellite Accumulation Area." SAA operators must ensure that adequate physical **or** administrative controls are in place. Physical Controls: • Locked doors or cabinet locks to prevent unauthorized access to the SAA. • If the area is located outdoors, adequate fences, gates, or locks. Administrative controls: • Consultation with a WMC on the adequacy of SAA controls and general disposition. • Posting of the name and phone number of the SAA primary contact. • The maintenance of a current list of authorized SAA	None

	users.	
Volume Limits	• 55-gal. limit for hazardous or mixed waste or • 1-qt. limit for acutely hazardous waste	No volume limits
Containers	Must be closed when waste is not being added or removed. Must be made of or lined with materials that are compatible with the waste. Must be stored and handled so as to prevent container rupture or leakage	Must be closed when waste is not being added or removed. Must be made of or lined with materials that are compatible with the waste. Must be stored and handled so as to prevent container rupture or leakage Containers with a concentration of volatile organic compounds (VOCs) greater than 500 ppm by weight must be monitored for emissions unless they meet DOT specifications under 49 CFR Part 178. Other exclusions from the emission monitoring requirement can be found in 40 CFR 265.1080.
Labeling	Label must include • The words Hazardous Waste or a list of major constituents • Accumulation start date (the date the excess began, if volume limits of 55 gallons are exceeded) • The generator's name and the WPF/WSP number or WPF/WSP number pending or a log book • Mixed waste must be additionally marked "Radioactive Waste."	Label must include • The words Hazardous Waste • The accumulation start date (the date the waste was placed or transferred into the area) • Mixed waste must be additionally marked "Radioactive Waste."
Time Constraints	If volume limits (55 gallons or 1 quart of acutely hazardous) are exceeded, transfer the waste to a <90-day accumulation area or a TSDF within three days	Waste must not remain in excess of 90 days from the date originally generated. If a container/drum contains waste generated on different days, use the earliest date waste was added as the accumulation start date. Submit requests for an extension beyond the 90-day limit to ENV-CP, Geri Martinez (geri@lanl.gov) by day 70. An extension can be granted by NMED if the extension is needed due to unforeseen, temporary, and uncontrollable circumstances. Provide the following information to ENV-CP: • Justify why the extension is required and what has been done to-date to move the waste; and • A written action plan ensuring the waste will be moved before the 30-day

		extension ends.
Location	• Must be located at or near the point of generation • Must be under the control of the operator of the process generating the waste • Owner/Operator/Generator must be an active user of the SAA • Must be registered with ENV-CP • Legacy/No-Owner waste is not allowed to be stored in an SAA	• Must have a minimum of 2 ft. aisle spacing • Must have an emergency/site-specific plan and a contingency plan • Must have emergency and decontamination equipment available • Must be registered with ENV-CP
Safety Equipment	None	The <90 day area must be equipped with the required eyewash and safety showers, spill control equipment, communications and alarm equipment, and emergency equipment for the types of hazards posed at the site. The equipment must be tested and readiness maintained to ensure it operates as required in time of an emergency. ► An Industrial Hygiene/Safety person must determine if equipment is required or if equipment is not required, this determination must be documented in a memo to file. ► Install and maintain all safety equipment as directed by Industrial Hygiene/Safety.
Inspections	Inspections are not required	Use the <90 day Inspection Record Form (see Attachment 1), inspections are required: • Each day wastes are actively managed • A minimum of weekly whether or not waste management activities were performed.
Signs/Posting	The area must have a sign with the words Hazardous Waste Satellite Accumulation Area.	The area must have a sign with the words Hazardous Waste <90-Day Accumulation Area.
Documentation	Characterization documentation must be kept for all waste streams.	Characterization documentation must be kept for all waste streams.
Packaging	Hazardous waste must be shipped in a Department of Transportation-approved container that is compatible with the waste.	Hazardous waste must be shipped in a Department of Transportation-approved container that is compatible with the waste.
Shipping	Contact your WMC.	Contact your WMC.

Table 3. UWA and Used Oil Requirements

	UWA	Used Oil
Volume Limits	No volume limits	No volume limits
Containers	Must be closed when waste is not being added or removed. Must be made of or lined with materials that are compatible with the waste. Must be stored and handled so as to prevent container rupture or leakage.	Used Oil containers stored outside must be closed except when waste is being added or removed. Must be made of or lined with materials that are compatible with the waste. Must be stored and handled so as to prevent container rupture or leakage.
Labeling	Label must include • The words Universal Waste and a list of major constituent (batteries, lamps/bulbs, aerosol cans, mercury containing equipment or pesticides) • Accumulation start date	Label must include • The words Used Oil
Time Constraints	Waste must not remain in excess of one year from the date originally generated.	None
Location	• Must be registered with ENV-CP	If you accumulate 10 gallons or more in a single location maintain a log sheet of origin/generator of the oil. • Must be registered with ENV-CP
Inspections	Inspections are not required	Inspections are not required
Signs/Posting	The area must have a sign with the words Universal Waste Accumulation Area.	It is suggested, although not required, that the area have a sign with the words Used Oil and the name and phone number of the primary user.
Packaging	Universal waste must be shipped in a Department of Transportation-approved container that is compatible with the waste.	
Shipping	Contact your WMC.	Contact your WMC.

8.0 DEFINITIONS AND ACRONYMS

See LANL *Definition of Terms*.

See LANL Acronym Master List.

9.0 RECORDS

Records generated by this document will be submitted for records management in accordance with P1020-1, *Laboratory Records Management* and if applicable, with the ADESH-AP-006, *Records Management Plan*.

- Inspection Records Forms must be kept by the waste generator.
- Characterization documentation must be kept by the waste generator.

10.0 TRAINING

See Waste Management Procedure P409, Section 6.0.

11.0 REFERENCES

P409, "LANL Waste Management"

40 CFR Section 260 through 279

SAA Policy, accepted by NMED 5/11/1996

12.0 ATTACHMENTS OR APPENDICES

Attachment 1, Inspection Record Form for < 90 day Accumulation Areas

HAZARDOUS/MIXED WASTE FACILITY INSPECTION RECORD FORM FOR < 90

[1] FACILITY: TA Bldg Room Other Location:	[2] Site ID #:	[3] START DATE:	[4] END DATE:

PART I- Enter condition of the item inspected (**OK**, **NA** [Not Applicable], or **AR** [Action Required]) in column for day inspected.

ITEM	INSPECTED FOR:	MON	TUE	WED	THU	FRI	SAT	SUN
[5] NO USE	No waste stored							
[6] LABELS	Hazardous waste labels on all tanks and containers							
[7] ACCUMULATION START DATE	Present and legible							
[8] NOT EXCEEDING 90 DAYS	Waste has not exceeded 90 days							
[9] COVERS/LIDS OF CONTAINERS	Closed and secured properly							
[10] INTEGRITY (containers/structure)	Integrity, leakage, deterioration, corrosion, and damage							
[11] COMPATIBILITY	Separated according to compatibility							
[12] AISLE SPACE/STACKING	Appropriateness and adequacy							
[13] COMMUNICATION EQUIPMENT	Availability and proper operating condition							
[14] SPILL/FIRE EQUIPMENT	Present, appropriate, and in proper operating condition							
[15] EYEWASHES/SAFETY SHOWERS	Proper operating condition							
[16] TANK SYSTEMS (Aboveground portions)	Discharge controls, leakage, fill level, and corrosion							
[17]**DATE**								
[18]**TIME**								
[19] **NAME OF INSPECTOR(S)**								

Comments:

September 2015

This document has been DC reviewed and is unclassified.

HAZARDOUS/MIXED WASTE FACILITY INSPECTION RECORD FORM FOR < 90

[1] FACILITY: TA Bldg Other Location:	[2] Site ID #:	[3] START DATE:	[4] END DATE:

Part II- For any AR (Action Required) in PART I, describe below: action required, action taken, date, and time of action. Attach additional sheets if necessary. If more than one action is required, number each AR.

[20]

This document has been DC reviewed and is unclassified.

Los Alamos
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EST. 1943

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Environment, Safety, Health Directorate

WM-SVS: Waste Management Services

Administrative Procedure

Radioactive Waste Management

Document Owner/Subject Matter Expert:

Name:	Organization:	Signature:	Date:
Gregg Geisinger	WM-SVS	Signature on File	01-12-2016

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Name:	Organization:	Signature:	Date:
Joe Rodriguez	WM-SVS	Signature on File	01-12-2016

Approval Signatures:

Quality Assurance Reviewer:	Organization:	Signature:	Date:
Larry Maassen	QPA-IQ	Signature on File	01-19-2016
Responsible Line Manager:	Organization:	Signature:	Date:
Raeanna Sharp-Geiger	ADESH	Signature on File	02-08-2016

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1.0 INTRODUCTION

The purpose of this procedure is to provide requirements for Radioactive Waste Management. This document is managed and owned by the Environment, Safety, and Health Associate Directorate and provides instructions on applying the requirements.

1.1 Purpose

This procedure summarizes the requirements in Los Alamos National Laboratory (LANL) procedure P151-1, LANL Packaging and Transportation Program Procedure; Department of Energy (DOE) Order 435.1, "Radioactive Waste Management" and the associated manual, DOE Manual 435.1-1, *Radioactive Waste Management Manual* (collectively referred to as DOE O/M 435); and DOE Order 458.1, "Radiation Protection of the Public and the Environment," Section 4.k.

1.2 Scope

The Waste Management Division (WM) provides radioactive waste planning, characterization, reporting, and disposal services in support of LANL's radiation and environmental protection missions.

Radioactive waste may also potentially be characterized as mixed waste. Mixed waste contains both radioactive and hazardous components as defined by the Atomic Energy Act of 1954 (as amended) and Title 40 Code of Federal Regulations (CFR) §261, "Identification and Listing of Hazardous Waste." Consequently, users of this Functional Series Document (FSD) must also follow the guidance in ADESH-AP-TOOL-111, Waste Characterization, to ensure their waste characterization process complies with the hazardous waste characterization requirements in Title 40 CFR §262.11, "Hazardous Waste Determination," and LANL's Hazardous Waste Facility Permit. This FSD will also help users make transportation determinations in accordance with the Department of Transportation requirements in Title 49 CFR §173, "Shippers–General Requirements for Shipments and Packages."

1.3 Applicability

This procedure applies to any LANL employee, contractor, or subcontractor who has been identified as a waste generator.

Note: Treatment and storage facility (TSF) workers become "waste generators" when activities at the TSF (e.g., repackaging, sorting, and segregation) lead to the generation of regulated waste or trigger re-characterization of the waste stream.

2.0 PRECAUTIONS AND LIMITATIONS

This procedure cannot establish new requirements; it may only summarize the requirements in federal/state statutes/regulations/permits, DOE orders, and authorized Laboratory policies.

3.0 RADIOACTIVE WASTE MANAGEMENT REQUIREMENTS

Low-level waste (LLW), mixed low-level waste (MLLW), transuranic waste (TRU), and transuranic mixed waste (TRM) must meet waste package certification requirements before the waste is packaged, shipped, and disposed. Generators of radioactive waste have two options in meeting the waste package certification requirements. For either option the waste generator must make a request via e-mail to WCO@lanl.gov to arrange for waste package certification.

- For radioactive waste destined to the Nevada National Security Site (NNSS), the waste generator must follow the requirements outlined in the LANL Off-Site Waste: Nevada National Security Site procedures.
- For wastes destined to a non-NNSS facility, the waste generator may also follow the requirements outlined in the LANL Off-Site Waste: Nevada National Security Site procedures (recommended), or WM can perform an evaluation of each waste stream to ensure waste characterization, packaging, shipment, and disposal are compliant with applicable regulations and waste acceptance criteria.

While carrying out their radioactive waste management duties, waste generators and waste management coordinators (WMCs) must reference the appropriate Functional Series Documents (FSDs) as directed in the waste-type sections below. The FSDs support the requirements for each waste type addressed in DOE O/M 435.

3.1 Waste Generation Planning

DOE Manual 435.1-1 includes the following requirement: “Prior to waste generation, planning shall be performed to address the entire life cycle for all transuranic/low-level waste streams.” This planning includes waste minimization strategy evaluation and beginning the waste stream profile process. The waste generator will coordinate with the WMC and radiation control technicians prior to generating the waste. Waste generation planning also includes the following:

- **Quality Assurance Program:** Each organization owning a waste storage area or waste staging area must implement a quality assurance program compliant with DOE Order 414.1D, “Quality Assurance.”
- **Documentation:** Required documentation includes a listing of waste records and specification of how records are protected and retained, the retention period, and how documents are maintained for retrievability and auditability.
- **Planning New Radioactive Waste Streams:** All waste generators that anticipate generating a new waste stream should review the new R&D and new operations waste stream planning FSD and implement its requirements. This FSD also applies to proposed new research and development laboratory (R&D) projects or proposed significant modifications to existing waste streams. The waste minimization provisions in this FSD must be implemented wherever practicable.
- **Removing Waste from Radiological Areas:** Before radioactive waste can be removed from a radiological control area, it must meet the release criteria in LANL procedure P121, Radiation Protection. The Green is Clean (GIC) program is designed to reduce the generation of

radioactive LLW through a waste segregation and verification program based on acceptable knowledge (AK) and screening. Waste generators in radiological control areas segregate clean waste from radiologically contaminated waste and place waste determined to be nonradioactive in GIC containers. Contact Green-is-Clean to arrange for this service.

- **Waste Forecasting:** To access treatment, storage, or disposal facilities (TSDFs), the waste generator must provide volume projections for waste transfers to each TSDF for radioactive waste disposition. Any waste generator failing to provide the requested waste forecasting information in a timely manner may be prohibited from transferring waste to the applicable facility.

3.2 Radioactive Waste Management Basis Information

Radioactive-waste-generating facilities must submit radioactive waste management basis (RWMB) information with the RWMB form. Contact the Waste Certification Program (WCP) for guidance.

- WMCs must register LLW staging and storage areas and transuranic (TRU) waste storage areas with the WM, on behave of generators who own these areas.
- The generating facility must implement and document the inspection schedule for staging and storage areas.
- Radioactive waste generators must ensure their waste is certified for storage and shipment in concurrence with the WMC.
- Unless a formal agreement is in place with DOE, facilities that intend to store radioactive waste for longer than 1 year must submit a modified RWMB to request a storage extension for the waste as specified in LANL procedure P409, Section 3.4.3.

3.3 Waste Certification and Protection

Waste certification and protection is the process of ensuring that

- the initial characterization methods are adequate (waste generator organizations mischaracterizing waste will be charged for any remediation work required to bring the waste, the site, and/or the facility into compliance with governing regulations);

Note: Acceptable characterization approaches include defensible AK and/or physical/chemical/radiological analysis.

- waste packages meet the WAC of the intended TSDF, including waste package certification consistent with the NNSS WAC;
- access to the storage area is controlled such that waste containers are protected from tampering, unauthorized waste addition or removal, and the elements;
- waste containers are adequate to protect the waste against external sources of contamination over the expected storage period; and
- the process for linking waste characterization documentation to specific containers guarantees that the documentation and the information on the containers match;

- during storage;
- when the responsibility for physical control of the waste is transferred; or
- when the waste is shipped.

The following practices are essential to ensuring waste certification and protection requirements are met:

- development of accurate and complete waste documentation;
- adequate container labeling;
- a communications system that ensures personnel consistently understand the status of waste containers and container transfers; and
- quality controls to validate the container tracking system.

For the purposes of DOE Manual 435.1, Chapter IV, Section J, WMCs ensure radioactive waste containers meet the acceptance requirements for waste being transferred into on-site radioactive waste staging or storage areas. WMCs are responsible for reporting to management when a facility's physical structure or operation does not enable them to stage or store radioactive waste. When radioactive waste is readied for shipment to a TSDF, WAC certification activities are completed by the LANL WCO.

To ensure the integrity of the radioactive waste is maintained during staging and storage, WMCs verify:

- the waste characterization documentation is accurate and complete;
- the waste meets the WAC for the on-site radioactive waste staging or storage area;
- the waste container is adequate to protect the waste against external sources of contamination while in storage;
- waste containers are closed and sealed in accordance with manufacturer's instructions before shipment;
- measuring and test equipment used to close the container and/or obtain weights of the container or waste meet the requirements of LANL procedure P330-2, Control and Calibration of Measuring and Test Equipment (M&TE); and
- nonconforming items and/or processes are reported to the responsible line manager and nonconformance coordinator.

3.4 Stabilization

When practical, radioactive waste shall be generated to minimize volume and in a manner that provides a stable waste form. Radioactive wastes shall not react with other wastes or the packaging during storage, shipping, handling, and disposal. Chemical stability and compatibility shall be demonstrated to ensure that no reactions occur and significant quantities of harmful gases, vapors, liquids, or explosive conditions and compounds are not generated (specifically when different waste

forms are combined in a single waste container). For waste compatibility determinations refer to ASESH-AP-TOOL-115 (Rev. 0), Waste Compatibility Determinations.

3.5 Waste Container Loading Configuration Requirements

LLW waste packages destined to the NNSS shall be filled and loaded in accordance with LANL procedure WM-PROG-QP-204, Low-Level Waste Packaging Oversight of Waste for Disposal at the Nevada National Security Site (NNSS).

MLLW waste packages destined to the NNSS shall be filled and loaded in accordance with LANL procedure WM-PROG-QP-208, Mixed Low Level Waste Packaging Oversight of Waste for Disposal at the Nevada National Security Site (NNSS). For radioactive waste destined to a TSDFs other than NNSS, WM must be consulted for guidance.

For all LANL waste package configurations, be sure, at a minimum, to complete the following steps:

- Verify the package maximum gross weight;
- Ensure that the package is not overloaded;
- Verify that the waste designated for loading is compatible with the package;
- Verify that the physical configuration of the loading mechanism will not damage the package;
- Verify that the waste and the package are certified for disposition at the disposal facility; and
- Verify the package is free from nonconforming waste items.

3.6 Staging and Storage

3.6.1 LLW Staging

Safe and secure staging of LLW is required per LANL procedure P409. Stage LLW in a location and manner that minimizes worker exposure and protects the integrity of the waste and waste package for the expected time of storage. The seal date (also known as the rad start date) begins when the final container for the waste has been filled and sealed. The staging seal date must then be included on the container and that information must be updated in WCATS. LLW can be accumulated in its final container at the point of generation when waste activities are under the control of the generator or inside a staging area. Accumulation means the collection or generation of waste items into the final container inside a staging area until filled and sealed prior to shipment from the staging area. Accumulation points outside of staging areas do **not** have to be registered. There is no set limit to the time waste can be accumulated in its final container as long as this done in a timely manner, given the circumstances of the waste-generating process. Waste streams should be evaluated by the generator annually, for disposition or continued accumulation, as a best management practice.

3.6.2 General Staging and Storage Requirements

- Before waste can be accepted by a storage area or TSF, the waste must be characterized as summarized in the Waste Characterization FSD.

- Radioactive waste in staging and storage must not be readily capable of detonation, explosive decomposition, reaction at anticipated pressures and temperatures, or explosive reaction with water. Pyrophoric materials must be treated, prepared, and packaged to be nonflammable before storage.
- If inventory limits are required by the storage/staging area, the facility must ensure they are not exceeded.
- LLW may be staged for no more than 90 days pending transport to a LLW storage area or TSDF.
- Waste packages cannot be stored for longer than 1 year. If storage must exceed this limit, the facility must re-submit its RWMB and request a storage extension by following the process outlined in LANL procedure P409.
- Waste with no disposal path may be stored for longer than 1 year only with an approved No Path Package from WM for each waste stream.
- Monthly inspections of staging and storage areas are required with the radioactive waste staging area monthly inspection form or radioactive waste storage area monthly inspection form, as appropriate.

3.6.3 Signs and Labels

- A sign for a waste staging or storage area must be posted indicating the Site ID number obtained when the site is registered.
- TSFs must register radioactive waste staging and storage areas that are managing waste generated by the TSF itself, and these areas must be posted with Waste Staging Area signs within the TSF generation areas (e.g., secondary waste generation, equipment disposal, etc.).
- TSFs do not require Waste Storage Area signs, but the waste in these areas must be included in the RWMB.
- Staging and storage areas must be evaluated by a radiological control technician (RTC). The radiation protection program must post signs in the areas, as appropriate.
- Signs to meet the requirements of LANL procedure P121, Chapter 7, must be posted. (The radiation protection program or your WMC may be contacted for radiation protection signs.)
- Before waste in a staging area will be accepted by a storage area or TSF, containers must be labeled (Refer to the LANL waste management labels guidance). Waste in storage areas must comply with the requirements in the LANL WAC for LLW packaging and labeling or TRU waste packaging and labeling.
- Before LLW waste with an added contaminant (non-hazardous) will be accepted by a storage area or TSF, containers must meet the packaging and labeling requirements summarized in the Asbestos-Containing Material, Polychlorinated Biphenyls (PCBs), or Beryllium FSDs, as appropriate.

3.7 Requirements for Specific Radioactive Waste Types

3.7.1 Low-Level Waste

DOE O 435.1 formally defines low-level radioactive waste as radioactive waste that is not high-level radioactive waste, spent nuclear fuel, transuranic waste, byproduct material (as defined in section 11e.(2) of the *Atomic Energy Act of 1954*, as amended), or naturally occurring radioactive material.

Primarily LLW generated at LANL is radioactive waste that contains less than 100 nCi/g of alpha-emitting transuranic radionuclides, with a half-life greater than 20 years.

- Follow the LLW staging and storage requirements summarized in section 3.6 of this procedure. Radioactive waste facilities must inspect their LLW waste staging and storage areas monthly with the radioactive waste staging area monthly inspection form or radioactive waste storage area monthly inspection form, respectively.
- Facilities that must store LLW in excess of 1 year must submit a modified RWMB to request a storage extension for the radiological component of the waste as specified in LANL procedure P409, Section 3.4.3.a.

3.7.2 Mixed Low-Level Waste

MLLW is waste containing both LLW and a hazardous component as defined by the Atomic Energy Act of 1954 (as amended) and a Resource Conservation and Recovery Act (RCRA) constituent as identified in 40 CFR 261.

Because of its hazardous waste components, MLLW cannot be staged or stored solely in compliance with DOE O/M 435. Follow the requirements summarized in the functional series document (FSD) ADESH-TOOL-206, Hazardous Waste (General), as appropriate.

- Because of the hazardous waste component, MLLW containers must be inspected in accordance with requirements of the appropriate registered waste area described in the FSD listed above.
- Facilities that must store MLLW in excess of 1 year must:

  1. before the end of 1 year's MLLW storage, notify LANL's Site Treatment Plan point of contact to include the waste in LANL's Site Treatment Plan.

  2. submit a modified RWMB to request a storage extension for the radiological component of the waste as specified in LANL procedure P409, Section 3.4.3.a.

3.7.3 TRU Waste

Radioactive waste containing more than 100 nanocuries (3700 becquerels) of alpha-emitting transuranic isotopes per gram of waste, with half-lives greater than 20 years, except for:

- High-level radioactive waste;
- Waste that the Secretary of Energy has determined, with the concurrence of the Administrator of the Environmental Protection Agency, does not need the degree of isolation required by the 40 CFR Part 191 disposal regulations; or

- Waste that the Nuclear Regulatory Commission has approved for disposal on a case-by-case basis in accordance with 10 CFR Part 61.

Follow the waste storage requirements summarized in section 3.6 of this procedure. Radioactive waste facilities must inspect their TRU waste storage areas monthly with the radioactive waste storage area monthly inspection form.

Facilities that must store TRU in excess of 1 year must submit a modified RWMB to request a storage extension for the radiological component of the waste as specified in LANL procedure P409, Section 3.4.3.a.

3.7.4 Mixed TRU Waste

Mixed TRU waste (MTRU) is TRU determined to contain both a hazardous component subject to RCRA, as amended, and a radioactive component subject to the Atomic Energy Act of 1954, as amended.

Because of the hazardous waste component of MTRU, it cannot be accumulated in a staging area or stored in a radioactive waste storage area; use the ADESH-TOOL-206, Hazardous Waste (General), or the LANL TSF's FSD.

- Facilities that must store MTRU in excess of 1 year must:

  1. notify LANL's Site Treatment Plan point of contact to include the waste in LANL's Site Treatment Plan.

  2. submit a modified RWMB to request a storage extension for the radiological component of the waste as specified in LANL procedure P409, Section 3.4.3.a.

3.7.5 Liquid Low-Level Waste

The FSD for radioactive liquid waste generation, certification, documentation, and shipment to TA-50 or TA-53 specifies the process from waste generation planning through final disposition.

- Follow the LLW staging and storage requirements summarized in section 3.6 of this procedure. Radioactive waste facilities must inspect their LLW waste staging and storage areas monthly using the radioactive waste staging area monthly inspection form or radioactive waste storage area monthly inspection form.
- Facilities that must store LLW in excess of 1 year must submit a modified RWMB to request a storage extension for the radiological component of the waste as specified in LANL procedure P409, Section 3.4.3.a.

3.7.6 Radioactive TSCA Waste (PCBs & Asbestos) or Beryllium-Contamination Radioactive Waste

Radioactive waste that contains a substance regulated under the Toxic Substance Control Act (TSCA), most commonly PCBs, must be managed subject to DOE Manual 435.1-1 and TSCA. LLW or MLLW waste that contains PCBs, asbestos, or beryllium, must be managed subject to DOE Manual 435.1-1 and the NNSS WAC, in communication with the on-site WPC.

Use the following FSDs in addition to radioactive requirements:

- PCB storage FSD
- Asbestos FSD,
- Beryllium powder FSD.

For radioactive contaminated beryllium in other forms contact wco@lanl.gov.

4.0 DEFINITIONS AND ACRONYMS

See LANL *Definition of Terms*.

See LANL Acronym Master List.

5.0 RECORDS

Records generated by this document will be submitted for records management in accordance with P1020-1, Laboratory Records Management and if applicable, with the ADESH-AP-006, Records *Management Plan*. Records generated by implementation of this procedure are:

- radioactive waste staging area monthly inspection forms;
- radioactive waste storage area monthly inspection forms;
- radioactive waste management basis; and
- site registration form for radioactive waste storage/staging areas.

6.0 REFERENCES

- ADESH-TOOL-111.2, Waste Characterization
- ADESH TOOL-203.2, Beryllium Powder
- ADESH-TOOL-206, Hazardous Waste (General)
- ADESH-TOOL-500.2, New Mexico Special Waste: Asbestos without Hazardous Waste Contamination
- 40 CFR §261, "Identification and Listing of Hazardous Waste"
- 40 CFR §262.11, "Hazardous Waste Determination,"
- 49 CFR §173, "Shippers–General Requirements for Shipments and Packages"
- DOE O 414.1D, "Quality Assurance"
- DOE O 435.1, "Radioactive Waste Management"
- DOE M 435.1-1, *Radioactive Waste Management Manual*
- DOE O 458.1, "Radiation Protection of the Public and the Environment"
- ENV-RCRA-TOOL-109.0, New Process Waste Stream Planning
- LANL Off-Site Waste: Nevada National Security Site procedures

- P151-1, LANL Packaging and Transportation Program Procedure
- P330-2, Control and Calibration of Measuring and Test Equipment (M&TE)
- P409, LANL Waste Management
- P121, Radiation Protection
- WM-PROG-QP-204, Low-Level Waste Packaging Oversight of Waste for Disposal at the Nevada National Security Site (NNSS)
- WM-PROG-QP-208, Mixed Low Level Waste Packaging Oversight of Waste for Disposal at the Nevada National Security Site (NNSS)
- WM-TOOL-302.1, Radioactive PCB Accumulation Area Requirements

7.0 TRAINING

Personnel must be trained in accordance with the requirements in LANL procedure P409, LANL Waste Management, and course 23264, Waste Generation Overview. Additional training requirements may be facility specific.

8.0 ATTACHMENTS OR APPENDICES

N/A

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Environment, Safety, Health Directorate

WM-SVS: Waste Management Services

Administrative Procedure

Radioactive Characterization of Waste

Document Owner/Subject Matter Expert:

Name:	Organization:	Signature:	Date:
Gregg Geisinger	WM-SVS	Signature on File	11-24-2015

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Name:	Organization:	Signature:	Date:
Larry Maassen	QPA-IQ	Signature on File	11-23-2015

Approval Signatures:

Quality Assurance Reviewer:	Organization:	Signature:	Date:
Doris Quintana	QPA/OIO	Signature on File	11-23-2015
Responsible Line Manager:	Organization:	Signature:	Date:
Raeanna Sharp-Geiger	ADESH	Signature on File	02-10-2016

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This document has been DC reviewed and is unclassified.

1.0 INTRODUCTION

The purpose of this document is to provide requirements for radioactive characterization of waste. This procedure is managed and owned by the Associate Directorate Environment, Safety and Health and provides instructions on the applicability and implementation of the requirement.

1.1 Purpose

This document summarizes the requirements in United States Department of Energy (DOE) Manual 435.1-1, Radioactive Waste Management Manual and DOE O 458.1, Radiation Protection of the Public and the Environment, Section 4.k.

1.2 Scope

The Waste Management Division (WM) provides radioactive waste planning, characterization, reporting, and disposal services in support of LANL's radiological and environmental protection missions. Generators must characterize waste through sampling and analysis, acceptable knowledge (AK), or a combination of both, to demonstrate the waste meets TSDF requirements. For waste characterized as MLLW, generators shall demonstrate that the MLLW meets the applicable Title 40 CFR. Generators shall characterize waste with sufficient accuracy to permit proper segregation, treatment, storage, and disposal. The characterization methods and procedures employed by the generator shall ensure that the physical, chemical, and radiological characteristics of the waste are recorded and known during all stages of the waste management process.

Mixed waste contains both radioactive and hazardous components as defined by the Atomic Energy Act of 1954 (as amended) and Title 40 Code of Federal Regulations (CFR) §261. Users of this Function Series Document (FSD) must also follow the guidance in ADESH-AP-TOOL-111, "Waste Characterization," to ensure their waste characterization process complies with the hazardous waste characterization requirements in Title 40 CFR §262.11, "Hazardous Waste Determination" and the Los Alamos National Laboratory (LANL) Hazardous Waste Facility Permit. This document will also assist in making transportation determinations as required by the Department of Transportation Title 49 CFR §173.

Users seeking authorized release limits based on requirements in Section 4.k of DOE Order 458.1 should follow the requirements provided under "Release and Clearance of Property," below.

1.3 Applicability

This document applies to any LANL employee, contractor, or sub-contractor who has been identified as a waste generator.

Note: Treatment and Storage Facility (TSF) workers become "Waste Generators" when activities at the TSF (e.g., repackaging, sorting, and segregation) lead to the generation of regulated waste or trigger re-characterization of the waste stream.

2.0 PRECAUTIONS AND LIMITATIONS

This document cannot establish new requirements; it may only summarize the requirements in federal/state statutes/regulations/permits, DOE Orders, and authorized Laboratory policies.

3.0 RADIOLOGICAL CHARACTERIZATION METHODS

There are several methods for radiological characterization of waste. The waste characterization methods described below are not intended to be all-inclusive. In addition, these methods can be used individually or in combination.

Note: SAFE-4 (Material Control and Accountability), uses NON-DESTRUCTIVE ASSAY (NDA) instruments for accountability, confirmation, and verification measurements. SAFE-4 requirements may be in addition to waste characterization methods described in this procedure.

3.1 Using Direct Analytical Data to Characterize the Waste

Direct sampling and analytical analysis is the preferred method of radiological characterization, which is generated from samples taken directly from the waste being characterized. Waste Generators can meet general and specific waste analysis requirements using several methods or combinations of methods. Wherever feasible, the preferred method to meet the waste analysis requirements is to conduct sampling and laboratory analysis because it is more accurate and defensible than other options.

When sampling and analysis is used as a method of characterization, data validation shall be conducted on a portion of chemical and radiological data prior to use of the data for characterization. Data validation is a comprehensive analysis and review of analytical data conducted against a set of predetermined criteria and leading to the assignment of relative usability (i.e., completely usable, estimated value, unusable) for each analytical result. The validation criteria should be developed using the Data Quality Objective (DQO) process and are dependent upon the type(s) of data involved and the purpose for which the data are collected. Data shall be validated by technically qualified personnel who are independent of those performing the analyses.

There are job aids to assist in determining the concentration of isotopes in the waste located on the WM website.

3.2 Using Non-Destructive Assay to Characterize Radioactive Constituents

Non-Destructive Assay (NDA) can deliver measurements of radioactive and nuclear materials for characterization purposes. Some of which include, radioactive waste container characterization, assessments of material hold-up in process equipment, confirmation and verification measurements of special nuclear materials for safeguards processes, and quantification of fissile materials for criticality safety purposes.

Note: Due to the minimum detectable activities of the assay equipment, only TRU and LLW determinations can be made using NDA. NDA cannot be used for the Release and Clearance of Property.

3.3 Using Acceptable Knowledge to Characterize Radioactive Constituents

Waste generators can meet general and specific radioactive waste analysis requirements using several methods or combinations of methods. Wherever feasible, the preferred method to meet the radioactive waste analysis requirements is to conduct sampling and laboratory analysis because it is more accurate and defensible than other options. However, waste generators can meet the intent of radioactive waste analysis requirements by applying acceptable knowledge. Acceptable knowledge can be used to meet all or part of the radioactive waste analysis requirements. Acceptable knowledge can be broadly defined to include:

"Process knowledge," whereby detailed information on the wastes is obtained from existing published or documented waste analysis data or studies conducted on wastes generated by processes similar to that which generated the waste. Therefore, with many wastes the application of acceptable knowledge is appropriate because the physical/chemical makeup of the waste is generally well known and consistent.

While seemingly attractive because of the potential savings associated with using existing information (such as published data), waste generators must ensure that this information is current (prevalent) and accurate. If waste generators use acceptable knowledge in addition to or in place of sampling and analysis, regulators, administrators, auditors, etc. look for documentation that clearly demonstrates that the information relied upon is sufficient to identify the waste accurately and completely.

The following sources of acceptable knowledge may be used to segregate and characterize the radiological constituents of a waste stream. These methods may use source information, gross radiation measurements including scaling factors, calculations, and/or may include Surface Contaminated Object (SCO) calculations. All characterization methods must be documented and legally defensible for internal or external third party reviews. AK can be used for waste characterization in lieu of sampling and analysis if the waste generator's AK is of sufficient detail to qualify as acceptable. Other sources of AK may include but are not limited to:

- Plans and drawings;
- Areas and/or buildings where each waste stream is generated;
- Material inputs, including MSDSs;
- Manufacturing specifications;
- Mass balance documentation;
- Literature searches;
- Living memory (documented interviews);
- Laboratory notes and batch records;

- Process logs and batch records; and
- Procedures.

Source information. If the radionuclides used in a controlled area are well known and documented (e.g. materials control and accountability), and if operational controls limit the transfer of material containing other radionuclides into the area, the waste stream generated in this area may be segregated and characterized using source information. Values must be verified and documented periodically, at a minimum annually, or when a change in process or area controls has occurred.

Gross radiation measurements. Gross radiation measurements (e.g., gross alpha [fixed and/or removable], Beta and Gamma surveys) may be used if there is a demonstrable correlation between the gross radiation and the radionuclide content and/or activity of the waste stream. Scaling factors can be developed that relate gross radiation measurements to the activity concentration and/or activity of a waste stream. Waste Generators using gross radiation measurements shall ensure that measurements correlate with activity concentration on a consistent basis. Radionuclide distributions in the waste stream must be initially determined and periodically verified through direct measurements or sampling and analysis. Generators must document the methods used to develop scaling factors that relate gross radiation measurements to the activity concentration. When developing scaling factors, generators shall consider the waste package and detector geometry, shielding and attenuation effects, self-absorption, and the energy spectra and decay schemes of radionuclides in the waste.

Calculations. When applicable, calculations may be used to identify radionuclides and estimate activities, provided that the computational methods and software used have been verified, validated, and documented. Ensure that the computational methods used to segregate and characterize wastes are described in the waste characterization documentation. It is very important for waste generators to accurately complete WCATS panels, Process Information, Waste Description, and to add all necessary information in the Documentation panel.

Surface Contaminated Objects (SCOs). EP-TD-2204, *Requirements Document for Radiological Characterization of Surface Contaminated Objects at LANL*, defines the requirements for radiological characterization of SCOs. The methods described in EP-TD-2204 are used to determine:

- Compliance with U.S. Department of Transportation (DOT) regulations for categorization of SCOs;
- Total radioactivity for all radionuclides within a shipping container packed with SCOs;
- Radioactivity concentration (activity per gram of waste) in the shipping container to demonstrate conformance to portions of disposal site waste acceptance criteria (WAC) for near-surface land disposal.

An SCO is a solid object which itself is not radioactive, but which has fixed and/or removable radioactive contamination distributed on any of its surfaces. In keeping with DOE Order M 435.1-1, the methods presented in EP-TD-2204 incorporate a graded approach to waste characterization. More rigorous, detailed analysis is performed when waste approaches a DOT or WAC limitation.

3.4 Release and Clearance of Property

Release or clearance of property, soil, rubble, and debris from demolition and remediation activities may contain very low levels of radioactivity that are above background but below the radiological release limits. Release of these wastes must be conducted in accordance with the requirements in P412, Environmental Radiation Protection and DOE Order 458, Section 4.k.

The order sets forth the criteria for establishing the authorized limits for the release of property and defines residual radioactive material as material having a level of radioactivity that is low enough for release without restrictions.

If waste generators, project managers, construction managers, or other waste management personnel plan to utilize the release or clearance criteria established by P412 and DOE O 458 contact the WM-SVS Group Leader. The Group Leader will appoint the Rad Waste Authority to evaluate the potential for release or clearance of property, soil, rubble, and debris. If this path is viable, WM-SVS will assist in the process to ensure the requirements identified in P412 and DOE O 458 are satisfied.

3.5 Re-characterization of Waste Stream

Waste Generators must update waste characterization based on the following:

- there is a change to the waste-generating processes or operations;
- analytical results indicate a discrepancy in the waste stream description;
- new characterization information becomes available;
- a waste container is opened and secondary material is added to the container;
- waste is repackaged and secondary material is added during this process;
- there is a change in the ownership of a WSP;
- loss of process controls that are in place to ensure generated waste remains within the bounds of the WSP;
- inconsistencies in the AK documentation are identified;
- the Waste Generator is notified that waste received at an off-site facility does not match a pre-approved waste analysis certification or accompanying shipping documentation;
- waste is repackaged and no longer matches the characterization in its WSP;
- annual notification of AK waste streams indicates the waste does not match the waste specified by the waste generator;
- waste received at an off-site facility does not match a pre-approved waste analysis certification or accompanying shipping documentation; or
- an inspection reveals that the waste does not match the identity of the waste specified by the Waste Generator or a manifest on a shipping paper.

4.0 DEFINITIONS AND ACRONYMS

See LANL *Definition of Terms*.

See LANL Acronym Master List.

5.0 RECORDS

Records generated by this document will be submitted for records management in accordance with P1020-1 Laboratory Records Management and if applicable, with the ADESH-AP-006 Records Management Plan.

- Generators must keep characterization documentation such as analytical data, acceptable knowledge, spreadsheets, and/or calculations. This documentation must be uploaded into WCATs.

6.0 REFERENCES

DOE O 435.1, Radioactive Waste Management

DOE M 435.1-1, Radioactive Waste Management Manual

DOE O 458.1, Radiation Protection of the Public and the Environment

EP-DOP-2203, R4, *Operation and Calibration of Spectroscopy Systems*

EP-AP-2203, RO, *Analysis of Gamma Spectroscopy Data Acquired with HPGe Systems*

The LANL Hazardous Waste Facility Permit issued by the New Mexico Environment Department, December 2010 and updated versions.

7.0 ATTACHMENTS OR APPENDICES

N/A

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Environment, Safety, Health Directorate

Administrative Procedure

Facility TSF Operating Record

Document Owner/Subject Matter Expert:

Name:	Organization:	Signature:	Date:
Geri Martinez	ENV-CP	Signature on File	12-3-2015

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Name:	Organization:	Signature:	Date:
Gian Bacigalupa	ENV-CP	Signature on File	12-3-2015

Approval Signatures:

Quality Assurance Reviewer:	Organization:	Signature:	Date:
Doris Quintana	QPA/OIO	Signature on File	12-3-2015
Responsible Line Manager:	Organization:	Signature:	Date:
Raeanna Sharp-Geiger	ADESH	Signature on File	12-15-2015

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This document has been DC reviewed and is unclassified.

1.0 INTRODUCTION

The purpose of this document is to provide requirements for Facility TSF (Treatment and Storage Facility) Operating Record. This procedure is managed and owned by the Associate Directorate Environment, Safety and Health and provides instructions on the applicability of the requirement.

1.1 Purpose

This procedure summarizes the requirements in 40 CFR § 264.73 (Operating Record), Section 2.12.2 of LANL's Hazardous Waste Facility Permit (Facility Operating Record, http://int.lanl.gov/environment/waste/permit_tracking.shtml), and various other references to the Facility Operating Record within the Permit.

1.2 Scope

This procedure applies to any LANL employee, contractor, or sub-contractor who has been identified as a waste generator or a TSF worker.

2.0 PRECAUTIONS AND LIMITATIONS

This procedure cannot establish new requirements; it may only summarize the requirements in federal/state statutes/regulations/permits, DOE Orders, and authorized Laboratory policies.

3.0 FACILITY TSF OPERATING RECORD

3.1 Definition

The Operating Record applies specially to the management of hazardous and mixed waste as defined by Resource Conservation Recovery Act (RCRA). The written Operating Record is intended to keep track of hazardous waste activity at the facility and shall:

- Describe the hazardous waste received
- Describe methods and dates of treatment
- Describe location of wastes in the facility.

The Operating Record for each hazardous/mixed waste streams and individual hazardous/mixed waste containers are maintained in Waste Compliance and Tracking System (WCATS).

3.2 Interim Status and Permitted Areas Operating Record Requirements

The following are all the elements of the operating record as delineated in Section 2.12.2 of LANL's Hazardous Waste Facility Permit as well as other sections of the Permit. The Facility Operating Record for the operations of each permitted unit and interim status unit at the Facility are maintained for the life of the unit, including the post-closure care period.

1. *A description of the hazardous waste received, that is an authorized waste, and the methods and dates of treatment and/or storage at each permitted unit.*

   - Ensure descriptions of waste received and storage records are kept for the permitted storage units this information can be found in WCATS in most cases.
   - Ensure treatment units at TA-55 (Stabilization), TA-16 (Open Burning) and TA-36 and TA-39 (Open Detonation) document when hazardous waste was received, and methods and dates of treatment at each unit.

2. *The location of each type of hazardous waste within each permitted unit and the total quantity of all wastes and waste types at each unit (unit and structure).*

   - Ensure the location within each unit, total quantity of waste and waste types for storage units is documented in WCATS. Any changes to location information must be documented in WCATS. For certain units, portions of this information is kept separately from WCATS in a separate database for security reasons.
   - Ensure treatment units keep this information available for each unit at their facility.

3. *Documentation that treatment reagents are compatible with waste to be treated.*

   - Ensure documentation is kept at the applicable units at TA-16, TA-36, TA-39 and TA-55. This includes documentation about any secondary material/chemical/neutralizer that is added to the waste prior to or during treatment.

4. *Documentation that containers and liners are compatible with waste stored.*

   - Ensure liners are not reused.
   - Ensure containers and liners meet manufacture specifications and documentation is kept.
   - Ensure documentation is kept within the records specific to the permitted and interim status units.

5. *Records and results of waste analyses and waste determinations (AK and sampling and analysis).*

   - Ensure waste characterization documentation for each individual waste stream item or waste stream is located within its, WCATS record (as an updated document), or a reference to the documentation is included in the waste stream profile in WCATS. All AK documentation must include a unique identifier.

6. *Records and results of inspections including:*

    a. Inspection Record Form (IRF),
    b. TA-50-69 storm water controls,
    c. TA-54, Area L holding tank,
    d. TA-63 retention basin,
    e. documentation of items that are carried as issues, and
    f. close-out of issues.

    - Ensure documents that records inspections are kept within the records specific for the applicable units. These include the inspection record forms, any documentation (including database information) of issues identified, and documentation of close-out of those items.

7. *Documentation of inspections by a registered engineer trained and experienced in the proper installation of tank systems or components prior to replacing a portion of the tank or stabilization unit systems (40 CFR § 264.192(b) and Permit Section 4.3(3)).*

    - Ensure documentation is kept by the owner of the TA-55 for the tank storage system and stabilization unit.

8. *Documentation of maintenance and repair activities conducted at permitted and interim status units that involve equipment used for storage and/or treatment activities at the unit.*

    - Ensure documentation is kept with records specific for the applicable units. This includes maintenance documentation, replacement part procurement, restart inspections, and mitigations put in place while the equipment was out of service.

9. *Documentation demonstrating the installation and maintenance of secondary containment system coatings, sealants, or liners as required at Permit Sections 3.7.1(4) and 4.4(4).*

    - Ensure documentation is kept by the unit owner with records specific to the applicable units at TA-3, TA-54 and TA-55.

10. *Documentation of removal of liquids from secondary containment structures and from TA-54, Area G, Dome 224.*

    - Ensure documentation is kept by the unit owner of TA-54, Area G, Pad 5.

11. *Correspondence between the Permittees and the NMED-HWB, including but not limited to permit applications, modifications, reporting, notifications, and noncompliance.*

    - Ensure correspondence documentation is kept by Environmental Compliance Programs Group (ENV-CP) and may exist in the LANL electronic public reading room (EPRR).

12. *Documentation of all instances where an indoor fire suppression system has been activated resulting in fire suppressants contacting a waste storage floor.*

    - Ensure documentation is kept with the records specific to the applicable units at TA-3, TA-50, TA-54, and TA-55.

13. *Documentation of notifications and trainings associated with alternate emergency equipment as required at Permit Section 2.10.2.*

    - Ensure facility notifications and training are documented by the owner of the unit.

14. *Record keeping and reporting requirements associated with manifests in accordance with 40 CFR §§ 264.71, 264.72, and 264.76, whenever a shipment of hazardous waste is either received at, or initiated from a permitted unit.*

    - Ensure manifests for hazardous and mixed wastes are kept in WCATS. Manifests for transuranic waste are kept by OS-PT.

15. *Documentation that waste stored for greater than one year meet the conditions outlined in Permit Section 2.3.1.*

    - Ensure documentation for the Site Treatment Plan is kept by WM-SVS.

16. *Documentation that waste from off-site sources meets the requirements outlined in Permit Section 2.2.1.*

    - Ensure documentation about program is kept by Off-Site Source Recovery Program (OSPR).

17. *For stored wastes, the notice (or information contained in the notice for wastes generated on-site) and certification required at 40 CFR § 268.7.*

    - Ensure that a one-time notice is kept in the record for wastes that have been determined to be excluded from the definition of hazardous or solid waste or exempted from the regulation (e.g. deactivated characteristic hazardous waste managed in a waste water treatment system or materials used or reused as ingredients in an industrial process to make a product). Information on the generation of the material is included in WCATS.

18. *For treated wastes, information documenting if the treatment meets LDR standards as outlined in 40 CFR § 268.7(b).*

    - Ensure documentation associated with testing of residuals or treated wastes is kept within the records specific to the applicable units at TA-16, TA-36, TA-39 and TA-55.
    - Ensure documentation associated with whether a waste is treated to meet land disposal restriction standards is also kept within the records specific to the applicable units at TA-16, TA-36, TA-39 and TA-55.

19. *Monitoring, testing, analytical data, and response actions when there are issues with the integrity of tanks or secondary containment for tanks, miscellaneous units, or volatile organic control devices.*

    - Ensure documentation is kept within the records specific for the applicable units. This includes the inspection record forms, any documentation (including database information) of issues identified, and documentation of close-out of those items.

20. *Personnel training records.*

    - Ensure training records are kept in Utrain.

21. *Records required by the Permit during the course of any unresolved enforcement action regarding the Facility or as required by the Department.*

    - Ensure documentation of this information is kept with ENV-CP.

22. *A copy of emergency response agreements.*

    - Ensure documentation of agreements is kept with ENV-CP.

23. *Notices to off-site generators or notices of ownership transfer.*

    - Ensure notifications from the TSDF to the generator of off-site sources that the facility has the appropriate permit(s) for the waste must be kept with the specific program brokering with the generator (the off-site source recovery program) and within the records specific for the applicable units at TA-54.

24. *Annual certification stating a Facility program is in place to reduce the volume and toxicity of hazardous waste generated (waste minimization report).*

    - Ensure ENV-CP keeps the annual waste minimization report that documents this program.

25. *Documentation demonstrating distribution of the Contingency Plan (Attachment D)*

    - Ensure documentation of the distribution of the Contingency Plan is kept with by ENV-CP.

26. *Documentation of the annual review of the Contingency Plan (Attachment D) by the emergency managers.*

    - Ensure documentation of the annual review is kept with ENV-CP.

27. *Annual certification that emergency response personnel are familiar with the potential hazards in performing their duties associated with the hazardous wastes at LANL's permitted hazardous waste management units.*

    - Ensure documentation of the certification is institutional and is kept with ENV-CP

28. *Documentation associated with the implementation of the Contingency Plan (Attachment D) and all subsequent reporting and notification.*

    - Ensure documentation of implementation of the Contingency Plan (and all associated reporting) is kept with ENV-CP.

29. *Monitoring, corrective action program, and closure of unit considerations (264.73(b)(17) & (18)):*

    - Ensure all monitoring records associated with the implementation of a remediation program are kept.
    - Ensure all monitoring reports and records required by this Permit are kept, including but not limited to:
        a. sampling procedures, records of field measurements, laboratory analytical data, quality assurance/quality control documents, chain-of-custody records, well completion reports and periodic monitoring reports;
        b. records of all monitoring data used to complete Permit Application(s);
        c. sampling and analysis and removal of contents within holding tank at TA-54, Area L;
        d. sampling and analysis of contents within TA-54, Area G, Dome 224;
        e. sampling and analysis and removal of contents of TA-63 retention basin;
        f. vapor monitoring at TA-63;
        g. all data gathered or generated during the closure or post-closure process;
        h. all documentation of implementation and planned corrective action activities; and
        i. all laboratory reports, drilling logs, bench-scale or pilot scale data.
    - Ensure documentation of permit application data and the closure process is currently kept with ENV-CP.
    - Ensure documentation associated with bench-scale or pilot scale data and laboratory reports that are used for waste characterization purposes should be included or referenced within WCATS.
    - Ensure documentation associated with bench-scale or pilot scale data and laboratory reports for the purposes of proving waste treatment methodologies are kept within the records specific for the applicable units at TA-3, TA-16, TA-36, TA-39, TA-50, TA-54, and TA-55.

30. *For disposal units, for hazardous wastes left in the ground after closure the information required of a treatment facility.*

    - Ensure documentation of closure and post-closure activities is currently kept with ENV-CP.

For assistance or questions regarding the Facility Operating Record please call ENV-CP at 7-6259.

This document has been DC reviewed and is unclassified.

4.0 DEFINITIONS AND ACRONYMS

See LANL *Definition of Terms*.

See LANL Acronym Master List.

5.0 RECORDS

Records generated by this document will be submitted for records management in accordance with P1020-1, *Laboratory Records Management* and if applicable, with the ADESH-AP-006, *Records Management Plan*.

Operating Record Requirements			
Requirements from Section 3.2	Waste Specific	Unit/Location Specific	Institutional (Facility Wide)
1. Description and date of the hazardous waste received and the methods and dates of treatment and/or storage at each permitted unit		X	
2. Records of the location of each type of hazardous waste within each permitted unit, and the type and total quantity of all wastes at each unit and structure		X	
3. Treatment reagents are compatible with waste to be treated		X	
4. Containers and liners are compatible with waste stored		X	
5. Records, and results of waste analyses and waste determinations	X		X
6. Records associated with the results of inspections		X	
7. Inspections by a registered engineer prior to replacing a portion of a tank or stabilization unit systems		X	
8. Maintenance and repair activities conducted on equipment used for storage and/or treatment activities at permitted and interim status units		X	
9. Installation and maintenance of secondary containment system coatings, sealants, or liners		X	
10. Removal of liquids from secondary containment structures and from TA-54, Area G, Dome 224.		X	
11. Correspondence between the Permittees and the NMED-HWB			X

Operating Record Requirements			
Requirements from Section 3.2	Waste Specific	Unit/Location Specific	Institutional (Facility Wide)
12. Instances where an indoor fire suppression system has been activated resulting in fire suppressants contacting a waste storage floor		X	
13. Notifications and trainings associated with alternate emergency equipment		X	X
14. Record keeping and reporting requirements associated with manifests, whenever a shipment of hazardous waste is either received at, or initiated from a permitted unit			X
15. Waste stored for greater than one year			X
16. Waste from off-site sources meets the requirements outlined in Permit Section 2.2.1			X
17. Notice (or information contained in the notice for wastes generated on-site) and certification of stored wastes			X
18. Treated wastes, treatment meets LDR standards		X	
19. Monitoring, testing, analytical data, and response actions when there are issues with the integrity of tanks or secondary containment for tanks, miscellaneous units, or volatile organic control devices		X	
20. Personnel training records			X
21. Records required by the Permit during the course of any unresolved enforcement action regarding the Facility or as required by the Department			X
22. Emergency response agreements			X
23. Notification to off-site generators or notification of ownership transfer		X	
24. Annual waste minimization report			X
25. Distribution of the Contingency Plan (Attachment D)			X
26. Annual review of the Contingency Plan (Attachment D) by the emergency managers			X
27. Emergency personnel are familiar with potential			X

This document has been DC reviewed and is unclassified.

Operating Record Requirements			
Requirements from Section 3.2	Waste Specific	Unit/Location Specific	Institutional (Facility Wide)
hazards in performing their duties associated with the hazardous wastes at LANL's permitted hazardous waste management units			
28. Implementation of the Contingency Plan (Attachment D) and all subsequent reporting and notification.			X
29. Monitoring reports and records, corrective action program, and closure of unit considerations		X	X
30. Closure and post-closure activities.			X

6.0 TRAINING

N/A

7.0 REFERENCES

LANL Hazardous Waste Facility Permit

P409, LANL Waste Management

40 CFR 260 through 268

8.0 ATTACHMENTS OR APPENDICES

N/A

This document has been DC reviewed and is unclassified.

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Title:	ADESH-AP-TOOL-810 Waste Processing at Permitted Units
Author(s):	Martinez, Geraldine Emily
Intended for:	Environmental Programs
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Environment, Safety, Health Directorate

Administrative Procedure

Waste Processing at LANL Hazard Waste Permitted Units

Document Owner/Subject Matter Expert:

Name:	Organization:	Signature:	Date:
Geri Martinez	ENV-CP	Signature on File	01-11-16

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Name:	Organization:	Signature:	Date:
Gian Bacigalupa	ENV-CP	Signature on File	01-11-16

Approval Signatures:

Quality Assurance Reviewer:	Organization:	Signature:	Date:
Doris Quintana	QPA/OIO	Signature on File	01-12-16
Responsible Line Manager:	Organization:	Signature:	Date:
Raeanna Sharp-Geiger	ADESH	Signature on File	01-14-16

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REVISION HISTORY

Document Number and Revision *[Include revision number, beginning with Revision 0]*	**Effective Date** *[Document Control Coordinator inserts effective date]*	**Description of Changes** *[List specific changes made since the previous revision]*
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This document has been DC reviewed and is unclassified.

1.0 INTRODUCTION

The purpose of this document is to provide requirements for Waste Processing at LANL Hazardous Waste Permitted Units. This document is managed and owned by the Associate Directorate Environment, Safety and Health and provides instructions on the applicability of the requirement.

1.1 Purpose

This document summarizes the activities that are conducted at permitted units and are authorized under the storage portions of the LANL Hazardous Waste Facility Permit.

1.2 Scope

This document applies to any LANL employee, contractor, or sub-contractor who has been identified as a waste generator.

2.0 PRECAUTIONS AND LIMITATIONS

This document cannot establish new requirements; it may only summarize the requirements in federal or state statutes/regulations/permits, DOE Orders, and authorized Laboratory policies.

3.0 REQUIREMENTS

Requirements established in the 2010 Los Alamos National Laboratory Hazardous Waste Facility Permit (and all updates) must be met for all waste processing activities.

Note:	Secondary material should be segregated from the regulated waste being processed. If secondary material is added during the process, the activity becomes a waste generating process and must undergo waste characterization. Additionally, the Waste Generator must ensure that any secondary material added to the waste is compatible (See ADESH-AP-TOOL-115 “Waste Compatibility”) with the waste.

Note:	Prior to conducting any resizing activities, contact ENV-CP. A permit modification may be required.

3.1 Location and Type of Waste Processing at Treatment Storage and Facilities (TSFs)

TA-50

TA-50, Building 69, Waste Characterization, Reduction, and Repackaging Facility (WCRRF), is used primarily for repackaging transuranic waste into standard sized containers for transport to, and disposal at, the Waste Isolation Pilot Plan (WIPP).

TA-54

TA-54, Area G, Pad 11, Dome 375 contains a modular structure that is used for decontamination, segregation, waste assay, reclassification activities and repackaging of transuranic waste prior to shipment offsite. Also located on the pad is the unit, Real-Time Radiography (RTR1), which is used to provide X-ray examination of the contents of waste drums.

TA-54, Area G, Pad 1, Dome 412 contains five cells each of which are used for sorting and segregating transuranic waste and mixed transuranic waste, decontamination, and packaging waste items.

TA-54, Area G, Pad 10, also includes the following activities:

- The multichannel scaling (MCS) and a high efficiency neutron counter (HENC). The HENC are designed to provide a passive neutron and gamma measurement of transuranic waste drums in 55 gallon containers.
- The Super High Efficiency Neutron Coincidence (SuperHENC) counter is designed to provide a passive neutron and gamma measurement of large transuranic waste containers like standard waste boxes.
- RTR system #2 is designed to provide X-ray examination of the contents of a waste drum.
- Heated storage is utilized for storing transuranic and mixed transuranic waste storage prior to characterization.

TA-54, Area G, Structure 33, contains a drum venting system.

TA-63

TA-63, Transuranic Waste Facility (TWF) when constructed will include pads for trailer housing and the following characterization equipment:

- RTR unit. The non-destructive assay (NDA) equipment in the trailer is designed to provide X-ray examination of the contents of transuranic waste drums.
- HENC unit. The NDA equipment in the trailer is designed to provide a passive neutron and gamma measurement of 55 gallon transuranic waste drums.
- The SuperHENC unit. The NDA equipment in the trailer is similar to the HENC but includes a high efficiency neutron counter and a gamma counter that are both designed to handle standard waste boxes.

NOTE: If there are any changes to the unit, additions to the waste, or resizing of waste to be conducted, a permit modification may be required. For assistance call 665-3435.

3.2 Characterization

Refer to ADESH-AP-TOOL-111 “Waste Characterization.”

3.3 Definitions

Waste processing - includes any process tasks that change the contents, composition, or form of the waste being prepared for disposal. Waste processing at the Facility that is not defined as treatment is limited to sorting, segregating, repackaging, HENC, RTR, drum venting, and heated storage. These activities can be conducted within generator areas and at TSFs to make waste amenable for shipment off-site for disposal. These processing activities are not considered treatment of waste because they do not change the physical, chemical, or biological characteristics of the waste.

Secondary material - means miscellaneous materials associated with waste processing that are placed into primary or daughter drums during packaging or repackaging. Examples of secondary waste includes gloves, tools, rags, wipes (Kimwipes), plastic labels, tags, Personal Protective Equipment (PPE), plastic sheeting used for contamination control, and original packaging material (e.g., plastic bags, plywood sheathing, rigid liner lids cut into pieces).

Resizing - for waste management purposes incorporates any activity that can be categorized as resizing waste to fit into shipping containers including but not limited to compaction and size reduction using hand tools.

4.0 RECORDS

Records generated by this document will be submitted for records management in accordance with P1020-1, *Laboratory Records Management* and if applicable, with the ADESH-AP-006, *Records Management Plan*.

5.0 TRAINING

Persons who work in TSFs must complete:
Course #7488, *RCRA Personnel Training*;

Course #28582, *RCRA Refresher (Self-Study)*, every twelve months; and

Course #23263, *Waste Generation Overview Live*.

Note: The RCRA-related training listed above must be completed within six months of employment; during this period, workers must work under the supervision of a trained worker.

Remediation Workers must complete:
Course #23263, *Waste Generation Overview Live;*

Course #4464 *HAZWOPER: General Site Worker*, or Course #4465, *HAZWOPER: Limited Site Worker*;

Course #28652 *HAZWOPER: Refresher*, every twelve months;

Course #7488, *RCRA Personnel Training*;

Course #28582, *RCRA Refresher (Self-Study)*, every twelve months; and or other courses as assigned by the supervisor

This document has been DC reviewed and is unclassified.

6.0 REFERENCES

LANL Hazardous Waste Facility Permit

7.0 ATTACHMENTS OR APPENDICES

N/A

This document has been DC reviewed and is unclassified.

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Title:	ADESH-AP-TOOL-901 Elementary Neutralization
Author(s):	Martinez, Geraldine Emily
Intended for:	Environmental Programs
Issued:	2016-03-01 (Rev.1) (Draft)

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Environment, Safety, Health Directorate

Administrative Procedure

Elementary Neutralization

Document Owner/Subject Matter Expert:

Name:	Organization:	Signature:	Date:
Geri Martinez	ENV-CP	Signature on File	12-17-15

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Name:	Organization:	Signature:	Date:
Gian Bacigalupa	ENV-CP	Signature on File	12-17-15

Approval Signatures:

Quality Assurance Reviewer:	Organization:	Signature:	Date:
Doris Quintana	QPA/OIO	Signature on File	01-12-16
Responsible Line Manager:	Organization:	Signature:	Date:
Raeanna Sharp-Geiger	ADESH	Signature on File	01-14-16

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REVISION HISTORY

Document Number and Revision *[Include revision number, beginning with Revision 0]*	**Effective Date** *[Document Control Coordinator inserts effective date]*	**Description of Changes** *[List specific changes made since the previous revision]*
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This document has been DC reviewed and is unclassified.

1.0 INTRODUCTION

The purpose of this document is to provide requirements for Elementary Neutralization (see definition in Section 4.0). This document is managed and owned by the Associate Directorate Environment, Safety and Health and provides instructions on the applicability of the requirement.

1.1 Purpose

This document provides guidance for complying with 40 CFR §264.1(g)(6) and 260.10.

1.2 Scope

This document applies to any LANL employee, contractor, or sub-contractor who has been identified as a waste generator.

2.0 PRECAUTIONS AND LIMITATIONS

This document cannot establish new requirements; it may only summarize the requirements in federal/state statutes/regulations/permits, DOE Orders, and authorized Laboratory policies.

3.0 GENERAL REQUIREMENTS

Neutralization of a hazardous waste meets the RCRA definition of treatment (see Section 4.0).

The LANL Hazardous Waste Facility Permit and the hazardous waste management regulations prohibit treatment without a permit except in a few very limited circumstances. This document discusses the *Elementary Neutralization Unit* (ENU) exemption, which allows generators and Treatment, Storage and Disposal Facilities (TSDFs) to neutralize certain hazardous and mixed wastes without a permit provided certain criteria are met. Any questions regarding implementation or interpretation of these requirements should be addressed to ENV-CP at 7-6259.

To be exempt, the generator or TSDF operator may only neutralize hazardous/mixed waste that is corrosive ONLY (D002)(i.e., it has no other EPA Hazardous Waste Numbers), and may only conduct neutralization in a unit that meets the RCRA definition of a tank, tank system, container, transport vehicle, or vessel.

Questions

The questions below will help you determine if you meet the ENU exemption.

1. Does the hazardous/mixed waste you plan to neutralize exhibit only the characteristic of corrosivity (D002) (i.e., it has no other EPA Hazardous Waste? For example, if your waste stream exhibits the characteristics of both ignitability (D001) and corrosivity (D002), it does not qualify for the exemption.

   If you answered yes to the question above, go on to Question 2.

   If you answered no, please call 7-6259.

2. Will the hazardous/mixed waste be neutralized in a unit that meets the definition of a tank, tank system, container, transport vehicle or vessel (see Section 4.0)?

If you answered no, please call 7-6259.

If you answered yes to all of the questions above, you have met the permit exemption. Call 7-6259 for additional paperwork required and final authorization to proceed with the neutralization activity.

4.0 DEFINITIONS AND ACRONYMS

Treatment –means any method, technique, or process, including neutralization, designed to change the physical, chemical, or biological character or composition of any hazardous waste so as to neutralize such waste (40 CFR §260.10).

Elementary neutralization – means neutralizing (treatment) hazardous/mixed waste bearing ONLY the characteristic of corrosivity per 40 CFR §262.22 (i.e., it bears the D002 EPA Hazardous Waste Number only) and neutralization must occur in a tank, tank system, container, transport vehicle or vessel (as defined in 40 CFR §260.10).

Corrosivity (D002) – A solid waste exhibits the characteristic of corrosivity if it is: (1) aqueous and has a pH of less than or equal to 2 or greater than or equal to 12.5 as determined by a pH meter using Method 9040C in "Test Methods for Evaluating Solid Waste, Physical/Chemical Methods" (SW-846), or (2) it is a liquid and corrodes steel (SAE 1020) at a rate greater than 6.35mm (0.250 inch) per year at a test temperature of 55 C (130 F) as determined by Method 1110A in SW-846.

Container – Any portable device in which a material is stored, transported, treated, disposed of, or otherwise handled.

Tank – A stationary device, designed to contain an accumulation of hazardous waste which is constructed primarily of non-earthen materials (e.g., wood, concrete, steel, plastic) which provide structural support.

Tank system – A hazardous waste storage or treatment tank and its associated ancillary equipment and containment system.

Transport vehicle – A motor vehicle or rail car used for the transportation of cargo by any mode. Each cargo-carrying body (trailer, railroad freight car, etc.) is a separate transport vehicle.

Vessel – Includes every description of watercraft, used or capable of being used as a means of transportation on the water.

See LANL *Definition of Terms*.

See LANL Acronym Master List.

5.0 RECORDS

Records generated by this document will be submitted for records management in accordance with P1020-1, *Laboratory Records Management* and if applicable, with the ADESH-AP-006, *Records Management Plan*.

- Documentation must be maintained in WCATS for three years.

6.0 TRAINING

Waste Generators and WMCs must complete:

- Course #23263, *Waste Generation Overview Live*; and
- Course #21464, *Waste Generation Overview Refresher SS*, every three years.

Persons who work in, or are owners of, less-than-90-day waste accumulation areas must complete:

- Course #7488, *RCRA Personnel Training*, and
- Course #28582, *RCRA Refresher (Self-Study)*, every twelve months.

Persons who work in TSFs must complete:

- Course #7488, *RCRA Personnel Training*;
- Course #28582, *RCRA Refresher (Self-Study)*, every twelve months; and
- Course #23263, *Waste Generation Overview Live*.

Note: The RCRA-related training listed above must be completed within six months of employment; during this period, workers must work under the supervision of a trained worker.

7.0 REFERENCES

40 CFR 260-265

8.0 ATTACHMENTS OR APPENDICES

N/A

This document has been DC reviewed and is unclassified.

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Title:	ADESH-AP-TOOL-902 Sorption without a Permit
Author(s):	Martinez, Geraldine Emily
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Environment, Safety, Health Directorate

Administrative Procedure

Sorption Without A Permit

Document Owner/Subject Matter Expert:

Name:	Organization:	Signature:	Date:
Geri Martinez	ENV-CP	Signature on File	12-16-15

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Name:	Organization:	Signature:	Date:
Gian Bacigalupa	ENV-CP	Signature on File	12-16-15

Approval Signatures:

Quality Assurance Reviewer:	Organization:	Signature:	Date:
Doris Quintana	QPA/OIO	Signature on File	12-17-15
Responsible Line Manager:	Organization:	Signature:	Date:
Raeanna Sharp-Geiger	ADESH	Signature on File	12-23-15

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REVISION HISTORY

Document Number and Revision *[Include revision number, beginning with Revision 0]*	**Effective Date** *[Document Control Coordinator inserts effective date]*	**Description of Changes** *[List specific changes made since the previous revision]*
ADESH-AP-TOOL-902, Rev. 0	12/23/2015	This document was formatted into a new template. This document supersedes the previous version, ADESH-TOOL-902, R0.

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This document has been DC reviewed and is unclassified.

1.0 INTRODUCTION

The purpose of this document is to provide requirements for sorption of hazardous waste without a permit. This document is managed and owned by the Associate Directorate Environment, Safety and Health and provides instructions on the applicability of the requirement.

1.1 Purpose

The procedure summarizes the requirements in 40 CFR §264.1(g)(10), §270.1(c)(2)(vii), and §264.314.

1.2 Scope

This document applies to any LANL employee, contractor, or sub-contractor who has been identified as a waste generator.

2.0 PRECAUTIONS AND LIMITATIONS

This procedure cannot establish new requirements; it may only summarize the requirements in federal/state statutes/regulations/permits, DOE Orders, and authorized Laboratory policies.

3.0 GENERAL REQUIREMENTS

The LANL Permit and RCRA regulations prohibit "treatment" without a permit, unless specific exemptions are met. The United States Environmental Protection Agency provided a sorbent material exemption, which allows generators and TSDF operators to place sorbents (e.g., zeolite kitty litter) in a container without a permit provided certain criteria are met. Any questions regarding implementation or interpretation of these requirements should be addressed by ENV-CP at 7-6259.

The addition of sorbent material to hazardous/mixed waste in a container (or adding hazardous/mixed waste to sorbent material) is considered to be "treatment," which requires a RCRA permit unless the addition of sorbent qualifies for the exemption under 40 CFR §264.1(g)(10) and §270.1 (c)(2)(vii). To be exempt, the generator or operator must meet the following requirements:

- The sorbent must be added to waste in a container (or waste is added to the sorbent) at the time waste is first placed in the container,
- The addition of sorbent cannot create an ignitable, reactive, or incompatible waste, and
- The sorbent must be compatible with the type of waste and container; cannot result in reactions that damage the structural integrity of the container or facility.

To be compliant with these requirements, LANL has established a procedure to (1) make a "compatibility determination" (ADESH-AP-TOOL-115) conducted by designated subject matter experts (SMEs) to ensure that the sorbent material can be safely mixed with the waste, including secondary materials, and will not result in potential reactions or damage to the container, including

the inner liner; and (2) ensure that the addition of absorbents is *well-documented for safe and compliant processing.*

Questions

The questions below will help you determine if you meet the exemption, and must be resolved and documented prior to the addition of sorbents.

1. Timing: Is the sorbent material added to the waste in a container [or waste added to sorbent material in a container] at the same time the waste is first placed in the container?

   - Transferring of hazardous waste from one container to another container at the same time that a sorbent is added is covered under the exemption.
   - Adding sorbents at some other time after the hazardous waste is first placed in a container (e.g., after it is closed) would constitute treatment requiring a permit.

     NOTE: Addition of waste or sorbent that require the container be re-opened would not be covered under the exemption.

If you answered yes to the question above, you must document the basis for this decision and address Question Nos. 2 through 4 regarding compatibility prior to the addition of any absorbents. If you do not feel qualified to answer Question No. 1, are unsure, or answered no, please call 7-6259.

2. Compatibility: the following questions require a compatibility determination (CD) and must be resolved prior to the addition of the absorbent to ensure that the absorbent can be safely mixed with the hazardous/mixed waste, including secondary materials.

   A. Is the sorbent compatible with the waste, including secondary materials, and cannot create an ignitable, reactive, or incompatible waste?

   B. Is the sorbent compatible with the waste, including secondary materials, and cannot result in *potential reactions: heat generation, fire or explosion, gas and flammable gas generation, fume or flammable fume generation, or toxic dusts or mists?*

   C. Is the sorbent compatible with the container (including the inner liner) so as not to result in potential reactions or damage to the container, or inner liner, including *corrosion or decay?*

      - These questions require completion of a CD by qualified SMEs to ensure that the absorbent is compatible with the type of waste and cannot create an ignitable, reactive, or incompatible waste or result in reactions, including damage to the solid structural integrity of the container or device.
      - The CD involves qualified SMEs review for chemical compatibility of mixing the proposed sorbent material with the waste pursuant to Appendix V, part 264 and EPA's Chemical Compatibility Chart.

- The CD must be documented to ensure safe and reliable processing, and includes information such as: the type and amount of sorbent used (and accompanying MSDS or other product information); description of the waste stream, and any secondary materials; confirmation that the sorbent is non-biodegradable; documentation that a CD analysis was performed, and the date and signature of the persons completing the CD.

NOTE: The use of biodegradable sorbents is prohibited in RCRA wastes to be landfilled.

If you answered yes to each of the questions above, you have met the permit exemption.

4.0 GENERATOR TRAINING

See Waste Management Procedure P409, Section 6.0.

5.0 DEFINITIONS AND ACRONYMS

Compatibility -means that the hazardous/mixed waste can be safely mixed with sorbent material and may not result in any of the following potential reactions: heat generation, fire or explosion, gas and flammable gas generation, fume or flammable fume generation, toxic dusts or mists, or corrosion or decay of the container, including the inner liner.

Secondary material - means miscellaneous materials associated with waste processing that are placed into daughter drums during repackaging. Examples of secondary waste includes gloves, tools, rags, wipes (Kimwipes), plastic labels, tags, Personal Protective Equipment (PPE), plastic sheeting used for contamination control, and original packaging material (e.g., plastic bags, plywood sheathing, rigid liner lids cut into pieces).

Sorbent - means a material that is used to soak up free liquids by either adsorption or absorption, or both.

Treatment - means any method, technique, or process, including neutralization, designed to change the physical, chemical, or biological character or composition of any hazardous waste so as to neutralize such waste, or so as to recover energy or material resources from the waste, or so as to render such waste non-hazardous, or less hazardous; safer to transport, store, or dispose of; or amenable for recovery, amenable for storage, or reduced in volume.

See LANL *Definition of Terms*.

See LANL Acronym Master List.

6.0 RECORDS

Records generated by this document will be submitted for records management in accordance with P1020-1, *Laboratory Records Management* and if applicable, with the ADESH-AP-006, *Records Management Plan*.

- Documentation must be kept by the waste generator per ADESH-AP-TOOL-115, Waste Compatibility Determinations.

7.0 TRAINING

See Waste Management Procedure P409, Section 6.0.

8.0 REFERENCES

N/A

9.0 ATTACHMENTS OR APPENDICES

N/A

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Author(s):	Martinez, Geraldine Emily
Intended for:	Environmental Programs
Issued:	2016-03-01 (Rev.1) (Draft)

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Environment, Safety, Health Directorate

Administrative Procedure

Treatment by the Waste Generator

Document Owner/Subject Matter Expert:

Name:	Organization:	Signature:	Date:
Geri Martinez	EPC-CP	Signature on File	02-22-16

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Name:	Organization:	Signature:	Date:
Gian Bacigalupa	EPC-CP	Signature on File	02-22-16

Approval Signatures:

Quality Assurance Reviewer:	Organization:	Signature:	Date:
Doris Quintana	QPA/OIO	Signature on File	02-22-16
Responsible Line Manager:	Organization:	Signature:	Date:
Raeanna Sharp-Geiger	ADESH	Signature on File	02-24-16

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This document has been DC reviewed and is unclassified.

1.0 INTRODUCTION

The purpose of this document is to provide requirements for treatment of waste by the waste generator. This document is managed and owned by the Associate Directorate Environment, Safety and Health and provides instructions on the applicability of the requirement.

1.1 Purpose

This procedure summarizes the requirements in 40 CFR §262.34, 40 CFR §264.1(g)(6), 40 CFR §260.10 and 40 CFR §264.1(g)(10), 40 CFR §270.1 (c)(2)(vii) and 40 CFR §264.314.

1.2 Scope

This document applies to any LANL employee, contractor, or sub-contractor who has been identified as a waste generator.

2.0 PRECAUTIONS AND LIMITATIONS

This procedure cannot establish new requirements; it may only summarize the requirements in federal/state statutes/regulations/permits, DOE Orders, and authorized Laboratory policies.

NOTE: A Hazardous Waste Treatment Report Form (WTRF) must be approved by EPC-CP before any treatment can occur.

3.0 REQUIREMENTS

The Environmental Protection Agency (EPA) has consistently interpreted its regulations to allow generators to treat hazardous waste in their accumulation tanks and containers, without obtaining a permit or having interim status. Examples of treatment that may be conducted in accumulation tanks and containers include neutralization, precipitation of heavy metals from solutions, and oxidation/reduction reactions.

NOTE: Treatment is any method, technique, or process, including, neutralization, designed to change the physical, chemical, or biological character or composition of any hazardous waste so as to neutralize such waste, or so as to recover energy or material resources from the waste, or so as to render such waste non-hazardous, or less hazardous; safer to transport, store, or dispose of; or amenable for recovery, amendable for storage, or reduced in volume.

In the January 12, 1981, Federal Register (46 FR 2806-2808) [RO 14618], the preamble discussed the relationship between storage, treatment and disposal. It was noted that treatment is allowed at a permitted facility without affecting that facility's regulatory status. It was also stated that treatment activities similarly do not change the regulatory status of generators when it is performed in the generator's accumulation areas.

The provisions of 40 CFR §262.34(a) and (d) for large and small generators require that generators comply with most of the technical standards for containers (40 CFR §265 Subpart I) and tanks (40 CFR §265 Subpart J) with which an interim status storage facility would have to comply. Generators

are to comply with all of the provisions for treatment, storage and disposal facilities except the financial responsibility, closure/post-closure and corrective action regulations.

The EPA has specifically stated that because treatment often renders waste less hazardous, or more amenable for further treatment, recycling, or shipment off site, the discouragement of these practices by requiring generators to obtain a permit for on-site treatment would be counterproductive.

NOTE: A waste generator is defined as "any person, by site, whose act or process produces hazardous waste..." (40 CFR. 260.10).

Treatment by the Waste Generator can be conducted in a < 90 day accumulation area provided they are compliant with all applicable provisions in 40 CFR 262.34. The following conditions must be met before treatment can occur:

- Treatment must be conducted in tank or container.
- Treatment must take place in a < 90 day accumulation area see ADESH-AP-TOOL-209 and must be in compliance with 40 CFR 265, Subparts, I, J, W and/or DD.
- Complete and submit a RCRA WTRC (Hazardous Waste Treatment Report Form) to Geri Martinez, geri@lanl.gov before any hazardous waste is treated. **The WTRF must be approved by EPC-CP before treatment can occur.** The WTRF must be submitted annually to EPC-CP for approval.
- A Waste Analysis Plan (WAP) must be completed and implemented when treating to meet Land Disposal Restrictions (LDR) treatment standards. The WAP must include detailed chemical and physical analysis of a representative sample of the prohibited waste(s) being treated and contain all the information required to treat the waste(s).
- Call 7-6259 to determine if a waste analysis plan (WAP) must be submitted. EPC-CP can also provide you with a sample WAP.
- Ensure the waste to be treated is compatible with the container/tank. For more information on compatibly see ADESH-AP-TOOL-111, "Waste Characterization."

An example of waste generator treatment is Elementary Neutralization see ADESH-AP-Tool-901.

Note:	Thermal treatment cannot be conducted by a waste generator a permit is required for that type of treatment.

3.1 Characterization

See ADESH-AP-TOOL-111, "Waste Characterization."

4.0 DEFINITIONS AND ACRONYMS

N/A

5.0 RECORDS

Records generated by this document will be submitted for records management in accordance with P1020-1, *Laboratory Records Management* and if applicable, with the ADESH-AP-006, *Records Management Plan*.

- WTRFs and WAPs will be maintained by the generator for three years.

6.0 TRAINING

See Waste Management Procedure P409, Section 6.0.

7.0 REFERENCES

40 CFR 260 through 264

8.0 ATTACHMENTS OR APPENDICES

N/A

This document has been DC reviewed and is unclassified.

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Title:	Settlement Agreement and Stipulated Final Order (SFO), Ordered Action 9 - Evaluation of P300 Integrated Work Management with Regards to Subject Matter Expert Engagement
Author(s):	Goldberg, Shanon D.
Intended for:	Environmental Programs
Issued:	2016-02-24 (Draft)

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memorandum

Environmental Protection Division
Environmental Compliance Programs (ENV-CP)

To/MS: Matthew W. Hardy, OIO-DO, (E-File)
From/MS: Mark P. Haagenstad, ENV-CP, (E-File)
Phone/Fax: 505-665-2014
Symbol: EPC-DO-16-048
Date: February 22, 2016

Subject: **Settlement Agreement and Stipulated Final Order (SFO), Ordered Action 9 – Evaluation of P300 Integrated Work Management with Regards to Subject Matter Expert Engagement**

In accordance with the *LANL/NMED Settlement Agreement and Stipulated Final Order, Ordered Action 9, Attachment A*, the Respondents are required to provide a Memorandum documenting the Evaluation of Policy P300, *Integrated Work Management,* in regards to the role of Subject Matter Expert (SME) engagement in procedure review and approval. The purpose of the evaluation is to examine/document Laboratory institutional requirements in effect at the time of LANL's 3706 Waste Re-packaging Campaign (conducted in accordance with the Framework Agreement) and subsequent revisions made to the Policy.

Laboratory Policy document P300 was issued in October 2008 under institutional authorization of the ADESH Directorate. The document is currently issued as Revision 7; revisions were made in October 2009, July 2010, October 2011, March 2012, January 2011, October 2014, and December 2015. The following table is an excerpt of, P300, Rev. 7, Section 10.0, *History* and reflects relevant changes to the document in light of Subject Matter Expert engagement in the integrated work management process.

P300 Revision Summary
Changes Relevant to SME Engagement

Effective Date of P300 Revision	Revision Number	Summary of Revisions
10/30/2009	Rev. 1	Updated Attachment A, *Integrated Work Management* (IWM) Process for Research and Development (R&D). Document was updated to emphasize critical thinking, strengthen guidance to reduce likelihood of "missed" moderate or high hazards in initial

Effective Date of P300 Revision	Revision Number	Summary of Revisions
		hazard grading, and strengthen the hazard analysis review teams.
07/16/2010	Rev. 2	Strengthened SME involvement and incorporation of a peer review process. Clarified SME types to be engaged and their level of involvement (Sections 3.1.2.a and 3.1.3.c). The peer review process was formalized (Section 3.1.3.b).
10/31/2011	Rev. 3	Addition of two training courses for work document preparers: Course #12454 *IWM: Refresher* and Course #12494 *Integrated Work Management: What-If Checklist*.
10/16/2014	Rev. 6	Clarified requirements for maintaining an institutional inventory of work activities. Formalized steps for determining an activity's hazard level based on an initial hazard screening process and documenting the determination. Worker authorization was redefined to be based on required training.
12/09/2015	Rev. 7	Transition of the issuing authority from Associate Director for Environment, Safety, and Health (ADESH) to Associate Director for Nuclear and High Hazard Operations (ADNNHO). Responsible Manager changed from ADESH to Operations Support-Division Leader (OS-DL) and Responsible Office changed from ADESH to Operations Support-Division Office (OS-DO).

The institutional requirement for hazard identification and control development has been an element dictated by P300 *Integrated Work Management* since its inception. The Policy has been strengthened by addition of peer reviews (Section 3.1.3.b) and SME involvement (Sections 3.1.2.a and 3.1.3.c). The addition of these requirements was applicable to all work activities. Revisions to the Policy, as documented in P300, section 10.0 - *History*, have strengthened the process and emphasized the need for SME input into hazard analysis and controls development. Systems have been provided to track and inventory work activities across the Laboratory.

The structure, formality and currency of P300 provides delivery of clear expectations for work definition, review, validation and documentation for all work activities across the Laboratory. P300, Revision 7, Section 10.0 – *History* is provided in Appendix 1.

MPH/lm

Attachment: 1. P300 *Integrated Work Management*, Rev. 7, effective 12/09/2015, Section 10.0 – *History*.

CY: John P. McCann, ENV-DO, (E-File)
locatesteam@lanl.gov, (E-File)
env-correspondence@lanl.gov, (E-File)

Appendix 1

P300 *Integrated Work Management, Section 10.0 – History*

10.0 HISTORY

Revision History		
10/31/08	P300, Rev. 0	Renumbered document, Implementation Procedure (IMP) 300, Integrated Work Management.
10/30/09	P300, Rev. 1	Added the following new requirements: - procedure for extending the effective date of an Integrated Work Documents (IWD), and - Facility Operations Director (FOD) signature needed to approve work activities in multiple FOD jurisdictions (facility safety envelopes). Clarified the following: - Integrated Work Documents (IWDs) should address hazardous chemical spill control, mitigation, and cleanup, where appropriate. Updated Attachment A, Integrated Work Management (IWM) Process for Research and Development (R&D), to emphasize critical thinking, identify the potential for interacting with the facility, the dangers of scope creep and getting fresh eyes and
		outside help, including the following: ▪ retained and reinforced the basic process for Integrated Work Management (IWM) and Integrated Safety Management (ISM), ▪ strengthened guidance to reduce likelihood of "missed" moderate or high hazards in initial Person in Charge (PIC) grading, ▪ strengthened hazard analysis review teams, ▪ called for specific additional considerations in hazard analysis and development of controls, ▪ added that PIC is to verify that workers from other line organizations are authorized by their own Responsible Line Managers (RLMs) to perform work, and ▪ clarified annual review requirement for Research and Development (R&D) IWDs. Reformatted to meet the requirements set forth in P311-1, *Creating, Revising, and Cancelling Institutional Documents.*

Revision History		
07/16/10	P300, Rev. 2	Revised to improve LANL activity-level work and integration of safe work practices. Revised to improve IWM implementation including strengthening Subject Matter Expert (SME) involvement, incorporating a peer review process, and clarifying other elements of IWM as follows: 1. Clarified applicability of document when implementing within or across the IWM work categories, e.g., R&D, operations, facilities maintenance, and subcontractors. 2. Added requirement for confirming use of *Hazard Grading Table* (new requirement). 3. Clarified applicability of IWD elements for low-hazard activities, e.g., forms. 4. Clarified SME types and involvement. 5. Added Peer Review requirement (new requirement). 6. Added requirement for validation walk down documentation (new requirement). 7. Revised complete security section to clarify annual review requirements and Security Requirements Tool (SRT) implementation. 8. Added requirement for safety basis consideration (new requirement). 9. Removed requirement for RLM or FOD to determine adequacy of IWD and communicate approval via memo (new requirement). 10. Added requirement for IWDs and specific work activity procedures to be kept current (new requirement). 11. Revised instructions for extending effective dates of IWDs. 12. Removed requirement for RLMs to maintain listing of IWDs requiring qualified workers. 13. Revised Attachment A to include requirements for peer review (flowchart revised); annual IWD review and expiration date established; PIC to involve SMEs throughout the process, as needed; PIC to appoint SMEs for Hazard Analysis team; and peers selected by RLM. (new requirements). 14. Updated forms as applicable.
10/31/11	P300, Rev. 3	Added two new required training courses: Course #12454, *IWM: Refresher*, and Course #12494, *Integrated Work Management: What-If Checklist* (2-day Course). Clarified existing requirements to align with current practice. Modified to reflect that this Quick Change does not require an Unreviewed Safety Question/Unreviewed Safety Issue (USQ/USI) review. Added "Note 1" and reference to Box 12 instructions to Fig. A-1. Updated links, titles, and acronyms. Clarified references to forms.

Revision History		
03/30/12	P300, Rev. 4	Revised IWM Toolbox references to be consistent with Toolbox format changes. Clarified existing requirements to align with current practice. Clarified and improved alignment of Attachment A with the main body of the document. Clarified use of "workers or a representative set of workers…" for High-Hazard Complex hazard analysis team. Clarified process for RLM, or RLM designee, authorization of workers from other organizations. Incorporated optional Form 3024, *Responsible Line Manager Delegation Form* into the IWM Toolbox. Eliminated requirements for use of Security Requirements Tool (SRT). Clarified requirement for documenting feedback and lessons learned. Incorporated acceptance of organizational-specific methods that capture lessons learned on a periodic basis. Added "Note" to clarify requirement to keep IWDs or equivalent current to match referenced Institutional Documents.
01/22/14	P300, Rev. 5	Section 3.1.2, Identify and Analyze Hazards, was modified to be consistent with an existing requirement in P101-32, Worker Exposure Assessments. Specifically, RLMs must involve ESH deployed personnel in work planning activities to ensure worker exposure assessments are completed when required during the hazard identification and analysis stage of work planning. Updated language in Section 5.0 to reflect Unreviewed Safety Question/Unreviewed Safety Issue (USQ/USI) process and implementation dates for affected facilities.
10/16/14	P300, Rev. 6	Performed three-year review in accordance with PD311, *Requirements System and Hierarchy*. Clarified requirements associated with maintaining an institutional inventory of work activities, determining an activity's hazard level based on an initial hazard screening process, and documenting the determination. Redefined worker authorization to be based on training requirements. Revised Attachment A to be consistent with the clarified requirements associated with the Work Management System and completing an initial hazard screening that supports the activity hazard level determination. Reordered Attachment B questions to be from high hazard to low hazard. Deleted references to the JHA tool. Updated language in Section 5.0 to reflect Unreviewed Safety Question/Unreviewed Safety Issue (USQ/USI) process and implementation dates for affected facilities.

Revision History		
	P300, Rev. 7	Section 2.1: The Issuing Authority (IA), Responsible Manager (RM), and Responsible Office (RO) were changed as follows: ▪ IA changed from Associate Director for Environment, Safety, and Health (ADESH) to Associate Director for Nuclear and High Hazard Operations (ADNHHO) ▪ RM changed from ADESH to Operations Support-Division Leader (OS-DL) ▪ RO changed from ADESH to Operations Support-Division Office (OS-DO) Section 5.0: Updated to reflect that this document is effective on the date of issue. Section 9.2: Updated acronyms. Section 14.0: Update contact information

TA-55

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Name	Organization	Date	Signature
Originator			
Dale E. Forney	OS-RTS	2/18/15	
Subject Matter Expert (SME):			
Arthur D. Carroll	OS-RTS	2/18/15	
Document Owner:			
James W. Angelo, Division Leader	OS-DO	2/25/15	
Responsible Line Manager Approval:			
Cheryl D. Cabbil, Associate Director	AD-NHHO	2/27/15	for:

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1.0 INTRODUCTION

1.1 Purpose

This document provides requirements and guidance on the process for developing technical procedures at the Los Alamos National Laboratory (LANL), their structure, and the format of action steps to meet various procedure logic needs. The document implements the technical procedure content requirements of Attachment 16, *Local Procedures*, of P315, *Conduct of Operations Manual*, and incorporates the technical procedure structures of Department of Energy (DOE) standard DOE-STD-1029-92, Change 1, *Writer's Guide for Technical Procedures*.

This document incorporates mandatory, conditional, and optional requirements and format. This document is divided into the following four (4) basic parts: 1) procedure development considerations (see Section 3.0, *Planning and Development*); 2) procedure structure and format considerations (see Section 4.0, *Procedure Format*); 3) methods for procedure logic and action structure (see Section 5.0, *Writing Action Steps*); and 4) standard methods for highlighting key information and steps (see Section 6.0, *Key Information/Steps*).

Part 1 – This part deals with the planning and development of a technical procedure and is intended purely as guidance, intended to provide the inexperienced Procedure Writer with guidance on issues that may not be readily apparent, such as identifying records resulting from the execution of a procedure.

Part 2 – This part deals with the structure and format of procedures and is intended to satisfy the DOE Order 422.1, *Conduct of Operations*, requirement for the establishment of format standards (see requirement 2.p.[3]). Some of the technical procedure sections and sub-sections described in this part are mandatory, some are conditional, and some are optional. Each individual section in this part describes one of the various technical procedure sections and subsections and begins with a statement indicating if that section or subsection is mandatory, conditional, or optional. If conditional, this lead-in statement describes the condition that would require the section. The remaining information in these sections provides guidance the Procedure Writer should use to ensure that the associated technical procedure meets its intended purpose. Any specific requirements within this part will clearly be identified and will reference back to the requirement in P315, *Conduct of Operations Manual*.

Part 3 – This part deals with the format of the various technical procedure action step used to convey to the Performer the correct logic flow associated with the work activity the technical procedure is describing. Which of these action steps to be use, is at the discretion of the Procedure Writer based on the need of the logic flow. Each of the individual sections of this part describes a different action step and provides requirements and guidance to help select the best one and to ensure that the action step chosen meets its intended purpose. Any specific requirements within this part will clearly be identified and have its reference back to the requirement in P315, *Conduct of Operations Manual*.

Part 4 – This part deals with standard methods to highlight within the technical procedure key information and action steps in order to satisfy the DOE Order 422.1, *Conduct of Operations*, requirement (see detailed attribute 2.p.[3].o). Currently, this part only addresses Safety Basis and Nuclear Criticality Safety, but may be expanded to address other issues of information/step highlighting that may arise. The direction of this part is considered mandatory. Each of the individual section of this part provides requirements to ensure that the key information is properly highlighted.

1.2 Scope and Applicability

This document is applicable to all LANL technical procedures written to the standards established in Attachment 16, *Local Procedures*, of P315, *Conduct of Operations Manual*, and is to be used by all LANL employees, contractors, and subcontractors to the extent required in their contract.

1.2 Scope and Applicability (continued)

Although this document only provides guidance for the writing of technical procedures, it may be used by the Procedure Writer and the Responsible Line Manager (RLM) for writing other types procedures (e.g., administrative procedures and emergency and alarm response procedures).

This administrative procedure (functional series document) is issued as part of the Conduct of Operations (CoO) Program implemented at the LANL. This document derives from P315, *Conduct of Operations Manual*.

- Issuing Authority (IA): Associate Director for Nuclear and High Hazard Operations (ADNHHO)
- Responsible Manager (RM): Operations Support (OS) Division Leader
- Responsible Office (RO): Operations Support – Readiness and Technical Support (OS-RTS)

2.0 BACKGROUND

A primary objective throughout the DOE complex is that operations be conducted in a safe, deliberate, and controlled manner. In addition to training or day-to-day supervision, providing sound procedures and requiring workers to use them are among the most formal, direct, and effective methods available to managers to ensure that their operations meet DOE's objective. Procedures provide managers with a critical management tool to communicate detailed expectations for how individual workers are to perform specific tasks.

To be effective management tools, the procedures that workers use must present the best knowledge available of how to integrate the policies, principles, rules, parameters, processes, controls, products, culture, physical facilities, equipment, material, and people necessary to operate a facility or perform the work activity safely. In addition, procedures must be technically and operationally accurate, up-to-date, and easy to follow. Ensuring that facility procedures meet these criteria is a complex job.

Attachment 16, *Local Procedures*, of P315, *Conduct of Operations*, acknowledges that many types of procedures are required to operate a facility and, therefore, fall under its requirements. These include: 1) administrative procedures; 2) technical procedures; and 3) emergency and alarm response procedures.

Technical procedures are known by many names depending upon the specific use or the organization. These include operating procedures (OPs), detailed operating procedures (DOPs), standard operating procedures (SOPs), surveillance requirement (SR) procedures, and in-service inspection (ISI) procedures to name a few. For purposes of this Writer's Manual, any procedure that provides "*a formalized approach or set of instructions required to execute a specific work activity, which includes operation of equipment or systems, controls the design basis and configuration of the facility and its equipment or systems, and the management of the facility within its safety, security, and environmental envelope*" (see P315, *Conduct of Operations Manual*, Attachment 16, *Technical Procedures*, Section 16.4, *Definitions and Terms*).

3.0 PLANNING AND DEVELOPMENT

The subsections of this section address various topics that may be encountered during the procedure development process, providing guidance for each. The use of these subsections is at the discretion of the Procedure Writer, but it is recommended that all of these subsections be read and considered for each procedure.

3.1 Identifying the Design Bases

The bases of procedures is a compilation of information such as the Documented Safety Analysis (DSA) or Safety Analysis Document (SAD) for an accelerator, Technical Safety Requirements (TSRs), operational "lessons learned," facility configuration and conditions during performance, and the engineering design. The technical bases documentation is needed to describe the technical parameters and boundaries within which the process is performed. The management control bases of procedures contain information such as institutional administrative processes, facility administrative requirements, and relevant plans and programs. The design bases of procedures include the design criteria, vendors, and engineering standards drawings and specifications that were used in the design and construction of the facility.

NOTE: The Document History File (DHF) is the hard copy or electronic file that documents the development, review, concurrence, and approval of a procedure. The specific content of the DHF is subjective and the guidance provided within this document are recommendations unless noted otherwise. The minimum requirements are detailed in P315, *Conduct of Operations Manual*, Attachment 16, *Local Procedures*, Section 16.5.1.k, *Document History File*.

The bases are living documents, subject to change, and the revisions used are documented in the DHF to allow for review of the current revision's DHF when a revision to a technical procedure is required. The DHF is a compilation of all pertinent information used to develop the procedure and any subsequent revisions. The bases are used to analyze the requirements that must be included in procedures or revision. The contents of the bases may be revised during procedure preparation to ensure that the final product contains accurate and relevant information.

3.2 Identifying Source Documents

In addition to design basis documents, requirements from other sources (such as DOE orders) must also be implemented by the procedure. Collectively, these requirements are called source requirements and provide the technical basis for the procedure.

- Identify the DOE rules and orders, TSRs, DSA or SAD, and other requirements and commitments directly implemented by the procedure (e.g., industry codes and standards).
- Identify the specific requirements within the source requirements documents that are implemented by the procedure.
- Ensure that the currently authorized versions of the source requirement documents are used (e.g., the codes and standards in effect when the facility was designed, not the most recent versions, normally apply unless a modification, commitment, or technical safety requirement change invokes a more current version).
- Identify the source documents in the DHF or in the Reference section (see Section 4.5.13, *References*) of the procedure.
- If more than one type of source requirement document exists, the DHF should use subheadings to list them; e.g.,
    - DOE rules and orders;
    - TSRs and safety analysis reports; and
    - Industry codes and standards.
- The DHF should identify the location within the procedure that implements each source document requirement.

3.3 Capturing Data

The execution of some procedures may require the capture of data. The data may be required to meet a regulatory or contract requirement, meet an expectation of our clients, or provide supporting data for the LANL performing organization.

- Review the source documents (see Section 3.2, *Identifying Source Documents*) for any mandatory data collection requirements. Potential drivers for mandatory data collection include:
    - When required to verify compliance with a law, regulation, rule or other compliance requirement or commitment.
    - When required by quality requirements [e.g., LANL Quality Assurance Plan (QAP), Weapons Program QAP, etc.].
    - When data is required by the work activity's client.
- Coordinate with the responsible line manager (RLM) for the procedure and subject matter experts (SMEs) to determine any additional data collection needs. The RLM makes the final decision regarding what, if any, additional data is to be collected by the procedure. Potential reasons for data collection include:
    - When data is required by Engineering, the Facility Operations Director (FOD), or the operating organization to provide historical data on the work activity.
- Document any data collection requirements (mandatory or optional) and the justification in the DHF.

3.4 Identifying Records

Records generated by procedures are maintained to document various conditions, such as the tasks completed by performing the procedure or conditions identified during the performance of the procedure. Administrative controls establish requirements for, and control of, records (see Section 4.5.12, *Records*).

The need for records may be to meet a regulatory or contract requirement, meet an expectation of our clients, or support LANL, facility, or organization operations. Records as a result of a procedure performance are not mandatory. These records may be driven by federal, state, or local law or regulation, a requirement from our customers, a Quality Assurance (QA) requirement, or requirements of LANL, project, or facility management.

- Review the source documents (see Section 3.2, *Identifying Source Documents*) for any mandatory requirements for creation of records.
- Review the project, facility, or LANL QAP for any mandatory requirements for the creation of records.
- Coordinate with the RLM for the procedure and SMEs to determine any additional records generation needs. The RLM makes the final decision regarding what, if any, additional records are generated by the procedure.
- Coordinate with the local Records Management Point of Contact (RM-POC) to review the list of identified records within the proposed procedure and identify the specific storage, retention, and disposition requirements.
- Document any records requirements (mandatory or optional) and the justification in the DHF.

3.5 Consistency

One of the most important principles in writing effective technical procedures is to maintain consistency in style, format, and organization, both within and among procedures. Inconsistencies can result in users attributing differences in meaning to differences in presentation. Consistency allows users to move through documents without having to waste effort interpreting the style of presentation for each section they encounter. This facilitates comprehension and allows users to concentrate on the actual performance of the instructions. When employing the guidelines discussed in this document, maintain consistency!

3.6 Writing Style

Narrative prose and paragraph style are inappropriate for writing procedures. Users of procedures will likely be working under difficult, sometimes stressful conditions, and thus procedures should be written so that users can grasp the intended meaning quickly and easily. The guidance provided in Section 5.0, *Writing Action Steps*, incorporates this concept.

3.7 Defining Work Steps

Although Section 5.0, *Writing Action Steps*, provides guidance on how to write the individual action step, the process for identifying the steps within the process is different. If steps, especially those responding to an unexpected condition, are not included in the procedure then delays in execution, upset conditions, or injury to workers may result.

- Develop the basic process as a team with the SME and operator(s) for the activity.
- Engage other SMEs (e.g., Radiation Protection, Safety Basis, and safety personnel) as required during this process.
- Write the basic activity steps as described by the SME and operator(s).
- Read through the individual activity steps asking “What can go wrong?” Avoid making the procedure excessively complex by addressing only those issues that have a reasonable likelihood of occurring. Issues that, although possible, are not likely to occur can be addressed through the Pause/Stop Work process. Add additional conditional action steps (see Section 5.2, *Conditional Steps*) as required when issues are identified.
- When the team can iterate through the individual activity steps without identifying any new “What can go wrong?” issues, then the process is well defined. At this point in the process the team should apply the appropriate level of detail as described in Section 3.8, *Determining Level of Detail*.

3.8 Determining Level of Detail

Writing at the appropriate level of detail is the key to successful communication with procedure users. For ease of use and to reduce distraction and confusion, include only information in the procedure that relates directly to completing the task.

- Provide a level of detail that considers the following variables:
    - Qualification level of the users. As qualification level increases, the level of detail can decrease on tasks that are simple or are frequently performed.
    - Complexity of the task. As the task’s complexity increases, the level of detail can increase.

3.8 Determining Level of Detail (continued)

- Frequency of task performance. As the task's frequency of performance increases, the level of detail can decrease.

- Degree of standardization desired. The level of detail varies directly with the degree of standardization desired. The more standardized the performance, the more detailed the procedure will be.

- Write procedures to a level of detail consistent with the qualifications and training of the expected users. Job task analyses and training records provide information useful in assessing the level of detail requirements. When in doubt, write to the lowest common denominator.

- Determine whether the amount and kind of information provided are adequate for intended users by answering the following questions:

  - Can the procedure be performed in the sequence in which it is written?

  - Can the users locate and identify all equipment referred to in the procedure?

  - Can the users explain in detail how to perform general instructions?

  - Can the users perform the procedure without obtaining additional information from persons or procedures not specified by the procedure?

  - Can the users perform the procedure without obtaining direct assistance from persons not specified by the procedure?

- Ensure that the decision making required in the procedure is consistent with the user's qualifications and level of authority. This approach permits tasks to be performed with minimum supervision.

- Exclude information that is useful only to reviewers or other persons not involved in performing the procedure.

4.0 PROCEDURE FORMAT

The subsections of this section describe the various sections that could be included in a procedure. These potential procedure sections could be mandatory, conditional (if situation requires), or optional. Each subsection will note how the associated procedure section must be applied when developing a procedure.

4.1 Page Headers, Footers and Numbering

The inclusion of page headers, footers and numbering in technical procedures is mandatory.

Each page of the procedure must include a page header that fits at the top of the page and that includes a unique identifier (i.e., procedure number) for the procedure. The unique identifier for procedures may include the building number, system, and/or equipment to which it applies to make it easier for personnel to identify the use of the procedure.

- Place the page header at the top of every procedure page.

- Do not include a page header on the coversheet.

4.1 Page Headers, Footers and Numbering (continued)

- Ensure that margins are adequate on all sides so that information is not lost during duplication. Surrounding the text area with a box is one method to ensure that information is not lost.

- Include the following information in the page header (see Example 4-1, *Page Header*):

    - Procedure Title

    - Procedure Number and Revision Number

    - Page Number and Total Number of Pages

    - Classification Markings, as applicable, in accordance with P204-2, *Classified Matter Protection and Control Handbook*.

    - Procedure Usage Level (see P315, *Conduct of Operations Manual*, Attachment 16, *Technical Procedures*, Section 16.4.1, *Usage Levels*)

Example 4-1
Page Header

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- Place the page footer at the bottom of every procedure page (see Example 4-2, *Page Footer*).

Example 4-2
Page Footer

UCNI

- Do not include a page footer on the coversheet.

- Include in the page footer any Classification Markings required by P204-2, *Classified Matter Protection and Control Handbook*.

- Number pages consecutively. Begin with the coversheet (which is page 1) and continue to the end.

- For an appendix or an attachment, maintain the page numbering sequence and use an internal page number (see Example 4-3, *Appendix or Attachment Page Header*).

4.1 Page Headers, Footers and Numbering (continued)

Example 4-3

Appendix or Attachment Page Header

Reservoir Plug Welding SOP-618-4, Rev. 0
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APPENDIX A -- Check Sheet/Data Sheet
(Page 1 of 1)

4.2 Procedure Titles

The inclusion of a procedure title in technical procedures is mandatory.

Procedure titles provide the users with a very concise understanding of the purpose and scope of the procedure in a very concise form.

- Write procedure titles that are concise, clear, and descriptive of the system, equipment, process, or activity.
- Write procedure titles to permit the users to easily identify the procedure and activity to which the procedure applies.
- Write unique procedure titles to assist the users in identifying the correct procedure.

4.3 Section Headings

The inclusion of section headings in technical procedures is mandatory.

Section headings break the text of the procedure into sections by grouping related action steps or information. Section headings help users locate information in the procedure, break up long series of action steps into more manageable groups, and track their progress through the procedure, especially when branching to other sections.

- Give each major activity in the Work Steps section(s) of the procedure a unique and descriptive heading.

NOTE: The need for more than three heading levels may indicate that the scope of the procedure is too large and that multiple procedures with smaller scopes may be required.

- Limit the number of heading levels to three (e.g., 1.0, 1.1, and 1.1.1) if possible. Excessive levels result in complex section numbers (see Example 4-4, *Section Headings*).

4.3 Section Headings (continued)

Example 4-4
Section Headings

1.0 FIRST LEVEL HEADING

1.1 Second-Level Heading

1.1.1 Third-Level Heading

[1] First-level action step

[2] First-level action step with two second-level action steps

[a] Second-level action step

[b] Second-level action step

- Identify first-, second-, and third-level headings by a decimal numbering system.
- Begin first-, second-, and third-level headings at the left margin of the text block.
- Identify first-level headings with all capital letters and **bold** type.
- Identify second--level headings with initial capital letters of important words and **bold** type.
- Identify third-level headings with initial capital letters of important words and *italic* type.
- Use topics for second- and third-level headings (e.g., Cooling Water Pumps).
- Use a list to organize material other than action steps under headings and action steps.
- Designate listed items with indented upper-case letters.
- If it is necessary to continue a section on subsequent pages, repeat the heading on subsequent pages with an indication that the page is a continuation (see Example 4-5, *Section Heading Continuation*).

Example 4-5
Section Heading Continuation

3.2 Special Tools, Equipment, Parts and Supplies (continued).

4.4 Step Numbering

The use of action step numbering in technical procedures is mandatory.

Action steps reduce a task or activity to a discrete set of instructions. Action step numbering identifies individual action steps and their sequence (see Example 4-6, *First-Level Action Step with Second-level Action Steps*).

Example 4-6
First-Level Action Step with Second-level Action Steps

[3] Prepare compressed gas cylinders.
  [a] Select compressed gas cylinders with current in-service dated gas certification.
  [b] Verify that each cylinder regulator will maintain 35 psig (30 to 40).

- Make action steps readily distinguishable by the users.
- Limit the number of action step levels to two whenever possible.
- Identify first-level action steps with bracketed numbers.
- Identify second-level action steps with bracketed lower-case letters.
- Restart the step numbering for each heading or sub-heading.
- Step numbering is not affected by having multiple performers.

4.5 Procedure Organization

Procedures are organized to provide users with all the information needed to accomplish an activity. Procedures include the following elements:

- Coversheet
- Revision Status
- Table of Contents (conditional)
- Introduction
- Precautions and Limitations
- Prerequisite Actions
- Acceptance Criteria (conditional)
- Work Steps
- Post-Performance Activity (optional)
- Definitions and Acronyms (optional)
- Responsibilities (optional)
- Records

4.5 Procedure Organization (continued)

- References (optional)
- Appendices (conditional)
- Attachments (conditional)

Not all procedures require each of these sections and/or subsections (e.g., not every procedure has an appendix or an attachment). If the procedure does not need an element, do not include it. The contents and format for each of these procedure elements are discussed in the following sections.

4.5.1 Coversheet

The inclusion of a Coversheet in technical procedures is mandatory.

The Coversheet provides a means for the users to verify that the procedure is appropriate for the task at hand.

- Include the following minimum information (see Figure 4-1, *Sample Coversheet*):
    - Procedure Number and Revision
    - Procedure Title
    - Effective Date
    - Approval Signatures (e.g., RLM, FOD, and SMEs) – These must include the printed name, signature, and date. The organization and Z# are recommended.
    - Classification Review – This must include the printed name, signature, date, and the classification results. The organization and Z# are recommended.
    - Hazard Grading (i.e., Low, Moderate, or High/Complex) (see P315, *Conduct of Operations Manual*, Attachment 16, *Technical Procedures*, Section 16.5.1.f, *Hazard Grading*)
    - Procedure Usage Level (see P315, *Conduct of Operations Manual*, Attachment 16, *Technical Procedures*, Section 16.4.1, *Usage Levels*)
- The following information is optional:
    - Reviewers – These must include the printed name, signature, and date. The organization and Z# are recommended.
    - Next Review Date – This is based upon the criteria of P315, *Conduct of Operations Manual*, Attachment 16, *Local Procedures*, Section 16.7.1, *Frequency*.
    - Expiration Date – This is based upon the criteria of P315, *Conduct of Operations Manual*, Attachment 16, *Local Procedures*, Section 16.7.1, *Frequency*.
    - Procedure Type [e.g., Operating Procedures (OPs), Administrative Procedures (APs), Alarm Response Procedures (ARPs), and Emergency Operating Procedures (EOPs).] – This is typically part of the procedure's unique identifier (i.e., procedure number).
    - Procedure Status (e.g., New or Revised)

4.5.1 Coversheet (continued)

- Superseded Procedure(s) – This identifies other procedures that are being superseded by the issuance of this procedure.

- Safety Basis-related Information [e.g., Unreviewed Safety Question (USQ) evaluation number]

Figure 4-1
Sample Coversheet

SOP-618-4, Revision 0

Reservoir Plug Welding

Effective Date: 10/22/13
Expiration Date: 10/22/16
Supersedes: SOP-611-14, Rev.4
Next Review Date: 10/22/16

Hazard Grading: ☐ Low ☒ Moderate ☐ High/Complex
Usage Mode: ☒ Reference ☐ UET UET Sections: _____
Status: ☒ New ☐ Major Revision ☐ Minor Revision
☐ Review w/No Changes ☐ Other: _____
Safety Basis: ☐ N/A ☒ USQ ☐ USI
No.: LANL-14-001-D Rev.: 0 Date: 09/25/2013

Originator
Procedure Writer, Facility Operations

Name	Z#	Signature	Date
David T. Thompson	313131	SIGNATURE ON FILE	10/19/13

Reviewers

Function	Name, Z#	Signature	Date
Safety Basis	Jennifer S. Brown, 212121	SIGNATURE ON FILE	10/20/13
Crit. Safety	John R. Tanner, 424242	SIGNATURE ON FILE	10/19/13
Rad. Protect.	Bill J. Turner, 123242	SIGNATURE ON FILE	10/19/13
Engineering	Frank A. Thomas, 222333	SIGNATURE ON FILE	10/21/13
Operations	Bill D Smith, 232300	SIGNATURE ON FILE	10/20/13

Approvals
Responsible Line Manager, Facility Operations

Name	Z#	Signature	Date
John W. Smith	111111	SIGNATURE ON FILE	10/22/13

Classification Review
☒ Unclassified ☐ UCNI ☐ Classified _____

Name	Z#	Signature	Date
Mary C. Brown	333333	SIGNATURE ON FILE	10/20/13

- Provide a simple descriptive title that identifies the system, equipment, process, or activity described in the procedure.

- Include other information, as needed, to differentiate the procedure from other procedures (e.g., specific conditions or activities that the procedure controls).

4.5.2 Revision History

The inclusion of a Revision History section in technical procedures is mandatory.

It is essential that users follow the most current versions of procedures. Document Control ensures that only the most recent versions are available.

Identify changes (additions, corrections, and/or deletions) made in the procedure. If the changes are not extensive, such as a total rewrite, mark the changes with vertical lines in the margin. Only the marks for the most recent revision are to appear in the revision.

- Include the following information in a table format:
    - Procedure Number and Revision
    - Effective Date
    - Action Type [e.g., New, Major or Minor Revision, Immediate Procedure Change (IPC), or Periodic Review.]
    - Description of Change (Brief summary of the modifications. Use as much space as needed to communicate important changes to the procedure users.)
- At a minimum the Revision History section must contain the current revision.
- Older revisions may be dropped if their inclusion would result in the table exceeding one page.

4.5.3 Table of Contents

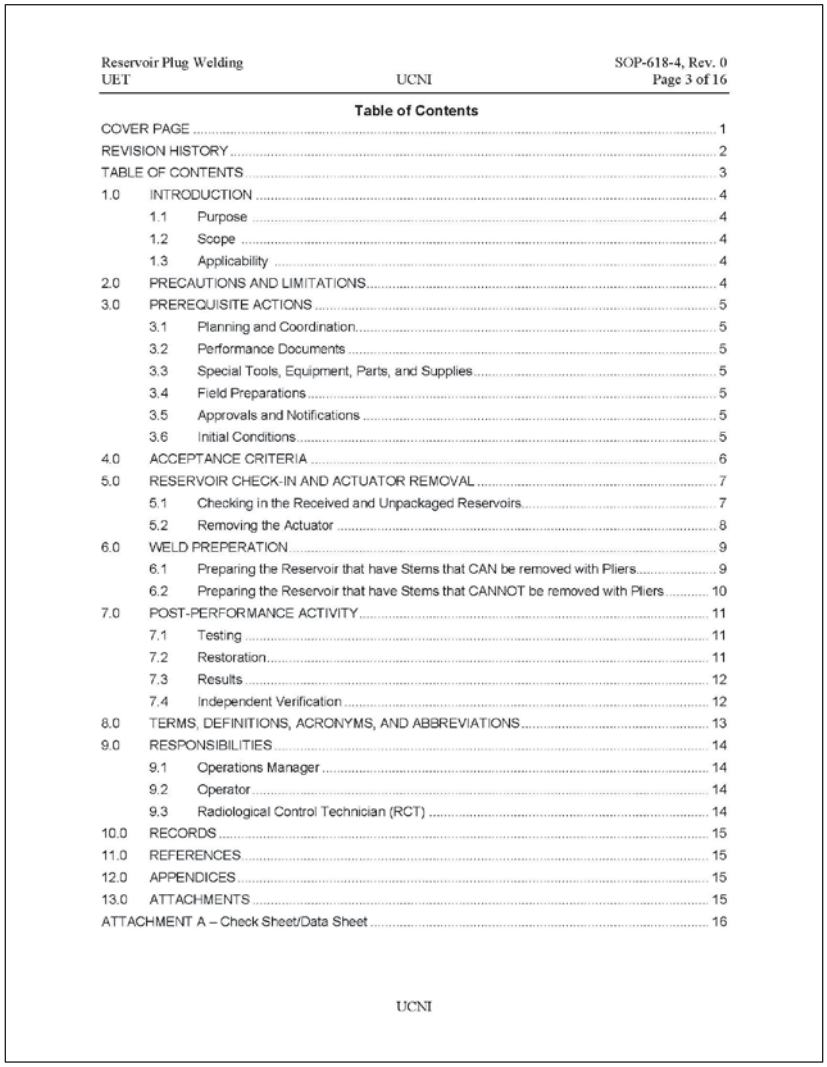
The inclusion of a Table of Contents section in technical procedures is conditional, based on the size and organizational complexity of the procedure.

The Table of Contents helps users locate the portions of the procedure they need for a specific operation and is useful for locating appendices.

- List the procedure section and subsection headings and the titles of appendices exactly as they appear in the procedure (see Figure 4-2, *Sample Table of Contents*).
- List third-level subsection headings in the table of contents when required by the length and complexity of the procedure (i.e., listing third-level headings is optional).
- In the table of contents, identify at the right margin, the page number on which the heading or title first appears.
- List the procedure appendices and attachments after listing all procedure sections.

4.5.3 Table of Contents (continued)

Figure 4-2
Sample Table of Contents



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4.5.4 Introduction

The inclusion of an Introduction section in technical procedures is mandatory.

The Introduction section addresses the purpose, scope, and applicability of the procedure.

4.5.4.a Purpose

The inclusion of a Purpose section in procedures is mandatory.

- Provide a clear, concise description of the goal to be achieved by performing the procedure. Avoid purpose statements that repeat the procedure title and headings of the table of contents (see Example 4-7, *Purpose Statement*).

4.5.4.a Purpose (continued)

Example 4-7
Purpose Statement

1.1 Purpose

This procedure provides instructions for setup, performance of HEPA filter testing to ensure compliance with Surveillance Requirement (SR) 4.8.1.

- Identify the driver(s) (e.g., laws, regulations, standards and TSRs), as appropriate, that are the basis for the procedure.

4.5.4.b Scope

The inclusion of a Scope section in procedures is mandatory.

1. Describe the activities covered by the procedure (see Example 4-8, *Scope Statement*).

Example 4-8
Scope Statement

1.2 Scope

This procedure addresses the actions necessary to plug weld reservoirs, to decontaminate them, and to store them. This procedure does not include the receipt and unpackaging of reservoirs, nor does it address the reworking of improperly welded reservoirs.

- If necessary, address the limitations of the procedure (i.e., what the procedure does not cover).
- Optionally, identify the personnel performing the work activity, the location where the procedure is applicable, and other implementation requirements.

4.5.4.c Applicability

The inclusion of an Applicability section in procedures is optional. If a separate stand-alone Applicability section is not used, then the applicability statement must be included as part of the Scope section.

- Specify the conditions that require procedure use in the applicability statement (e.g., in a surveillance test procedure the applicability statement might be that the test has been requested by a manager).

4.5.5 Precautions and Limitations

The inclusion of a Precautions and Limitations section in technical procedures is mandatory.

Failure to include precautions and limitations within the procedure can cause a severe injury to, or the death of, the procedure users and/or serious damage to equipment or the environment.

- Write precautions and limitations to inform users of hazardous conditions and their potential effects (see Example 4-9, *Precaution Statements*, and Example 4-10, *Limitation Statement*).

Example 4-9
Precaution Statements

2.0 PRECAUTIONS AND LIMITATIONS

2.1 Vapor pressure thermometer capillary tubing can be damaged if rolled up to less than 8 inches in diameter.

2.2 The instrument terminals may carry hazardous electrical currents. You may receive a severe or fatal electric shock if you touch these terminals without protection.

Example 4-10
Limitation Statement

2.0 PRECAUTIONS AND LIMITATIONS

2.1 The unavailability of the standby motor generator during power operations may exceed a technical safety requirements limiting condition of operation.

- Do not include user actions in the precautions and limitations section.
- If user actions are required to respond to the precaution or limitation, provide action step(s) at the appropriate location in the procedure and use a conditional action step to define the conditions that require an action.
- Avoid generic precautions that are part of a job description or inherent in the task.
- Include hazards and controls that exist during the entire procedure or occur at more than one point in the procedure. Follow the requirements of Section 4.5.8, *Work Steps*, when addressing hazards that apply to individual action steps.
- Ensure that all of the task and area hazards identified in the associated hazard analysis are considered for inclusion.

4.5.5 Precautions and Limitations (continued)

- Ensure that the source of the precaution or limitation is clearly identified (e.g., if an electrical shock hazard is identified, determine the equipment that is the source of the potential electrical shock).

- Address the following in precautions and limitations as appropriate.

    - Identify and address potential hazards to personnel, the public, or the environment; e.g.,

        - Radiation or contamination
        - High-temperature or high-pressure fluids
        - Hazardous substances
        - Electrical shocks
        - Excessive noise levels
        - Confined space hazards
        - Falls
        - Moving equipment or parts of equipment
        - Fire hazards.

    - Identify and address the protection of equipment and material from

        - Inadvertent, incorrect, or omitted actions that may cause facility shutdown
        - Inadvertent, incorrect, or omitted actions that may result in limiting conditions for operation as defined in the technical safety requirements
        - Limitations identified in approved vendor information
        - Limitations identified in applicable design documents
        - Unusual alarms affecting facility availability that may occur or are expected to occur as a result of performing the procedure
        - Mechanical or electrical bypasses (lifted leads, inhibits, jumpers, and fuse removals) used in performing the procedure
        - Electrical and mechanical interlocks involved in performing the procedure
        - Actions resulting in emergency response or automatic incident response
        - Undesirable consequences of violating each precaution or limitation statement.

    - Advise the users that the procedure contains TSR-related or nuclear criticality safety step(s).

4.5.5 Precautions and Limitations (continued)

- Include a statement regarding the users' authority to exercise the LANL Pause/Stop Work process, which is recommended, but not required.

- In the Work Steps section, write as warnings or cautions (see Section 5.10, *Warning, Caution, and Note Steps*) any hazardous conditions that apply to individual action steps.

4.5.6 Prerequisite Actions

The inclusion of a Prerequisite Actions section in technical procedures is mandatory.

The prerequisite actions section identifies actions that must be completed by the users, requirements that must be met, and notifications and authorizations that must be completed before the users continues with the procedure.

- Include the following subsections in the prerequisite actions section:
  - Planning and Coordination
  - Performance Documents (conditional)
  - Special tools, Equipment, Parts, and Supplies (conditional)
  - Field Preparations (conditional)
  - Approvals and Notifications (conditional)
  - Initial Conditions (conditional).

- Vary the sequence of procedure subsections as appropriate; the sequence of subsections should be determined by the sequence of the actions to be performed (e.g., an approval might be needed before a field preparation is performed).

- Arrange action steps in an order ensuring that all required permissions and notifications are obtained before any facility equipment is manipulated.

- If the procedure is generic, include only those prerequisite actions that apply to all uses of the procedure. Application-specific prerequisite actions, including data sheets, are contained in separate procedures.

- Include provisions for recording data, sign-offs, and remarks discussed in the following subsections as needed.

4.5.6.a Planning and Coordination

The inclusion of a Planning and Coordination section in technical procedures is mandatory.

The planning and coordination section includes information on activities that must be undertaken to plan and coordinate the performance of the procedure. These actions may include, but are not limited to, the following:

4.5.6.a Planning Coordination (continued)

- Include instructions for a pre-job planning meeting [e.g., plan-of-the-day/plan-of-the-week (POD/POW) or pre-job brief (PJB).] with the participants as appropriate (e.g., a pre-job meeting may include coordinating activities at several locations, planning detailed measurements to be taken by several persons or groups, or other aspects of performing a complex procedure).

- Provide administrative requirements, such as verification that the procedure to be used is the current revision.

- Provide action steps to ensure that needed information is obtained and recorded. These action steps may involve:

    - Identifying the principal personnel involved by functional title (e.g., Operations Manager, etc.) or responsibility (e.g., performer or independent verifier).

    - Recording the facility condition at the start and end of the procedures and the date and time the procedure is started.

    - Justifying and identifying portions of the procedure that are used.

    - Obtaining needed permits (e.g., excavation or penetration).

- Address any special system conditions and hold orders required to perform the work.

4.5.6.b Performance Documents

The inclusion of a Performance Documents section in technical procedures is conditional, based on the need for documents other than the procedure itself to execute the procedure.

The performance documents section identifies those documents required to be in hand or readily available at the work site, such as permits, drawings, vendor manuals, logbooks, and/or other documents referenced by the base procedure.

- List all other documents required to perform the procedure, such as drawings, approved vendor manuals, and other procedures that may be referenced in the base procedure.

- Where feasible, include such material in the procedure to lessen the number of references to which the users must refer.

- Do not include reference documents used to create the procedure.

4.5.6.c Special Tools, Equipment, Parts, and Supplies

The inclusion of a Special Tools, Equipment, Parts, and Supplies section in technical procedures is conditional, based on the need for these items to execute the procedure.

The special tools, equipment, parts, and supplies section (see Example 4-11, *Table Identifying Required Parts*) identifies the tools and supplies that may require staging, calibration, or verification of availability in order to execute the procedure.

Example 4-11
Table Identifying Required Parts

[3] Obtain the following parts:

Description	Part Number	TIIC No.	Quantity	Class
Gasket	3	XX-XX-XX	1	EQ
Piston	5	YY-YY-YY	1	EQ
Nut	6	ZZ-ZZ-ZZ	2	NA

- One option is to break out the listing of these items into separate, stand-alone subsections if the number of entries justifies it. If separate, stand-alone subsections are to be used, then these should be titled
  - Special Tools and Equipment
  - Tools and Fixtures
  - Measuring and Test Equipment
  - Consumables

- List special tools, measuring and test equipment, parts, and supplies required to perform the procedure (see Example 4-12, *Measuring and Test Equipment Identification)*. Strict attention to the completeness and correctness of this section is extremely important (e.g., failure to specify a necessary item could result in costly equipment downtime, or the use of a substitute for a specialized tool could damage equipment). It may be appropriate to provide some of this information in tables.

- If required to support customer, records, or other requirement, include a sign-off space (see Section 5.13.2, *Sign-offs*) to document the verification of the calibration or other information regarding the special tools, measuring and test equipment, parts and supplies.

- Identify certified or qualified parts and equipment needed for the activities.

- Provide guidelines for selecting and assembling special tools, measuring and test equipment, parts, and supplies.

- Provide separate action steps for the different categories such as parts, supplies, or measuring and test equipment.

- Identify specific equipment (e.g., screwdriver, radio, chain hoist, etc.) necessary to perform procedures.

Example 4-12
Measuring and Test Equipment Identification

[3] Obtain two stopwatches (calibrated and approved by Standards and Calibration Lab), and complete Table 4-2.

Table 4-2

M&TE No.	Expiration Date	Performer Initials
		_____
		_____

- Specify alternative tools and equipment if applicable.
- Avoid using the statement “or equivalent” when specifying equipment, if possible.
- Do not specify ordinary craft tools such as standard pliers and wrenches.
- If the procedure has a generic application, do not include instrument-specific information such as the serial number or calibration date. This information is included in application-specific procedures.
- Provide clear specifications for verifying the adequacy of test equipment. Specifications include ranges, accuracies, and compliance with calibration standards.
- Ensure that the range and accuracy of measuring equipment are consistent with the expected values to be measured.
- Determine when data concerning test equipment (e.g., serial numbers or calibration dates) must be recorded. Provide space in the procedure or in an attachment to record the data before the users encounter action steps that use the test equipment for critical measurements.
- Specify verification and performance checks or special controls required before the equipment is used. If the performance check is done just before use, include the check in the body of the procedure rather than in the prerequisite actions section.
- Identify unique software, approved in accordance with P1040, *Software Quality Assurance*.

4.5.6.d Field Preparations

The inclusion of a Field Preparations section in technical procedures is conditional, based on the need for field conditions to be established prior to execution of the procedure.

4.5.6.d Field Preparations (continued)

- Provide instructions for preparatory field activities that must be completed before continuing with the procedure. Examples of these activities are listed below.
    - o Ensure site accessibility.
    - o Perform lock-out/tag out of equipment (see Example 4.5-13, *Tag Out Action Step*).

Example 4-13
Tag Out Action Step

[4] Ensure that the GM Diesel unit to be inspected has been tagged out.

    - o Unlock valves or rooms.
    - o Record the as-found condition of the structure, system, or component.
    - o Verify if systems and components are in use before removing them from service (e.g., redundant safety system or indicator lights).
    - o Confirm the correct system or equipment configuration (see Example 4-14, *Field Preparations*).

Example 4-14
Field Preparations

[4] Verify that the halon fire protection system is in service for each GM Diesel room.

[5] Ensure that the following tests have been completed on the GM Diesel unit to be tested:

[a] SP-EG-100 series.

[b] SP-EG-1.

    - o Establish system or equipment alignment and power supply.
    - o Identify actions to cope with potential hazards such as fire, radioactive spills, or exposure to radiation.
    - o Install portable communications equipment and prepare special test equipment.
    - o Ensure that needed support services, such as craft personnel to remove a relay cover, are available.

4.5.6.d Field Preparations (continued)

- Ensure the availability of performance documents before continuing with the procedure.
- Provide specifications and tolerances that determine whether the results of the prerequisite action steps are acceptable.
- Obtain required permits such as radiation work, electrical work, or confined space work permits. Ensure that appropriate sign-offs and approvals are obtained.

4.5.6.e Approvals and Notifications

The inclusion of an Approvals and Notifications section in technical procedures is conditional, based on the need for the notification and/or approval of key personnel prior to execution of the procedure.

The approvals and notifications section identifies approvals and notifications that must occur before the actions in the procedure begin. Approvals and notifications related to specific action steps in the procedure are placed adjacent to the affected action step (see Example 4-15, *Approval to Begin a Procedure*).

- Provide instructions to ensure that all necessary approvals are obtained and all required notifications are made before initiating the procedure. Approvals and notifications may involve responsible individuals such as the
  - Operations Manager (OM)
  - RLM
  - Control Room Operator
  - Cognizant System Engineer (CSE) or Plant System Engineer (PSE)
  - Support, Quality Control, Regulatory, and Audit Personnel
  - Safeguards or Security Personnel
  - Radiological Control Technicians (RCTs).

Example 4-15
Approval to Begin a Procedure

3.3 Approvals

[1] Consult with, and obtain permission from, your supervisor before beginning performance of this procedure. _____
Supervisor Initials

4.5.6.e Approvals and Notifications (continued)

- If an integrated work document (IWD) encompasses activities performed in procedures does not include instructions to obtain permits before performing the activity, provide instructions for obtaining the required permits [e.g., radiation work permits (RWPs) or confined space entry permits].

- Identify any required notification requirements in the event of a delay in the procedure execution (see Example 4-16, *Notification in Case of Delay*).

Example 4-16

Notifications in Case of Delay

[2] IF the test is delayed until a later shift,
THEN obtain approvals to begin or continue the test from the following individuals:

Position	Signature	Date	Time
Shift Manager			
Central Control Room Operator			
Shift Technical Engineer			

4.5.6.f Initial Conditions

The inclusion of an Initial Conditions section in technical procedures is conditional, based on the need for field conditions to be established prior to execution of the procedure.

- Identify the expected initial field conditions required to start the work activity.

- Include the required status (e.g., operating or shutdown) of any supporting equipment and/or systems.

- Identify any process parameter that must be achieved before the work activity begins.

4.5.7 Acceptance Criteria

The inclusion of an Acceptance Criteria section in technical procedures is conditional, based on the need for the overall results of the procedure to meet specific criteria to be considered successful.

Acceptance criteria provide a basis for determining the success or failure of an activity. Each criterion should be associated with the action step where the verifying action is performed and recorded. This section may be used to summarize the acceptance criteria or to state where the acceptance criteria are located in the procedure itself or in referenced procedures or datasheets.

4.5.8 Work Steps

The inclusion of one or more Work Steps sections in technical procedures is mandatory.

The Work Steps sections contain the action steps that prescribe the principal tasks and subtasks of the procedure.

- Organize activities in the order in which they will be performed.
- If required, divide the Work Steps sections into individual sections (e.g., 5.0, 6.0, etc.) or subsections (e.g., 5.1, 5.2, etc.) that are grouped into logically related activities, such as those established in the design basis (see Section 3.1, *Identifying the Design Basis*) and source documents (see Section 3.2, *Identifying Source Documents*).
- Use headings for each subsection that reflect the activity rather than a generic title (e.g., "Removing the Actuator," rather than "Actuator").
- The individual action steps within the Work Steps sections are written in accordance with Section 5.0, *Writing Action Steps*, of this document.
- State only one action (or closely related actions) per step.
- It is recommended that each first-level section heading be started on a new page.
- Include only the information pertinent to the performance of the procedure.
- Use consistent, precise, easy-to-understand terminology.
- Avoid acronyms and abbreviations, other than commonly understood terms.
- If the procedure applies to more than one user, indicate the performer's functional title before to the step statement(s) occur (see Example 4-17, *Identification of Performer*).

Example 4-17

Identification of Performer

[2] Torque head bolts with torque wrench set at 90 foot-pounds.

QA Inspector

[3] Verify that head bolts are torqued to 90-foot pounds. _____

- Include hazards and controls that apply to individual action steps. Follow the requirements of Section 4.5.5, *Precautions and Limitations*, when addressing hazards that apply to the entire procedure or occur at more than one point in the procedure. This information is conveyed in the form of a Warning or a Caution (see Section 5.10.1, *Warnings and Cautions*). Consult the Hazard Analysis, if one was performed, to ensure that required hazard information is appropriately communicated and, as much as possible, incorporated into the procedure.
- Include independent verification (IV) instructions as designated by the FOD or RLM (see P315, *Conduct of Operations Manual*, Attachment 10, *Independent Verification*).

4.5.8 Work Steps (continued)

- Instrument readings are to include the tolerance and must conform to both the instrument scale and the readability of the field instrument.

- Instructions include explicit parameters and do not require mental arithmetic. If calculations are required, they must be clearly explained and space provided to document the calculation.

- If the scope of the action steps required to respond to an abnormal event is simplistic, instead of developing a stand-alone Abnormal Operating Procedure (AOP) include these action steps as a separate performance subsection.

4.5.9 Post-Performance Activity

The inclusion of a Post-Performance Activity section in technical procedures is conditional, based on the need for any of its subsections.

The post-performance activity section stipulates actions needed to close out the procedure performance. This section includes, but is not limited to, the following elements

◊ Testing (conditional)

◊ Restoration (conditional)

◊ Results (conditional)

◊ Independent Verification (optional)

- The creation of separate subsections listing the various post-performance activities is optional.

4.5.9.a Testing

The inclusion of a Testing section in technical procedures is conditional.

- If the operability of equipment has been affected while performing procedures and where operability must be verified before returning the equipment to service, include action steps that specify these tests.

- The actions steps to perform testing of a system or equipment may be included in the Work Steps section (see Section 4.5.8, *Work Steps*) as individual action steps, or a separate subsection, or a separate procedure.

4.5.9.b Restoration

The inclusion of a Restoration section in technical procedures is conditional, based on the need to return the system or process to a predetermined configuration following execution of the procedure.

- Provide action steps to return of affected structures, systems, and components (SSCs) to the desired configuration.

4.5.9.b Restoration (continued)

- Include instructions for
    - Required restoration adjustments, storage, or maintenance of laboratory and process equipment
    - The return of tools and equipment
    - The proper disposal or storage of consumables such as test samples or chemicals not used in the process.
    - The proper disposal of waste.
- Provide space for recording the notification of appropriate personnel that the SSC has been returned to service, if required.
- Include provisions for the close out of any permits (such as confined entry permits) that were required to perform the procedure.
- Provide verification of appropriate SSC restoration action steps, if required.
- The actions steps to return a SSC to service may be included in the Work Steps section (see Section 4.5.8, *Work Steps*) as individual action steps or a separate subsection.

4.5.9.c Results

The inclusion of a Results section in technical procedures is conditional.

This section may include, but is not limited to, the following elements:

- Provide instructions to summarize the results of the procedure, including
    - Listings of facility conditions
    - Date and time of test start and test completion
    - Participants
    - Reasons for the test
- Provide instructions to state whether
    - Problems or delays were encountered
    - Corrective action(s) were performed
    - Authorization signatures were obtained.
- Provide instructions to state whether acceptance criteria were satisfied, a nonconformance report was initiated, and/or a limited condition for operation was exceeded.
- Provide an action step to review the entire completed procedure and associated documentation, if any, for completion and to review and approve test results.

4.5.9.c Results (continued)

If the procedure is an "IWD-equivalent" procedure for a Moderate Hazard or High Hazard/Complex work activity as defined in P300, *Integrated Work Management*, an action step to perform a Post-Job Review must be added.

4.5.9.d Independent Verification

The inclusion of an Independent Verification section in technical procedures is optional.

- List the IV requirements as designated by the FOD or RLM.
- The actions steps to perform IV may be included in the Work Steps section (see Section 4.5.8, *Work Steps*) as individual action steps.

4.5.10 Definitions and Acronyms

The inclusion of a Definitions and Acronyms section in technical procedures is conditional, based on the need to define terms, acronyms, and/or abbreviations not found in the LANL Policy Office webpage list of definitions and acronyms.

The procedure should be written so that the users understand each step without having to refer to any supplemental information. If the clarification of terms, acronyms, and abbreviations is required, then the following apply:

- To the extent possible, Procedure Writers should avoid using terms, acronyms, and abbreviations that are not commonly known or defined in a LANL or facility-specific glossary of terms, acronyms, and abbreviations.
- LANL or facility-specific glossaries of terms, definitions, acronyms, and abbreviations should be maintained and used to ensure the consistent use of these elements and consistent interpretation by the users.
- Users should be adequately trained and familiar with the terms used in the procedure.
- If the Procedure Writer determines that a term needs amplification in a specific procedure, the preferred method is to add the amplification as a note preceding the affected action step or be incorporated in the action step.
- If multiple terms, acronyms, and abbreviations not commonly known or documented in a LANL or facility-specific glossary of terms, acronyms, and abbreviations are used, a separate procedure section or a stand-alone attachment may be used.

4.5.11 Responsibilities

The inclusion of a Responsibilities section in technical procedures is conditional, if the responsibilities are not readily apparent from the action steps within the procedure.

The procedure should be written such that the responsibilities are explicit in each action step. More complex procedures involving multiple performers may require a summary of responsibilities to help coordinate of resources.

- Provide a summary of the activities performed by each functional position involved in the execution of the procedure. Do not repeat the actual actions. Do not add actions not addressed in the procedure.

4.5.11 Responsibilities (continued)

- List those functional positions that are directly relevant to the procedure and are not called out in the Work Steps section(s). Examples include support personnel, such as RCTs or Operations Center Personnel.

    - Do not list generic responsibilities defined in institutional documents. For example, basic radiation support, such as the performance of smears or surveys, which are part of the general control of contamination, is not listed. In this example, the general responsibility is within the scope of the Radiation Protection Program itself. These situations typically do not require the inclusion of a specific action step in the procedure.

    - List generic responsibility if it is critical to the successful execution of the procedure. For example, the performance radiation protection smears during the un-packaging of potentially contamination containers must be performed at critical points in the process and specific action steps are included in the procedure at these critical points in the process.

- Use bullets to list the individual responsibilities for each functional position.

4.5.12 Records

The inclusion of a Records section in technical procedures is mandatory.

Records generated by procedures, if any, are maintained for a variety of reasons, including to document the tasks completed by performing the procedure, document the status of equipment or process parameters, or provide an operational history. Administrative controls establish requirements for, and control of, records.

- Identify the records generated as a result of performing the procedure (e.g., forms, data sheets, checklists, and documentation of as-found conditions). Coordinate with the RLM and the RM-POC.

- Classify the records generated as appropriate to the LANL and facility records management process and indicate the appropriate storage, retention, and disposition requirements of the records.

- Specify the governing document for managing records; specifically identify P1020-1, *Laboratory Records Management*, and any local procedure.

- If no records are generated, state this.

- Use a table to identify the records and identify the associated records processing requirements (recommended) (see Example 4-18, *Records Table*).

4.5.12 Records (continued)

Example 4-18
Records Table

Records Identification	Record / Non-Record	Protection/Storage Methods	Processing Instructions
Attachment A	Record	Supervision must implement a reasonable level of protection to prevent loss and degradation. Records must be maintained in a metal file cabinet when not in use.	When the records are ready for final disposition, the record is transferred to Records Management in accordance with procedure AP-515-1, *Records Processing*.
Criticality Safety (CS) Worksheet	Non-Record	None	Destroy when no longer needed.

4.5.13 References

The inclusion of a Reference section in technical procedures is optional.

- List the documents specifically referenced in the procedure. All other source documents will be captured in the DHF.
- List the DOE rules and orders, TSRs, DSA or SAD, and other documents (e.g., industry codes and standards) whose requirements and commitments are directly implemented by the procedure.
- Do not include broad, programmatic documents unless a specific purpose for the reference exists.
- Do not include documents listed as performance documents (see Section 4.5.6, *Prerequisite Action*).

4.5.14 Appendices

The inclusion of an Appendices section in technical procedures is conditional, based on if the procedures include appendices.

Appendices are part of the procedure; number the pages to show that they are a continuation of the main body of the procedures. In addition, number the individual appendix pages independently to ensure that all pages are available if the appendix is detached from the main body of the procedure.

Appendices are supplemental information added to the procedure that is obtained from an outside source. Examples of items that may be placed in an appendix are tables, figures, and graphs. Appendices do not contain any action steps.

- Provide a separate, stand-alone section listing the procedure appendices.

4.5.14 Appendices (continued)

- A separate, stand-alone section may be omitted if the table of contents lists the individual appendices.
- Reference appendices within the text of the procedure.
- Assign to each appendix a unique identifier, specifically an Arabic number (e.g., 1, 2, or 3) that are assigned sequentially.
- Include the text "Appendix X," where X is the appendix's unique identifier, in the header for each appendix. Also identify the appendix page and total number of pages as part of the appendix header (see Example 4-19, *Appendix Page Header*).

Example 4-19
Appendix Page Header

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- Avoid using vendor information as appendices.
    - Integrate approved vendor information into the body of the procedure, when possible, rather than referencing the information.
    - Refer to administrative requirements for processing and using vendor information.

4.5.15 Attachments

The inclusion of an Attachments section in procedures is conditional, based on if the procedures include attachments.

Attachments are part of the procedure; number pages to show that they are a continuation of the main body of the procedures. In addition, number the individual attachment pages independently to ensure that all pages are available if the attachment is detached from the main body of the procedure.

Attachments are supplemental information added to the procedure that is part of the procedure itself. Examples of items that may be placed in an attachment are tables, figures, and graphs that are too large to incorporate in the body of the procedure or data sheets to capture data. Attachments may contain action steps.

- Provide a separate, stand-alone section listing the procedure attachments.
- A separate, stand-alone section may be omitted if the table of contents lists the individual attachments.
- Reference attachments within the text of the procedure.

4.5.15 Attachments (continued)

- Assign to each attachment a unique identifier, specifically a capital letter (e.g., A, B, or C) that are assigned sequentially.

- Include the text "Attachment X," where X is the attachment's unique identifier, in the header for each attachment. Also identify the attachment page and total pages as part of the header (see Example 4-20, *Attachment Page Header*).

Example 4-20
Attachment Page Header

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Attachment A
(Page 1 of 1)

- Include in the attachments any information that would be more conveniently located outside the main body of procedures (see Example 4-21, *Valve Alignment Checklist*).

Example 4-21
Valve Alignment Checklist

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APPENDIX D
SHIELD SYSTEM HX COOLING WATER SUPPLY
& VALVE ALIGNMENT CHECKLIST
(Page 1 of 2)

Component Noun Name	Description (Location)	Valve Number	Required Position	Initials
Bypass Effluent to HX		CWS-V-272D	OPEN	____ ____ IV
Flow Pressure Tap		CWS-V-1513	OPEN	____

5.0 WRITING ACTION STEPS

The basic element of an action step (see Example 5-1, *Basic Action Step*) is an imperative sentence — a command to perform a specific action. An action step answers the question "what is to be done?" Additional elements, such as cautions and condition statements, add precision to instructions.

The subsections of this section describe the individual types of action steps that are used in procedures. The Procedure Writer must determine which of these types of action steps are required for a given procedure, but will use the guidance provided in these subsections for those types of actions steps chosen. Therefore, the Procedure Writer determines which subsections are used and the sequence they are used.

Example 5-1
Basic Action Step

[1] Label the actuator disposal can with Identification Tag Form 45.

5.1 Basic Steps

- Start the basic action step with a singular present tense action verb (see Attachment A, *Action Verb List*) such as "open." Attachment A of this document provides a list of suggested action verbs (see Example 5-2, *Basic Action Step Breakdown*).

- Describe the direct object of the verb (see Example 5-2, *Basic Action Step breakdown*).

    - Identify equipment precisely as it is labeled in the field, including the unique identifier and the noun name.

    - For switches and pushbuttons, use the position term should be in all upper-case letters match the term found in the field. For example, don't use START if the position in the field is RUN.

    - If the equipment is not labeled in the field, use equipment nomenclature precisely as it appears in the basis or other source documentation.

    - Avoid using acronyms and abbreviations when writing action steps, particularly for short, simple words and terms. If an acronym or abbreviation is used, it must (1) be easily understood by the users and (2) have a standardized and unique meaning for the users.

    - Use only those acronyms and abbreviations that are included in an approved LANL or facility-specific list or that are defined in the procedure.

- Complete the basic action step with supportive information about the action verb and the direct object. Supportive information includes further description of the object and the recipient of the object (see Example 5-2, *Basic Action Step Breakdown*).

Example 5-2
Basic Action Step Breakdown

	Action Verb	Direct Object	Supportive Information
[1]	Label	the actuator disposal can	with Identification Tag Form 45.

- Identify each action step and action sub-step within a section or subsection with a unique step number, as established in Section 4.4, *Step Numbering*, to distinguish the action steps from each other and from topical headings and explanations (see Example 5-3, *Action Step Numbering*).

Example 5-3
Action Steps Numbering

[3] Prepare compressed gas cylinders as follows:
- [a] Select compressed gas cylinders with current in-service dated gas certification.
- [b] Verify that each cylinder regulator is adjusted to 35 psig (30 to 40 psig).

- Write action steps using words that are easily understandable by the users. Where a word is used that requires a definition, include the definition as (1) part of that action step or (2) as a note that immediately precedes the action step.

- Restructure the actions as needed to avoid using action sub-sub-steps. Break one section into two or more sections to simplify the action step structure if necessary.

- Place three or more objects of the verb in a separate table or listing with appropriate checkoff boxes or sign-off blanks.

- Consider combining multiple verbs with the same object in a single action statement (see Example 5-4, *Multiple Actions Verbs in a Single Action Step*).

Example 5-4
Multiple Action Verbs in a Single Action Step

[12] Sign, date, and transmit completed form to Records Management.

- If someone other than the primary procedure user is responsible for performing an action step, identify the person to perform the task directly above the affected action step (see Example 5-5, *Identification of Performer*).

Example 5-5
Identification of Performer

[2] Torque head bolts with torque wrench set at 90 foot-pounds.

QA Inspector

[3] Verify that head bolts are torqued to 90-foot pounds. _____
Initials/Z#

- Use emphasis techniques (e.g., **bold**, *italics*, and underlining) to highlight important information, with the following constraints: (1) do not use all capital letters for blocks of text, (2) do not capitalize the first letter of any words unless they are formal, proper nouns in accordance with standard American English usage or they are the first word of a sentence, and (3) avoid the overuse of multiple emphasis techniques (see Section 6.0, *Key Information/Steps*).

- Specify numbers in the procedures with the same precision than can be read from the instruments.

- Avoid requiring users to make conversions from one unit of measure to another whenever possible. Provide an aid for the users if conversions are essential. Do not require mental calculations.

- Use consistent vocabulary, syntax, and punctuation

    - Include articles (a, an, the) when referring to a general item; omit the article when referring to specific items (e.g., “Open the door” or “Open door DW-9”).

    - Use punctuation in accordance with standard American English.

    - Present action steps, including associated action sub-steps and lists, with a minimum of interruption (e.g., page breaks).

    - Follow standard grammatical principles.

    - Use words consistently within and among procedures.

    - Use short, simple words.

    - Avoid ambiguous or vague adverbs.

- Use main action steps to allow users to comprehend the purpose of the action step quickly. Use action sub-steps to provide specific details for performance. Both main action steps and action sub-steps use the same basic action step form.

- Avoid formatting an action step so that it continues onto the next page.

- Present numerical information in Arabic numbers (as opposed to Roman numerals). Use spelled-out numbers only when one number without a specified unit of measure is followed directly by one with a unit of measure (see Example 5-6, *Spelled-out Number Use*) or when a number, typically a single digit number, is emphasized (see Example 5-7, *Emphasized Numbers*).

Example 5-6
Spelled-out Number Use

[4] Verify that two 6-gallon buckets are available.

Example 5-7
Emphasized Numbers

[7] Verify that only one cooling water pump is in the RUN position.

- All time reference must be in made in 24-hour time (e.g., 0823 for 8:23 A.M., 1956 for 7:56 P.M., etc.) (see P315, *Conduct of Operations Manual*, Attachment 2, *Shift Routines and Operating Practices*, Section 2.1, *Facility Operating Practices*).

5.2 Conditional Steps

Conditional action steps are used when a procedure's execution is based on a condition or a combination of conditions. The use of conditional action steps is extremely important in technical procedures because they provide the logic for the decisions required by the operator.

Conditional action steps use the following logic terms:

- IF or WHEN to present the condition to the users
- THEN to present the action
- OR or AND to present more complex conditions
- NOT to negate the condition

Other words (e.g., except, unless, but, and only) should not be used to present conditional information.

- Describe the condition first and then the action to be taken if that condition applies (see Example 5-8, *Basic Conditional Statement*).

Example 5-8
Basic Conditional Statement

[6] IF the plug piece is NOT clean,
THEN wipe the cone base off with an alcohol moistened cotton swab.

- The conditional term(s) should be in all upper-case letters and underlined in the action step. Additionally, white space must be used to add emphasis in conditional statements, specifically by starting each new conditional term on a new line (see Example 5-8, *Basic Conditional Statement*).

5.2 Conditional Steps (continued)

- If two or more conditions are required and all must be met, then place the conditional term AND between the conditions. Begin a new line when presenting the second condition and begin a new line with THEN and the action (see Example 5-9, *Multiple Condition Statements*). An alternative would be to make a single conditional statement that all of the following conditions must be met and then provide a bulleted list of the conditions before presenting the action on a separate line (see Example 5-10, *Alternate Multiple Condition Statement*).

Example 5-9
Multiple Conditional Statements

[6] IF Condition 1,
AND Condition 2,
AND Condition 3,
THEN open CWS-HMOV-290, ECW pump discharge valve.

Example 5-10
Alternate Multiple Conditional Statements

[6] IF all of the following conditions exist,
- Condition 1
- Condition 2
- Condition 3

THEN open CWS-HMOV-290, ECW pump discharge valve.

- If two conditions are involved and one or both of these conditions must be met before the action is taken, place the conditional term OR in underlined capital letters between the conditions. Begin a new line when presenting the second condition and begin a new line with THEN and the action (see Examples 5-11, *Conditional OR Statements*, and 5-12, *Conditional AND Statement*).

Example 5-11
Conditional OR Statements

[6] IF Condition 1,
OR Condition 2,
THEN open CWS-HMOV-290, ECW pump discharge valve.

Example 5-12
Conditional AND Statements

[6] IF Condition 1,
AND Condition 2,
THEN open CWS-HMOV-290, ECW pump discharge valve.

- If three or more conditions are described, consider using a decision table or a listing format.
- Avoid, if possible, using the logical connectors AND and OR in the same conditional statement as the resulting logic can be **ambiguous and difficult to understand** (see Example 5-13, *Avoid Using AND and OR in the Same Statement*).

Example 5-13
Avoid Using AND and OR in the Same Statement

Do not use a single, ambiguous action step:

[8] IF Condition A OR Condition B AND Condition C,
THEN open valve D.

Use two or more simple, unambiguous action steps:

[8] Verify that only one of the following conditions is met:
- Condition A
- Condition B

[9] IF Condition C,
THEN open valve D.

- Use only the logical connectors AND and OR to join conditions that include both a subject and a predicate. If two subjects apply to the same predicate (e.g., "IF the temperature and pressure are stable, ...") or one subject takes two predicates (e.g., "IF the level is stable or falling, ...") use the un-emphasized conjunctions "and" or "or" rather than the special emphasized logical connectors (see Example 5-14, *Two Subjects with One Predicate*).

Example 5-14
Two Subjects with One Predicate

[5] WHEN cooling water pump and pump discharge pressure have stabilized,
THEN close CWS-V-3351-1 bypass isolation valve.

5.2 Conditional Steps (continued)

- For a negative condition, use the conditional term NOT. Avoid using NOT if a single word can be used and the condition can be stated in a positive manner (e.g., "IF the valve is open, ..." is preferable to "IF the valve is NOT closed, ...").

5.3 Non-sequential Steps

Procedure users must perform the action steps in the order they are written unless the procedure specifically directs the users to perform action steps in another order. When the objectives of the action steps will be met regardless of the sequence in which they are performed, then:

- Sequence the action steps according to usability criteria, such as according to equipment or control board layout, to reduce opportunities for error.

- Identify non-sequential steps in one of three methods: (1) provide a note preceding the non-sequential action steps, (2) present the non-sequential action steps as bullets in lieu of step numbering, or (3) present a condition that result in performing action steps non-sequentially.

- If the note method is used, place the note before the sequence of action steps that can be performed non-sequentially (see Example 5-15, *Note Announcing Non-sequential Action Steps*).

Example 5-15
Note Announcing Non-sequential Action Steps

NOTE: The activities in action steps [1] through [7] may be performed in any order.

- If the bulleted list method is used, then precede the list with a lead-in, numbered action step (see Example 5-16, *Bulleted List of Non-sequential Action Steps*).

Example 5-16
Bulleted List of Non-sequential Action Steps

[1] Perform all of the following actions:
- Set switch S-7 to ON
- Set switch S-9 to ON

- If the performance of one or more action steps is dependent on a condition, then establish the condition in a note prior to the action step(s) that directs the performer to skip the steps if the condition is met. This is a variant of the action step structure described in Section 5.2, *Conditional Steps* (see Example 5-17, *Conditional Execution*).

5.3 Non-sequential Steps (continued)

Example 5-17
Conditional Execution

NOTE: If ISV pump is operating, the action steps [1] and [2] may be skipped.

[1] Ensure that the ISV Pump A discharge valve (ISV-A-D2) is OPEN.
[2] Set switch ISV-S-7 to the RUN position.

- Regardless of the method used, it is recommended that a checkoff box or sign-off line be added to every action in a series of non-sequential action steps to ensure that action steps are not omitted.

5.4 Equally Acceptable Steps

Equally acceptable alternative action steps are used when it is beneficial for users to be provided with more than one option. It is important to ensure that only one alternative is performed.

- Present alternative actions as items in a list within a single action step (see Example 5-18, *Equally Acceptable Action Steps*).

Example 5-18
Equally Acceptable Action Steps

[1] Perform <u>one</u> of the following actions and check the action taken
- Set switch S-7 to ON ☐
- Set switch S-9 to ON ☐

- Use the word "one" in lower case and emphasize (e.g., <u>underlined</u>) to introduce the list of alternatives (e.g., "Perform <u>one</u> of the following actions").

- A checkoff box (i.e., placekeeping) should be included for every action in a series of alternative action steps to ensure that action steps are not omitted and that redundant actions are not performed (see Section 5.13.1, *Placekeeping*).

- If placekeeping (e.g., checkoff box) is used, then specify that users checkoff only those action steps actually performed (see Section 5.13.1, *Placekeeping*).

5.5 Time-dependent Steps

Some action steps contain actions that impose time requirements on the users by specifying the duration of actions or actions that must be completed within a specific period of time.

- Place a note before the action steps to be timed in order to alert the users (see Example 5-19, *Time-dependent Action Steps with Note*).

5.5 Time-dependent Steps (continued)

- Begin the action steps with instructions for the users to record critical time information and provide the users with a place to record this information. Typically this information will be the time that "starts the clock," and the time by which some action step or action must be completed.

- Include guidance to identify the actions to take in the event that the time dependent action step cannot be performed within the specified time.

- A note to advise users of time-dependent actions and instructions to record the time information are not required when the time requirement is an inherent part of the action step and misunderstanding is unlikely (see Example 5-20, *Time-dependent Action Step without Note*).

Example 5-19

Time-dependent Action Steps with Note

NOTE: The following action step starts a time-limited sequence. Action steps [2] through [5] are to be performed within 20 minutes.

[1] Calculate the time by which action step [5] is to be completed with the following steps:

[a] Record the time that action step [2] is to be started. _____

[b] Add 20 minutes. + 20 minutes

[c] Record the time that action step [5] is to be completed. _____

[2] Place the *INCIDENT ACTION* switch to TEST.

[3] Verify the amber *ALARM TEST* light on the AIA graphic panel is LIT. _____

IV Initials/Z#

[4] Place the *INCIDENT ACTION* switch to OFF.

[5] Push the *RESET* pushbutton on the AIA logic tester and record the time.

[6] IF the time recorded in action step [5] is later than the time recorded in action step [1] [c],
THEN repeat action steps [1] through [5].

Example 5-20

Time-dependent Action Step without Note

[1] Push Generator Start pushbutton, and verify that the Generator started within 12 seconds.

_____ _____ _____

Time to Start Initial/Z# IV Initial/Z#

5.6 Concurrent Steps

Concurrent action steps contain actions that must be performed at the same time (e.g., parameters may have to be monitored or checked while the users accomplish another action, or two performers in different locations may have to execute actions simultaneously).

- If concurrent action steps are to be performed by one person, place those actions in one action step that describes precisely the relationship between the action steps (see Example 5-21, *Concurrent Actions Performed by a Single Performer*).

Example 5-21
Concurrent Actions Performed by a Single Performer

[1] Add 100 gallons of water to tank TNK-001 while limiting the flow rate to less than 5 gpm.

- If concurrent action steps are to be performed by more than one person (see Example 5-22, *Concurrent Actions Performed by Multiple Performers*), place a note before the first concurrent action step, as appropriate, identifying the.
    - Concurrent action steps
    - Personnel needed to perform each concurrent action step
    - Locations where the action steps are performed
    - Means of communication between locations.

Example 5-22
Concurrent Actions Performed by Multiple Performers

NOTE: The activity in action step [1] is performed by Operator #1 in room 601 concurrently with action step [2] performed by Operator #2 in room 610. Communications between operators is via channel 7 of the facility radio system.

Operator #1

[1] Ensure that the water transfer flow rate is less than 5 gpm.

Operator #2

[2] Add 100 gallons of water to tank TNK-001.

5.7 Continuous Steps

Continuous action steps are conditional action steps where the conditions they describe must be monitored throughout procedures or a portion of procedures (e.g., users may need to monitor a gauge and take a specific action if the gauge, at any point during the procedure, indicates a reading above or below a specific level).

5.7 Continuous Steps (continued)

- Place continuous action steps in the procedure at the point at which they first apply. Repeat the action steps periodically, as appropriate, on the facing pages of the procedure or in the body of the procedure.

- Format continuous action steps as conditional action steps and state the portion of the procedure during which they are applicable (see Example 5-23, *Continuous Action Step*).

Example 5-23
Continuous Action Step

[7] IF at any time while performing action steps [9] through [17] the high level alarm sounds,
THEN shut off the water to TNK-001.

- Notify the users when continuous action steps are to be discontinued.

5.8 Repeated Steps

Repeated action steps (see Example 5-24, *Repeated Action Steps*) are simple action steps that must be performed more than once during the execution of procedures.

Example 5-24
Repeated Action Step

[8] Vary the input signal until switch SW-1-7 trips.

- If an action step must be repeated an indefinite number of times to achieve an objective, specify that the action step is to be repeated until the expected results are achieved. Only a single sign-off line is provided for this action step regardless of the number of times the action step is performed.

- If it is important to know the number of times the sequence is repeated, provide placekeeping (see Section 5.13, *Placekeeping and Sign-off Steps*).

- If an action must be performed repeatedly at timed intervals, place instructions in the procedure and provide suitable space to record the times that the action step is performed.

- If an action step is to be performed periodically throughout procedures or a portion of procedures (but not at specific timed intervals), place reminders as action steps in the body of the procedure.

- If a large group of repetitive actions is required and becomes cumbersome, address the actions in action steps that reference a table, list, or appendix (an example of a large group of repetitive actions is a series of valve alignments).

- Notify the performer when repeated action steps are to be discontinued.

5.9 Verification, Determination, Notification, and Data Recording Steps

Verification action steps ensure that a specific activity has occurred or that a stated condition exists (e.g., independent verification or quality control check). Determination action steps call for a comparison with stated requirements, and no manipulation by the users occurs. Notification action steps require reporting when given criteria are met. Data recording action steps ensure that desired data are recorded (see Example 5-25, *Data Recording with Sign-off by Initials*).

Example 5-25

Data Recording with Sign-off by Initials

[10] Record cooling water flow to Cylinder 12 Cooling Jacket.

25 gpm	_____	_____
Required	Actual	Initials/Z# and date

- Provide appropriate space or tables for entering data (either in the procedure or in data sheets).
- If the condition to be verified or determined is not found, provide the appropriate actions to take.
- Include labeled lines in action steps as necessary for users to record required information.
- Specify the required independent verification and inspection action steps.
- Include directions for notifying other personnel as discrete action steps. Actions requiring notifications of others often include, but are not limited to the
    - System alignments to be performed.
    - Systems to be removed from or returned to service.
    - Alarms and alarm setpoints that may annunciate as a result of performing the procedure.
    - Equipment actuations that are expected to occur during performance of the procedure.
    - Actions with electrical or mechanical interlocks involved (e.g., interlocks to be honored or overridden).
    - Effects of precautions and limitations on the operating conditions, noting which equipment will be inoperative and which lights, alarms, or annunciators will react.
    - Changes or special conditions established by the procedure that could affect or appear to affect other equipment or systems [e.g., performing the procedure could involve mechanical or electrical bypass (lifted leads, inhibits, jumpers, and fuse removals) or other functional restrictions].
    - Methods and instructions for communication among multiple persons required to perform an action.
    - Inspection for degradation of qualified equipment (e.g., environmentally qualified or seismically qualified equipment).

5.9 Verification, Determination, Notification, and Data Recording Steps (continued)

- Identify parameters and acceptable ranges needed to perform the procedure.
    - Use the same units of measure in the procedure that users will read from the facility instrumentation.
    - If there is an acceptable range for a parameter, include the acceptable range rather than a point value.

5.10 Warnings, Cautions, and Notes

Warnings alert users to potential hazards to personnel. Cautions alert users to potential hazards to equipment, the environment, or the mission. Notes call attention to important supplemental information.

5.10.1 Warnings and Cautions

- Review all potential hazards with associated SMEs to determine warnings or cautions that need to be included (see P315, *Conduct of Operations Manual*, Attachment 16, *Technical Procedures*, Section 16.5.1.f, *Hazard Grading*) (see Example 5-26, *Warning Statement*, and Example 5-27, *Caution Statement*).

EXAMPLE 5-26
Warning Statement

WARNING

Elevated work platforms and ladders are required. Elevated work platforms and ladders pose a fall hazard. When working on elevated platforms and ladders, use caution. Place the ladder on a solid, level surface.

- Determine those parts of the procedure where the addition of information is necessary.
- Review each action step and list the potential hazards in a warning or caution format.
- If the danger is present during the entire procedure, place the warning or caution in the precautions and limitations section (see Section 4.5.5, *Precautions and Limitations*).
- Position warnings and cautions so they are completely on one page and appear immediately before and on the same page as the action step(s) to which they apply.
- Place warnings ahead of cautions whenever more than one type is used at the same point in procedures.
- Write warnings and cautions as short, concise statements, rather than as commands to distinguish them from action steps (e.g., “Touching this wire will electrocute you!”).

Example 5-27
Caution Statement

CAUTION

Operating the generator system at speeds less than 700 rpm for longer than 10 minutes with the exciter regulator in operation may cause damage to the exciter regulator field.

- Do not embed action steps in warnings and cautions (e.g., do not rewrite the instruction “Shut the valve,” as “The valve should be shut”).
- Ensure that cautions and warnings provide (1) a description of the hazardous condition, (2) the consequences of failing to heed the warning or caution, and (3) critical time considerations.
- To ensure visual identification, present warnings within a double line box with the word “warning” in **bold**, UPPERCASE text centered over the warning statement text (see Example 5-26, *Warning Statement*).
- To ensure visual identification, present cautions within a single line box with the word “caution” in **bold**, UPPERCASE text centered over the warning statement text (see Example 5-27, *Caution Statement*).
- Include only one topic in each warning or caution.
- Number each warning or caution when more than one exists (see Example 5-28, *Numbered Cautions*).

Example 5-28
Numbered Cautions

CAUTION 1

Operating the generator system at speeds less than 700 rpm for longer than 10 minutes with the exciter regulator in operation may cause damage to the exciter regulator field.

CAUTION 2

In the event of a power failure, emergency equipment will start and overload the diesel if the diesel is isolated on the emergency bus during testing.

5.10.1 Warnings and Cautions (continued)

- Avoid overusing warnings and cautions.

5.10.2 Notes

Notes call attention to important supplemental information. The information can be a reminder of preparatory information needed to perform the activities of a procedure or action step (see Example 5-29, *Note Statement*).

EXAMPLE 5-29
Note Statement

NOTE The following action steps closes generator breaker G-1 and starts diesel DL-1.

- Use notes to present information that assists the users in making decisions or improving task performance.
- Position notes so they are completely on one page and appear immediately before and on the same page as the action step(s) to which they apply.
- Place warnings and cautions ahead of notes whenever more than one type is used at the same point in procedures.
- Include only one topic in each note.
- Write notes as short, concise statements, rather than as commands to distinguish them from action steps (e.g., "The following action step starts a timed duration.").
- Do not embed action steps in notes. Embedded actions should be removed from the note and written as action steps (see Example 5-30, *Note Presentation*).

Example 5-30
Note Presentation

Wrong Form - The note contains an embedded action step.

NOTE: A timed duration starts when fluid collection begins. Time is measured and fluid is collected from the end of the test hose (at the floor drain) into a graduated cylinder.

Correct Form - The note was rewritten to remove an embedded action step

NOTE: A timed duration starts when fluid collection begins in action step [12] below.

[12] Collect fluid from the end of the test hose (at the floor drain) into a graduated cylinder.

5.10.2 Notes (continued)

- Number the notes if more than one note is entered at the same location in a section or subsection (see Example 5-31, *Numbered Notes*).

Example 5-31
Numbered Notes

NOTE 1: The following action step closes generator breaker G-1 and starts diesel DL-I.

NOTE 2: The following action step requires a time measurement starting at the initiation signal.

- Precede a note with the word "note" in **bold**, *italic*, UPPERCASE text followed by the note statement on the same line (see Example 5-29, *Note Statement*).

- Avoid overusing notes.

5.11 Branching and Referencing Steps

To perform a task, sometimes users must branch to or reference another procedure, section, or attachment. Branching routes the procedure users to other action steps or sections within the same procedure or to other procedures, and the users do not return to the original position. Referencing re-directs the procedure users to other action steps or sections within the procedure or to other procedures and then back to the original position in the base procedure.

Referencing and branching increases the potential for error with attendant safety and administrative consequences. Therefore, branching and referencing are highly discouraged. Use referencing and branching only when it is necessary to direct the users to information that is vital to the performance of the activity and when it is not appropriate to incorporate that information into the base procedure.

Data sheets are used exclusively for recording information, not for prescribing how action steps are to be completed. Therefore, the referencing and branching techniques of this section are not applicable to data sheets.

- Evaluate the following criteria to determine if referencing or branching is appropriate. If the answer to all of the following is "NO", then referencing or branching may be appropriate.
    - Can action steps be readily incorporated rather than referenced?
    - Will branching and referencing decrease the users' comprehension and ease of use?
    - Will users be directed to small, isolated sections, rather than whole procedures or appendices?
    - Will branching and referencing cause users to bypass prerequisites that affect the section to which they are being directed?
    - Will branching and referencing cause users to bypass precautions and limitations that affect the section to which they are being directed?

5.11 Branching and Referencing Steps (continued)

- If referencing or branching is appropriate, then use the following methods for referencing and branching:

    - Make it clear to the users that they are being directed to other action steps or sections within the procedure or to other procedures. Do not expect them to know implicitly that other action steps or sections within the procedure or to other procedures is being referenced.

    - Fully specify the location to which the users are to go when cross-referencing. If the users are being sent to another procedure, identify the procedure number, title, and section of the procedure (see Example 5-32, *Branching to another Procedure*). If the users are being sent to another location in the same procedure, identify the specific location in the procedure (see Example 5-33, *Branching within the Current Procedure*).

EXAMPLE 5-32
Branching to another Procedure

[12] GO TO procedure SOP-618-5, *Bagout*, Section 5.0, *Performance*, to bagout the waste.

EXAMPLE 5-33
Branching within the Current Procedure

[12] GO TO procedure Section 6.0, *Bagout Waste*, step [1] to bagout the waste.

    - Use a consistent format for presenting cross-references. Emphasize key words consistently so that users can identify a cross-referenced action step. Use a term such as GO TO presented in all capital letters to indicate a departure from the base procedure.

    - If referencing, use the term RETURN TO presented in all capital letters to indicate the reentry point into the base procedure.

    - If referencing, use the terms GO TO and RETURN TO in the same action step (see Example 5-34, *Referencing and Returning Action Step*).

EXAMPLE 5-34
Referencing and Returning Action Step

[12] GO TO procedure Section 6.0, *Bagout Waste*, step [1] to bagout the waste and RETURN TO step [13].

    - Ensure that a reference or branch directs the users to all material needed as a prerequisite to the identified material (e.g., ensure that in executing a reference or branch, users do not bypass an applicable caution or prerequisite action step).

5.12 Acceptance Criteria Steps

Acceptance criteria provide a basis for determining the success or failure of an activity. Acceptance criteria may be qualitative (specify a given event that does or does not occur) or quantitative (specify a value or value range).

- Determine where specific acceptance criteria are to be presented in the procedure. Either or both of the following methods can be used.
    - State the location of acceptance criteria, whether located at individual action steps (used when criteria are satisfied at the time of performance), in a specific section (see Section 4.5.7, *Acceptance Criteria*), in data sheets, or in other procedures. When acceptance criteria are located in other procedures, link procedures using referencing techniques if the information cannot be included in the procedure (see Section 5.11, *Branching and Referencing Steps*).
- Include instructions for notifications to be made or actions to be taken immediately by the users, in the event that specified acceptance criteria are not met (see Example 5-35, *Acceptance Criteria Failure Notification*).
    - Place these instructions or actions in the body of the procedure.
    - Ensure that these actions are consistent with administrative instructions.
- Include subsequent notifications and actions, such as those to be taken by reviewers, with the acceptance criteria.

Example 5-35

Acceptance Criteria Failure Notification

[14] IF specific acceptance criteria stated in action steps [15] through [19] are not met, THEN notify the Operations Manager as soon as practical after observing the nonconformance.

- Use acceptance criteria that consist of nominal values and, if available from the procedure basis, allowable ranges.

5.13 Placekeeping and Sign-off Steps

5.13.1 Placekeeping

Placekeeping helps users to keep track of their progress in procedures and reduces the probability of omitting or duplicating action steps. The placekeeping mechanism typically consists of checkoff boxes.

NOTE: The term “placekeeping” also refers to the technique for documenting unplanned interruptions in the execution of a procedure as described in P315, *Conduct of Operations Manual*, Attachment 16, *Technical Procedures*, Section 16.9.2.d, *Turning Over Procedures in Use*.

- Only required to be used for specific Usage Level procedures as defined in P315, *Conduct of Operations Manual*, Attachment 16, *Technical Procedures*, Section 16.4.1, *Usage Levels*.

5.13.1 Placekeeping (continued)

- May not be used for action steps with "equally acceptable" conditions as described in Section 5.4, *Equally Acceptable Steps*, as it doesn't provide a positive indication of the chosen condition. In these cases use sign-offs as described in Section 5.13.2, *Sign-offs*, is recommended.

- May not be used for action steps involving the verification of any Safety Basis, regulatory, or other compliance condition or parameter, as it doesn't provide a positive indication of the verification. In these cases use sign-offs as described in Section 5.13.2, *Sign-offs*, is recommended.

- May not be used for action steps involving the verification of any QA affecting condition or parameter, as it doesn't provide a positive indication of the verification. In these cases use sign-offs as described in Section 5.13.2, *Sign-offs*, is recommended.

- May be used for action steps as directed by the operating organization, provided its use is not restricted for other reasons, such as Usage Level.

- May be used for actions steps when the procedure execution may cross over shifts, thereby, requiring the tracking of execution status.

- If initials or signatures are not required, provide a placekeeping checkoff box near the right margin of the page or the right side of a table (see Example 5-36, *Checkoff Box*).

Example 5-36
Checkoff Box

[8] Turn the transformer test switch to the TEST position. ☐

- If placekeeping must be performed on a separate checklist, arrange the placekeeping items in the order in which the actions are to be performed and reference the associated action steps in the procedure on the checklist.

5.13.2 Sign-offs

Sign-offs are a form of placekeeping used when traceability back to the performer is required. A note should be added prior to any sign-off action steps defining the use of signatures, initials, check marks, or "N/A" for the sign-off. A sign-off action step includes one or more of the following elements:

◊ A blank line for verification, notification, or inspection signatures or initials, including Z number

◊ A blank line for sign-off, including Z number, by a person other than the users

◊ Blanks for recording data and the initials or signatures, including Z number, of persons recording the data.

- Only required to be used for specific Usage Level procedures as defined in P315, *Conduct of Operations Manual*, Attachment 16, *Technical Procedures*, Section 16.4.1, *Usage Levels*.

- May be used for action steps with "equally acceptable" conditions as described in Section 5.4, *Equally Acceptable Steps*.

- May be used for action steps involving the verification of any Safety Basis, regulatory, or other compliance condition or parameter.

5.13.2 Sign-offs (continued)

- May be used for action steps involving the verification of any QA affecting condition or parameter.
- May be used for action steps as directed by the operating organization, provided its use is not restricted for other reasons, such as Usage Level.
- May be used for actions steps when the procedure execution may cross over shifts, thereby, requiring the tracking of execution status.
- If procedures require that action steps be signed off, provide space for the sign-off of the action step (see Example 5-37, *Worker Sign-off*).

Example 5-37
Worker Sign-off

[14] Verify that the ISV Pump A discharge valve (ISV-A-D2) is closed. _____
Initials/Z#

- Provide a space for the date and/or time of a sign-off where such information is determined to be useful.
- Position a blank signature or initial line (for entering initials and Z number that identify the persons signing off on the action step) immediately following the affected action step, or on a separate data sheet or checklist, if necessary (see Example 5-38, *Worker and Second Party Sign-off by Initials*).

Example 5-38
Worker and Second Party Sign-off of by Initials

[13] Verify that the safety system pneumatic valve (ISV-P-2) is CLOSED.
_____ _____
Initials/Z# IV Initials/Z#

- If the sign-off is located in one procedure and the action to be signed off is located in a referenced procedure, indicate in the base procedure action step that documentation occurs in the referenced procedure sign-off space.
- Use the following methods to differentiate between sign-offs required of the users and those required of other personnel.
    - If the action step is to be signed off by someone other than the principal user, place the title or function of the responsible person under the blank line.
    - If the action step is to be signed off by the users, do not place any identifying title or function under the blank line.
- Do not combine two closely related actions each requiring a sign-off into a single action step. Make two separate action steps with individual sign-offs.

5.13.2 Sign-offs (continued)

- If an independent witness or other second party sign-off is needed, provide an additional space for initials and identify that an IV sign-off or other specified signature is required (see Example 5-38, *Worker and Second Party Sign-off by Initials*).

- Identify action steps requiring a hold point (action steps that require inspection of the actions performed). Inspections of the results of an action step before initiating successive action steps are normally designated as hold points. Hold points may involve quality assurance, health physics, engineering, or other inspectors (see Example 5-39, *Hold Point Verification Sign-off*).

Example 5-39
Hold Point Verification Sign-off

Hold Point:

[3] Torque head bolts with a torque wrench set at 90 foot-pounds. _____
QA Inspector Initials/Z#

- Include places for entering initials or signatures to identify persons recording data when presenting action steps in tables (see Example 5-40, *Sign-off using a Table*).

Example 5-40
Sign-off using a Table

Parameter	Tolerance	As Found	As Left	Initials/Z#
Pressure	290 psig (285 to 295)			_____ _____ IV
Temperature	350EF (345 to 355)			_____ _____ IV
Level	20 ft (19.5 to 20.5)			_____ _____ IV

- Action steps that require a written response, such as action steps that require independent verification, inspection, data recording, or documentation of completion, can also be considered sign-off devices in lieu of adding a separate sign-off line.

5.13.3 Sign-off or Checkoff of Conditional Action Steps

In some instances, performing an action depends on a condition or combination of conditions. Conditional action steps are introduced by the words IF or WHEN and are followed by an action.

- Provide a space for the users to mark conditional action steps where a sign-off or checkoff is desired. Typical entries indicating that the appropriate action was taken are “N/A” if the condition does not occur or a check mark or initial if the condition does occur. Direct the users what to place in the space (see Example 5-41, *Conditional Action Step with a Sign-off*).

Example 5-41
Conditional Action Step with a Sign-off

[4] IF the outside temperature is less than or equal to 39°F,
AND heated air is required,
THEN place coils in service.

_____
Enter N/A or Initials

6.0 Key Information/Steps

The DOE order requires that procedures consider "human factors," of which highlighting critical action steps and/or information are one such consideration. What constitutes important information is subjective and dependent upon the activity and management expectations. This section and its subsections address some issues that LANL has determined to be critical action steps and/or information.

6.1 Safety Basis

Procedures are typically the implementing vehicle for many Safety Basis TSR requirements. Additionally, some operating procedures have the potential for adversely impacting a credited Safety Basis parameter. This implementation may take the form of information or specific action steps. Action steps may either directly implement a TSR requirement, such a surveillance requirement, or have the potential for impacting a safety basis-credited parameter.

- Information (e.g., the TSR citation) and action steps related to safety basis must be highlighted by the addition of a dollar sign ($) to the first line of the text in the left hand margin. As an alternate, the dollar sign ($) may precede the action step or information text, separated by a dash (see Example 6-1, *Safety Basis Information Highlighting*, and Example 6-2, *Safety Basis Step Highlighting*).

Example 6-1
Safety Basis Information Highlighting

Format Option #1:

$ This procedure is associated with the following Surveillance Requirements:
SR 4.8.1 Verify that the differential pressure across the HEPA filter is ≤ 9.5 psid.

Format Option #2:

$ - This procedure is associated with the following Surveillance Requirements:
SR 4.8.1 Verify that the differential pressure across the HEPA filter is ≤ 9.5 psid.

6.1 Safety Basis (continued)

Example 6-2
Safety Basis Step Highlighting

Format Option #1:

$ [1] Verify that the differential pressure indicated on DPI-105 is ≤ 9.5 psid.
[SR 4.8.1]

Format Option #2:

[1] **$** - Verify that the differential pressure indicated on DPI-105 is ≤ 9.5 psid.
[SR 4.8.1]

- Provide a reference to the TSR requirement that the information is supporting (see Example 6-1, *Safety Basis Information Highlighting*).
- Highlight the TSR requirement number reference by using **bold** text (see Example 6-1, *Safety Basis Information Highlighting*, and Example 6-2, *Safety Basis Step Highlighting*).
- When writing an action step that implements a TSR requirement, add the TSR requirement number reference after the action step, enclosed in brackets (see Example 6-2, *Safety Basis Step Highlighting*) or parenthesis.
- Add a statement to the "Scope" statement of the Introduction section (see Section 4.5.4, *Introduction*) acknowledging that the procedure implements a TSR requirement.
- Add the TSR requirement to the Acceptance Criteria section (see Section 4.5.7, *Acceptance Criteria*) (see Example 6-1, *Safety Basis Information Highlighting*).
- Document in the DHF the background for any Safety Basis action step in accordance with Section 16.5.1.k, *Document History File*, in Attachment 16, *Local Procedures*, of P315, *Conduct of Operations Manual*.

6.2 Nuclear Criticality Safety

Because of the consequences of a criticality event, it is imperative that the worker maintain the Nuclear Criticality Safety (NCS) limits when performing a work activity.

Note: For procedure steps and/or information involving criticality safety, the use of a circle CS (Ⓒⓢ) is recommended because the asterisk (*) could be confused with a footnote reference.

- Information (e.g., description of the CSED or CSLA control) and action steps related to NCS limits must be highlighted by the addition of an asterisk (*) (see Example 6-3, *Nuclear Criticality Safety Information Highlighting with Asterisk*, and Example 6-4, *Nuclear Criticality Safety Step Highlighting with Asterisk*) or a circle CS (Ⓒⓢ) (see Example 6-5, *Nuclear Criticality Safety Information Highlighting with Circle CS*, and Example 6-6, *Nuclear Criticality Safety Step Highlighting with Circle CS*) to the first line of the text in the left margin. As an alternate, the asterisk (*) or a bolded, upper case CS, may precede the action step or information text, separated by a dash.

Example 6-3

Nuclear Criticality Safety Information Highlighting with Asterisk

Format Option #1:

2.0 PRECAUTIONS AND LIMITATIONS

***** This procedure has the potential to violate the Nuclear Criticality Safety Limits.
[CSLA #NCS-CSLA-14-986]

Format Option #2:

2.0 PRECAUTIONS AND LIMITATIONS

***** – This procedure has the potential to violate the Nuclear Criticality Safety Limits.
[CSLA #NCS-CSLA-14-986]

Example 6-4

Nuclear Criticality Safety Step Highlighting with Asterisk

Format Option #1:

* [11] Verify that the movement of the material from glovebox GB437 to glovebox GB438 will not violate the CSLA limits.
[CSLA #NCS-CSLA-14-986]

* [12] Move the material from glovebox GB437 to glovebox GB438.
[CSLA # NCS-CSLA-14-986]

Format Option #2:

[11] * – Verify that the movement of the material from glovebox GB437 to glovebox GB438 will not violate the CSLA limits.
[CSLA #NCS-CSLA-14-986]

[12] * – Move the material from glovebox GB437 to glovebox GB438.
[CSLA # NCS-CSLA-14-986]

Example 6-5

Nuclear Criticality Safety Information Highlighting with Circle CS

Format Option #1:

2.0 PRECAUTIONS AND LIMITATIONS

Ⓒⓢ This procedure has the potential to violate the Nuclear Criticality Safety Limits.
[CSLA # NCS-CSLA-14-986]

Format Option #2:

2.0 PRECAUTIONS AND LIMITATIONS

CS – This procedure has the potential to violate the Nuclear Criticality Safety Limits.
[CSLA # NCS-CSLA-14-986]

Example 6-6

Nuclear Criticality Safety Step Highlighting with Circle CS

Format Option #1:

Ⓒⓢ [11] Verify that the movement of the material from glovebox GB437 to glovebox GB438 will not violate the CSLA limits.
[CSLA # NCS-CSLA-14-986]

Ⓒⓢ [12] Move the material from glovebox GB437 to glovebox GB438.
[CSLA # NCS-CSLA-14-986]

Format Option #2:

[11] **CS** – Verify that the movement of the material from glovebox GB437 to glovebox GB438 will not violate the CSLA limits.
[CSLA # NCS-CSLA-14-986]

[12] **CS** – Move the material from glovebox GB437 to glovebox GB438.
[CSLA # NCS-CSLA-14-986]

- Add a general statement that the procedure has the potential for exceeding NCS limits and a reference to the associated Criticality Safety Limit Approval (CSLA) or Criticality Safety Evaluation Documentation (CSED) document to the Precaution and Limitation section (see Section 4.5.5, *Precautions and Limitations*). Include the CSLA or CSED number in bracketed **bold** text following the information text.

- Add an action step to the Prerequisite Actions section (see Section 4.5.6.a, *Planning and Coordination*) to review the CSLA(s) or CSED(s) prior to executing the procedure. Include the CSLA or CSED number in bracketed, **bold** text following the step text.

6.2 Nuclear Criticality Safety (continued)

- Add the CSLA(s) or CSED(s) to the Performance Documents section (see Section 4.5.6.b, *Performance Documents*) of the procedure with a notation that it may be located at the jobsite.

- Precede any action step that could result in exceeding a CSLA or CSED with another action step that verifies the execution of the following action step will not exceed the CSLA or CSED.

- The CSLA or CSED may be added to the procedure as an appendix (see Section 4.5.14, *Appendices*).

- Add the CSLA(s) or CSED(s) to the Reference section (see Section 4.5.13, *References*) of the procedure.

- Document in the DHF the background for any Nuclear Criticality Safety action step in accordance with Section 16.5.1.k, *Document History File*, in Attachment 16, *Local Procedures*, of P315, *Conduct of Operations Manual*.

7.0 RESPONSIBILITIES

7.1 Operations Support Division Leader

- Responsible for maintaining this document and implementing the CoO requirements into technical procedures.

7.2 Responsible Line Manager (RLM)

- Responsible for the development and technical content of technical procedure.

- Makes the final determination regarding any data collection requirements for technical procedure generated in accordance with this document.

- In coordination with the FOD, identifies the IV requirements, if any, for technical procedure generated in accordance with this document.

- In coordination with the RM-POC, makes the final determination regarding records requirements for technical procedure generated in accordance with this document.

- Makes the final determination regarding records generated by the execution of this document.

7.3 Facility Operations Director (FOD)

- In coordination with the RLM, identifies the IV requirements, if any, for technical procedure generated in accordance with this document.

7.4 Procedure Writer

- Uses this document when writing technical procedures.

- Works closely with the RLM and the SMEs to ensure technical accuracy and to jointly reach decisions on such issues as basis documentation, level of detail, and comment resolution.

7.5 Subject Matter Expert (SME)

- Provides technical, system, process, and administrative information for writing the technical procedures generated in accordance with this document.
- In coordination with the RLM, determine data collection requirements for technical procedures generated in accordance with this document.
- In coordination with the RLM, determine records requirements for technical procedures generated in accordance with this document.
- In coordination with the RLM, determine the records generated by the execution of this document.

7.6 Records Management Point of Contact (RM-POC)

- Provide support to the RLM in determining records requirements for technical procedures generated in accordance with this document.
- Process records generated by the execution of this document.

8.0 IMPLEMENTATION

This document is subject to the USQ/Unreviewed Safety Issue (USI) Process as described in PD110, *Safety Basis*, SBP112-3, *Unreviewed Safety Question (USQ) Process*, and SBP113-3, *Unreviewed Safety Issue Process*. Because this document may impact the presumptions of a facility's safety analysis, the requirements in this document are effective forty-five (45) days after the effective date of this document. This provides additional time to complete the USQ/USI review and changes to any local implementing document. If the USQ/USI review cannot be completed within forty-five (45) days, one of two things may occur: (1) the Associate Director for Nuclear and High Hazard Operations (ADNHHO) will enter a Performance Feedback and Improvement Tracking System (PFITS) item, and track this review until completed; or (2) the FOD or his/her designee must seek and obtain an exception or variance from ADNHHO as described in Section 10.0, *Exception or Variance*, of this document.

The requirements in this document (see Section 1.1, *Purpose*) are expected to be implemented as follows:

- All new technical procedures approved after this document becomes effective in their facility as noted above, are expected to meet the requirements of this document.
- All existing technical procedures are expected to be updated to meet the requirements of this document upon their next major revision.

This document does not implement any new contractual requirements.

9.0 TRAINING

Procedure Writers must complete U-Train course 27366, *OS-RTS ConOps, Technical Procedure Writer's Manual*. This course is recommended for RLMs and SMEs involved in the development of procedures.

It is recommended that Procedure Writers and RLMs complete U-Train courses #SS 24668, *OS-RTS ConOps Briefing, Attachment 16, Technical Procedures*, and #SS 24690, *OS-RTS: Use Every Time vs. Reference Procedures*.

10.0 EXCEPTION OR VARIANCE

Use LANL Form 2121, *Request for Alternate Implementation (Formality of Operations)*, and the process described in Section 7.0, *Exception or Variance*, of P315-2, *Formality of Operations Change Control*, to obtain an exception or variance from this document.

11.0 DOCUMENTS AND RECORDS

The AP generates the following documents and records:

NOTE: The minimum contents of the DHF is defined in P315, *Conduct of Operations Manual*, Attachment 16, *Local Procedures*, Section 16.5.1.k, *Document History File*.

- The DHF contents generated by this document includes the following:
    - A listing of the bases documents used to develop the procedure in accordance with Section 3.1, *Identifying the Design Basis*.
    - A listing of the source documents used to develop the procedure in accordance with Section 3.2, *Identifying Source Documents*.
    - A listing of the data collection requirements in the procedure and their justification in accordance with Section 3.3, *Capturing Data*.
    - A listing of the records requirements resulting from execution of the procedure and their justification in accordance with Section 3.4, *Identifying Records*.

12.0 DEFINITIONS AND ACRONYMS

Refer to Attachment C, *Acronyms, and Abbreviations*.

13.0 HISTORY

Date	Revision	Description
MM/DD/YY	o	Initial Issuance

14.0 REFERENCES

Document Number	Title
DOE-O-422.1	Conduct of Operations
P315	Conduct of Operations Manual
DOE-STD-1029-92, Chg. 1	Writer's Guide for Technical Procedures
Institute of Nuclear Power Operations (INPO) 09-004	Procedure Use & Adherence, February 2009

15.0 FORMS AND TEMPLATES

Technical Procedure Template (located on the OS-RTS webpage)

16.0 ATTACHMENTS

Attachment A, *Action Verb List*

Attachment B, *Glossary*

Attachment C, *Acronyms and Abbreviations*

17.0 CONTACT

Operations Support – Readiness and Technical Support (OS-RTS)

Telephone: (505) 665-3154

Fax: (505) 667-9829

Location: TA-03-0030

Website: https://int.lanl.gov/orgs/os/rts/

E-mail: osrts_conops@lanl.gov

Attachment A
(Page 1 of 6)
Action Verb List

The following list of verbs is not intended to be comprehensive. Verbs are selected from this list where possible so that words have a meaning common to all potential performers.

Contact OS-RTS at osrts_conops@lanl.gov to add additional verbs to this list.

VERB	DEFINITION (as used in Action Steps)
Actuate	Place into a specific state of functional performance.
Add	Increase the size or quantity.
Adjust	Make an incremental change or series of changes to arrive at a desired condition.
Align	Arrange equipment into a specific configuration to permit a specific operation.
Allow	Permit the completion of a specific action.
Announce	Make known publicly.
Assemble	Put together what is required to provide an operational or functional capability.
Attach	Fasten one thing to another.
Balance	Adjust several parameters at the same time at certain points in a system to specified values.
Barricade	To shut in or keep out with an obstruction.
Begin	Start an action or activity.
Bleed	Remove fluid from a piece of equipment at a restricted flow rate.
Block	Inhibit a capability of a specific system or piece of equipment.
Bolt	Attach or fasten with bolts.
Bypass	Circumvent a safety circuit (unless a single device provides for bypassing, such as a bypass switch, identify specific actions to bypass).
Calculate	Determine by computation (computational method should also be identified).
Change	Make different in some particular way.
Charge	Load or fill (specific actions to charge should be included).
Check	Perform a comparison with stated requirements. No manipulation of equipment by the checker is involved.
Circle	Draw a circle around.
Clean	Rid of dirt, impurities, or extraneous matter.
Clear	Move people and/or objects away from something.
Close	Manipulate a device to allow the flow of electricity or to prevent the flow of fluids, other materials, or light.

Attachment A
(Page 2 of 6)
Action Verb List

VERB	DEFINITION (as used in Action Steps)
Collect	Cause the assembly of something in a fixed location or container.
Compare	Determine the relationship of the characteristics or values of different items, parameters, or conditions.
Complete	Fulfill or accomplish an instruction totally.
Consult	Ask for advice, to take counsel; to refer to.
Connect	Join, fasten, or fit to permit a desired capability
Continue	Maintain or resume the performance of an activity or condition.
Cool	Lower the temperature of equipment or an environment
Coordinate	Arrange for activity involving other personnel.
Correct	Alter to reestablish a desired activity or condition.
Count	A together.
Cover	Protect or shelter equipment.
Cycle	Cause repetition of an action or activity.
Declare	Make known formally.
Decrease	Produce a smaller value.
Deenergize	Remove the supply of electrical power to equipment.
Depress	Manipulate to effect a specific position of a device.
Depressurize	Release gas or fluid pressure from.
Determine	Find out; to ascertain.
Discharge	Give outlet or vent to a fluid or other contents.
Disconnect	Separate or detach.
Discontinue	Cease to operate, administer, use, produce, or take.
Dispose	Remove from a specific location.
Don	Put on clothing or an article of personal protective equipment (PPE).
Drain	Remove liquid from an enclosure or part of an enclosure, usually to empty.
Draw	Bring, take or pull out, as from a receptacle.
Energize	Provide equipment with electrical power.
Ensure	Confirm that an activity or condition has occurred in conformance with specified requirements (by action if necessary).
Enter	Make report of, set foot in.
Equalize	Make equal or uniform.
Establish	Bring about. Take necessary actions to cause a specified set of conditions to exist.
Estimate	Approximate the size, extent, or nature of a variable.

Attachment A
(Page 3 of 6)
Action Verb List

VERB	DEFINITION (as used in Action Steps)
Evacuate	Vacate.
Evaluate	Assess; to determine the importance, size, or nature of; to appraise; to give a value to based on collected data.
Exit	Leave or withdraw.
Expedite	Accelerate the process or progress of.
Fill	Add fluid to a system or equipment to a prescribed point.
Filter	Pass fluid through a sized medium to stop the passage of unwanted material in the effluent.
Flush	Remove or clean with a washing action of a liquid.
Follow	Comply with an instruction.
Go to	Depart from a position in a procedure and resume at a different location in the procedure or in a different procedure.
Ground	Provide an electrical path to a system at zero potential.
Guide	Manage or direct movement of.
Hold	Maintain a position for equipment, a place in a procedure, or an act of retention.
Identify	Determine or make known the parameter value or condition as related to a procedure.
Implement	Carry out; accomplish.
Increase	Produce a larger value.
Indicate	Make known an activity, parameter value, or condition.
Inflate	Blow full with air or gas.
Inform	Communicate knowledge.
Initiate	Begin a process, usually involving several action steps or actions.
Inject	Introduce a new element; drive a fluid.
Insert	Place or position into; move control rods into the reactor core.
Inspect	Examine; perform a critical visual observation or check for specific conditions; test the condition of.
Install	Fix or fit into equipment or a system.
Instruct	Direct or command.
Interchange	Substitute two items, one for another.
Investigate	Search or inquire into.
Isolate	Shut off or remove from service.
Jumper	Make a connection between two circuit points not normally connected.

Attachment A
(Page 4 of 6)
Action Verb List

VERB	DEFINITION (as used in Action Steps)
Label	Mark or identify.
Latch	Close or fasten.
Lift	Elevate to a higher level or remove, as in removing electrical leads or restrictions.
Limit	Restrict or impose bounds.
Locate	Determine or establish place or position.
Lock	Securely fasten, prevent capability to function.
Log	Enter into a record of operations or progress.
Lower	Cause to move down or decrease position or value.
Lubricate	Apply a lubricant to.
Maintain	Hold or keep in any particular state or condition, especially in a state of efficiency or validity.
Minimize	Reduce to the smallest amount or degree.
Mix	Intermingle ingredients uniformly.
Monitor	Observe an activity, parameter value, or condition (usually on a continuous basis) to meet an instruction requirement.
Notify	Contact, advise, or communicate to make someone aware of an impending or completed activity, parameter value, or condition.
Observe	Watch carefully.
Obtain	Get or attain.
Open	Manipulate a device to prevent the flow of electricity or to allow the flow of fluids, other materials, or light.
Operate	Cause equipment or system to perform designed functions.
Pass	Go by; move by.
Perform	Carry out specified actions or action steps.
Place	Put or set in a desired location or position.
Plot	Represent graphically.
Plug	Connect or become connected, as in electrical plug; to stop or insert something.
Press	Act upon through thrusting force exerted in contact; to push.
Pressurize	Apply pressure within by filling with gas or liquid.
Prevent	Keep from happening.
Proceed	Go on in an orderly, regulated way.
Pull	Exert force upon so as to cause or tend to cause motion toward the force.
Purge	Make free of an unwanted substance, such as an impurity or foreign material.

Attachment A
(Page 5 of 6)
Action Verb List

VERB	DEFINITION (as used in Action Steps)
Push	Press against.
Pump	Move a fluid in a piping system by the use of suction, pressure, or both.
Rack in	Insert a circuit breaker into its operating position.
Rack out	Withdraw a circuit breaker into its non-operating position.
Raise	Cause to move up or increase position or value.
Read	Obtain information visually.
Recirculate	Cause repetitive motion of a fluid in a system.
Reduce	Decrease a variable to meet a procedure requirement.
Refer to	Use specified information that is in another location or procedure.
Release	Set free from restraint or confinement.
Remove	Take off, move away, or eliminate.
Repair	Restore to a sound state.
Repeat	Do again.
Replace	Install an equivalent part or component.
Request	Ask.
Reset	Reestablish a piece of equipment, part, or component to a previous condition, parameter value, instrument set point, or mechanical position.
Resume	Begin again after cessation or interruption.
Return to	Go back to a previous action step in the procedure in effect.
Review	Examine with deliberation for confirmation or compliance to an instruction.
Rotate	Cause to turn on an axis.
Sample	Take a representative portion for the purpose of examination.
Secure	Fasten or make safe.
Select	Take by preference of fitness from a number or group; pick out; choose.
Send	Dispatch.
Separate	Move apart or detach.
Set	Adjust equipment to a specified value
Shake	Agitate.
Shut down	Remove from operational status.
Silence	Stop from making noise.
Sound	Order, signal, or indicate by a sound.
Stabilize	Become stable, firm, steady.

Attachment A
(Page 6 of 6)
Action Verb List

VERB	DEFINITION (as used in Action Steps)
Start	Originate the motion or function of an electrical or mechanical device.
Station	Assign a person to stand and remain at a certain place.
Stop	Halt movement or progress; hold back; halt.
Store	Place in reserve; hold for later use.
Stroke	Operate a valve over its full travel. The travel time may be measured.
Subtract	Perform a subtraction.
Tag	Identify with a prescribed label.
Throttle	Adjust a valve to an intermediate position to obtain a desired parameter value.
Torque	Cause to twist or turn, as about an axis.
Transfer	Cause to pass from one to another.
Transport	Transfer or convey from one place to another.
Trip	Manually activate a semiautomatic feature; cause to fail or stop.
Turn	Adjust with a force on an actuator that positions form a circular movement.
Unlock	Unfasten the lock of.
Unplug	Remove from a socket or receptacle.
Update	Revise to include latest information or data.
Use	Avail oneself of; to employ; to utilize.
Vent	Release a gas or liquid confined under pressure.
Verify	Confirm, substantiate, and ensure that a specific activity has occurred or that a stated condition exists.
Walk	Move along on foot.
Weigh	Measure the heaviness of as by a scale.
Withdraw	Remove.
Work	Perform a task.

Attachment B
(Page 1 of 5)
Glossary

TERM	DEFINITION
Acceptance Criteria	Criteria that provide a basis for determining whether an activity has succeeded or failed. May be qualitative or quantitative.
Action	Specific act performed to accomplish a task.
Action Step	Specific procedure performed to accomplish a task.
Action Sub-step	Detailed action that follows an upper-level action step. Performing all action sub-steps of an action step results in the action step being performed.
Activity	Group of related tasks performed to accomplish a goal.
Appendix	Supplementary material at the end of a procedure. An appendix includes information from external sources, such as a vendor manual, text book, or engineering drawing that provides supplemental information but that is not required for the performance of the procedure.
Approvals	Permission (OK) from the responsible person(s) that an action or activity may take place. Approvals are usually obtained in written form, by signature or initials.
Attachment	Supplementary material at the end of a procedure. Includes information more conveniently located after the main body of a procedure, such as forms, tables, figures, and graphs that is required for the performance of the procedure. This could also include data sheets to capture data during the procedure execution.
Base Procedure	The original procedure from which users may be branched or referenced.
Branching/Branches	Routes the procedure users to other action steps or sections within the procedure or to other procedures, where users do not return to the original location.
Caution	Alerts users to conditions, practices, or procedures that must be observed to avoid potential hazards involving products, equipment, and conditions adversely affecting site operations.
Check	The act of making a check mark (√).
Checkoff	To check mark a box or line to indicate that the action step has been successfully accomplished.
Concurrent Action Steps	Two or more action steps that are performed at the same time.

Attachment B
(Page 2 of 5)
Glossary

TERM	DEFINITION
Conditional Action Step	An action step that is contingent on certain conditions or combinations of conditions. Instructions are performed if conditions warrant. Logic terms (e.g., IF, AND, and THEN) are used to present a conditional action steps.
Conditions Of Performance	The actual conditions under which the procedural activities are performed, including actual equipment location, lighting, ventilation, protective gear required, and temperature.
Content	Subjects, topics, and technical information in a procedure.
Continuous Action Steps	Action steps that apply for a period of time while the procedure is being executed.
Coversheet	The first page of the procedure, which includes, as a minimum, the procedure title and page header.
Data Point	A discrete item of information. Often quantitative, but may be qualitative, as well.
Data Recording	Writing down data points to obtain a written record of particular conditions at a given time. Data may be recorded for Quality Assurance (QA) purposes or for use in further calculations or verifications.
Decision Tables	A format for presenting algorithms in tables.
Determine	An action step that directs operators to see if a parameter has assumed a specified value or to see if a specific action has been carried out and, if it has not, to take the next action specified (e.g., notify supervisor).
Equally Acceptable Action Steps	Action steps that specify a number of equally acceptable alternative actions.
Facing Page	Either side of a two-page spread of a procedure.
Format	A plan or layout for the organization of pages in a document, including the size, style, typeface, and margins.
Headings	Words or short phrases that introduce a section.
Hold Point	Stopping point that requires users to wait until certain conditions exist or specific approvals or notifications have been made before continuing on in the procedure.
Independent Verification	IV is the act of checking an operation, the status of equipment, a calculation, or the position of a component to ensure that it conforms to established criteria by two qualified persons, separated by time and distance, to provide an extra measure of safety and reliability.

Attachment B
(Page 3 of 5)
Glossary

TERM	DEFINITION
Level of Detail	The level of technical detail presented in a procedure. Action steps that are written at a low level of detail include only general instructions and rely heavily on user training. Action steps that are written at a high level of detail precisely specify all actions.
Limitation	Define boundaries that are not to be exceeded.
Logic Term	One of the six words used in conditional action steps to structure the condition and relate it to the action: IF, WHEN, THEN, AND, OR, and NOT.
Non-sequential Action Steps	Action steps that appear where they are first required but that may need to be performed later in the sequence of actions. Include continuous action steps, time-dependent action steps, and repeated action steps.
Note	Provides important supplemental information to users. This information is explanation and contains no action or command.
Notification	Informs the appropriate personnel that an action or activity is about to occur or has already occurred.
Noun Name	A concise and meaningful verbal description of the function of an SSC (i.e., “XXXX Feed Pump” or “Bldg XXX Main Breaker”) that is added to its label (see STD-342-100, *Engineering Standards Manual*, Chapter 1, *General*, Section 200, *Equipment Numbering and Labeling*).
Page Header	Appears at the top of every page and presents the procedure title, procedure number, revision number, revision date, and page number.
Placekeeping	Used to assist users in knowing what action steps have been accomplished in a procedure. Checkoff boxes are used to indicate that an action has been accomplished.
Precaution	Hazards to personnel or equipment that can be encountered during the performance of the procedure. Can also describe abnormal conditions.
Procedure	Prescribes a process (a sequence of actions) to be performed to achieve a defined outcome.
Referencing/Reference	Referencing instructions direct the users to temporarily abandon their place in the base procedure to perform action steps elsewhere in that procedure or in another procedure. When executing a reference, users always returns to the base procedure action step after performing the referenced action step(s).
Repeated Action Steps	Action steps that are performed repeatedly at various times.

Attachment B
(Page 4 of 5)
Glossary

TERM	DEFINITION
Revision Log	Identifies the revision history of the procedure and its effective date.
Safety Envelope	Defines the conditions for which a facility has been designed, reviewed, evaluated, and determined to be capable of being safely operated. Determined by the facility design bases, design verification and functional test results, safety analyses, operating limits, surveillance requirements, and operating and maintenance procedures.
Sign-off	A set of initials or a signature that indicates that the responsible person has successfully accomplished the action step. May also be required of inspectors or other independent verification.
Source Requirements	Requirements implemented by the procedure that flow down from the design basis and other source documents.
Table	Graphic representation of information where the items are placed in a matrix created by columns and rows.
Table of Contents	A listing of sections, subsections, appendices, and attachments that helps in locating those portions of the procedure.
Task	A well-defined unit of work having an identifiable beginning and end and that is a measurable component of the duties and responsibilities of a specific job.
Task Analysis	The systematic process of examining a task to identify skills, knowledge, and/or abilities required for successful task performance.
Technical Basis	The technical background and information, as well as the documentation of the background and information needed as a basis for all technical content of a procedure.
Technical Procedure	Prescribe production, operation of equipment and facilities, and maintenance activities.
Technical Safety Requirements (TSR)	A requirement that defines the conditions, safe boundaries, and the management or administrative controls necessary to ensure the safe operation of a nuclear facility and to reduce the potential risk to the public and facility workers from uncontrolled releases of radioactive materials or from radiation exposures due to inadvertent criticality. Consists of safety limits, operating limits, surveillance requirements, administrative controls, use and application instructions, and the basis thereof.

Attachment B
(Page 5 of 5)
Glossary

TERM	DEFINITION
Time-Dependent Action Steps	Action steps that impose time requirements on users by specifying the duration of an action or actions that must be completed within a specific period of time.
Usage Level	A term to describe the procedure usage designation that has been applied to the procedure. The specific Usage Levels are defined in P315, *Conduct of Operations Manual*, Attachment 16, *Local Procedures*, Section 16.4.1, *Usage Levels*.
User	The person(s) actually performing the procedure.
Verb	The part of speech used to indicate an action or state of being.
Verification	Action steps that direct users to see if a parameter has assumed a specified value or to see if a specific action has been carried out, and, if it has not, to take actions to make it so.
Walkdown	That segment of a walkthrough that consists of physically visiting and observing the location in which the activities are to be performed and the equipment that will be used. Performed to ensure that the equipment and environment are actually as envisioned and that the people involved can perform the required tasks.
Walkthrough	The cumulative, detailed check of the process and facility. Activities that may be used to complete walkthroughs include walkdowns, simulations or modeling.
Warning	Alerts users to conditions, practices, or procedures that must be observed to avoid loss of life or severe injury. Alerts users to potential hazards to personnel.

Attachment C
(Page 1 of 2)
Acronyms and Abbreviations

ADNHHO	Associate Director for Nuclear and High Hazard Operations
AOP	Abnormal Operating Procedure
AP	Administrative Procedure
ARP	Alarm Response Procedure
BEP	Building Emergency Plan
CoO	Conduct of Operations
CSE	Cognizant System Engineer
CSED	Criticality Safety Evaluation Documentation
CSLA	Criticality Safety Limit Approval
DHF	Document History File
DOE	Department of Energy
DSA	Documented Safety Analysis
EOP	Emergency Operating Procedure
ERP	Emergency Response Procedure
FOD	Facility Operations Director
IA	Issuing Authority
IPC	Immediate Procedure Change
IV	Independent Verification
IWD	Integrated Work Document
LANL	Los Alamos National Laboratory
NCS	Nuclear Criticality Safety
OM	Operations Manager
OP	Operating Procedure
OS	Operations Support
OS-RTS	Operations Support – Readiness and Technical Support Group
PJB	Pre-Job Brief
POC	Point of Contact
POD	Plan of the Day
POW	Plan of the Week
PPE	Personal Protective Equipment

Attachment C
(Page 2 of 2)
Acronyms and Abbreviations

PSE	Plant System Engineer
QA	Quality Assurance
QAP	Quality Assurance Plan
RCT	Radiological Control Technician
RLM	Responsible Line Manager
RM	Responsible Manager
RO	Responsible Organization
RWP	Radiation Work Permit
SAD	Safety Analysis Document
SEQ	Security and Emergency Operations Division
SME	Subject Matter Expert
TSR	Technical Safety Requirements
USI	Unreviewed Safety Issue
USQ	Unreviewed Safety Question

Los Alamos
NATIONAL LABORATORY
EST. 1943

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Approval online	Lorenzo Najera	03/04/15
Security Responsible Line Manager	Name	Date

Approval online	Gary Hagermann	03/17/15
Responsible Line Manager	Name	Date

Users have the ultimate responsibility to ensure that they are working with the latest revision of the controlled document

Classification Review

☒ Unclassified/Not OUO ☐ OUO ☐ Classified

Approval online	Joe Pestovich	203435	03/03/15
	(Reviewed By)	(Z#)	(Review Date)

HISTORY OF REVISIONS

Revision	Revision Description	Revision Date	Effective Date
A	This AP supersedes TSE-AP-01, *Document Control*. New WETF AP to implement P 315, *Conduct of Operations*, Chapter 16. The following topics are addressed in this procedure which were not fully addressed in TSE-AP-01: • Document Action Request (DAR) • Relationship to Integrated Work Documents (IWD) • Immediate Procedure Change (IPC) process • Procedure Verification process • Procedure Validation process (for operations procedures only). • Abnormal Operating Procedures (AOPs). • Alarm Response Procedures (ARPs). • Working copies. • Cancelled procedures. • Deactivated procedures.	02/26/09	03/09/09
B	Revised the definition of UET. Updated Sections 5.2.3 and 5.2.5 to add the CSE and Design Authority Representative review and approval. Revised section 5.2.5 steps to include all the approvers. Updated the DAR to add UET and Reference checkbox. Deleted hardcopy review board, revised Validation form. Minor editorial corrections. Divided Cancellation and Deactivation sections. Clarified minor revision reviewers. Updated Document Control and Quality responsibilities. Other editorial / minor changes.	09/08/09	09/18/09
C	Added definition for Verify and Ensure. Updated section 5.2.2 for Independent Verification and UET. Updated DAR to add IV step and additional check boxes.	10/26/2009	11/06/09
C.1	Require an annual review for the following documents: DSA, TSR, FSAR, and the Emergency Management Program.	05/11/10	05/15/10
C.2	Closure of F-2.1 Finding from DOE STD-1070-94, *Nuclear Facility Training Program Assessment at WETF*, dated March 17 through 27, 2008, which requires training review of IWDs that cite training as a control. Added Training and RP review to IWDs.	06/08/10	06/17/10

HISTORY OF REVISIONS (continued)

C.3	1. Updated Section 2 to include P 101-8 2. Added Three bullets to section 4.4.1: 3. In section 4.4.1, fourth bullet, change "Witness Points" to "Hold Points". 4. Add "SMP" to list of acronyms (Safety Management Programs) 5. Section 5.1.4, step 4, remove parenthetical (Documents past their grace periods will be deactivated by the DCC.)	6/23/10	6/23/10
D	Incorporated IPCs, revised Section 5.1.4, Step 8 to allow for pen and ink change for periodic review. Editorial changes.	12/10/10	1/18/11
E	JCO-10-03 Add pre-evolution check question #29 to Attachment H, Procedure Validation checklist, page 46.	5/13/11	5/26/11
F	Revise procedure to change "shall" to "may" in referencing the ($) to be consistent with P315, Chapter 16. Updated the verification checklist to reflect the change. Add to Attachment H, Validation Checklist, Step 29 "in accordance with WETF-TSR-AC-12" and add the procedure to the reference section.	7/20/11	7/21/11
G	Change title to "Document Development". Remove the Document Control Process, delineate the document process, remove tables, and use the procedure template. Remove forms from attachments, and make them independent, with WETF FORM numbers assigned. Addresses PFITS issues (see PFITS issues listing). This revision is a Total re-write and there are no REV. BARS.	04/04/13	03/10/14
H	Add SAT to References and Acronyms. Clarify 1st Time Use Validation, 1.6 Definitions, NOTE 4, pg 24, and Appendix C. Add WETF-AP-17, *Abnormal Operating Procedure use*, to the Reference Section and to Appendix E, A.2.2. Qualification/Certification Training Standards have their own template and do <u>NOT</u> follow Appendix E requirements. Remove preliminary approval. Add high hazard activities review	9/16/14	03/17/15

PFITS listing

PFITS Issue Number	Addressed In This Document
2010-2233	Appendix E, C.20
2010-2234	Section 5.2, and Appendix D
2010-2579	Section 2.7.3, and Appendix B
2010-2644 Action 6	Section 2.7.3, and Appendix B
2010-2645 Action 2	Appendix B, 1st sentence
2012-1007 Action 2	Appendix C
2012-2232	Appendix B
2012-2938	Appendix E, A.1
2013-1819	Section 2.7.1/2.7.2, and Appendix E, B.1
2013-1820	Appendix B
2013-1821	Appendix B
2013-1824	Section 2.71/2.7.2, and Listing PFITS issues in the PFITS Listing

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1.0 INTRODUCTION

Tritium activities conducted by the Los Alamos National Laboratory (LANL) Weapons Engineering Tritium Facility (WETF) are performed using approved documents. Documents that describe facility and programmatic operations and configuration at WETF are developed, maintained and controlled to ensure safe, secure, and efficient operations with the primary focus on the safety of personnel and the protection of the environment and the public.

1.1 Purpose

This procedure establishes the responsibilities and requirements for the development, review, verification, validation, approval, and revision of documents. For periodic reviews, deactivations, and cancellation of documents, refer to WETF-AP-29, *WETF Document Control*. This document process ensures WETF documents remain accurate and consistent with the system physical configuration, are usable, current, and readily available, as required by the WETF-TSR-AC-06, *Quality Assurance Program Plan (QAPP)*.

1.2 Scope

This procedure addresses the development of current document types used at WETF, and the content of operations documents used to perform work under Conduct of Operations (CoO). Existing documents will come under full compliance with this process at their next major revision. If future document types are introduced at WETF that are not addressed, they may be managed in a manner similar to existing document types commensurate with the level of rigor appropriate for that type of document until the process is updated to address them.

This procedure implements P315, *Conduct of Operations Manual,* Attachment 16, *Technical Procedures*, and DOE-STD-1029-92, *Writer's Guide for Technical Procedures*, and it complements P300, *Integrated Work Management*.

The Security Responsible Line Manager (SRLM) or the Responsible Line Manager (RLM) determines if the procedure in process will be subject to P300 by evaluating the activity against the P300, Attachment B, *Hazard Grading Table*. If the activity hazard classification is moderate hazard orhigh-hazard/complex, the SRLM/RLM may do either of the following:

A. Develop an Integrated Work Document (IWD) in compliance with P300, or

B. Develop a technical procedure as an IWD Part 1 equivalent work control document in accordance with P315, Attachment 16, and DOE-STD-1029-92.

    1. Integrated Work Management (IWM) Expectations

        a. Define the work.

        b. Identify and analyze hazards.

        c. Develop and implement preventive measures and controls.

        d. Perform work safely, securely, and in an environmentally responsible manner.

        e. Provide feedback and strive for continuous improvement.

1.2 Scope (continued)

2. IWDs and IWD equivalent procedures consist of four parts:
    a. **Part 1**—Activity-Specific Information, Define the work.
    b. **Part 2**—Work Area Information, Identify hazards and controls.
    c. **Part 3**—Validation and Work Release, Walk down and approve the work activity.
    d. **Part 4**—Post-Job Review, Post-Job review and lessons learned at completion of work.

WETF Procedures serve as an IWD Part 1 equivalent. Parts 2 – 4 are required for compliance with P300. Use the language in the WETF Procedure Template.

The WFO Training Team [comprised of appropriate subject matter experts (SMEs) and others with expert knowledge of the operation or activity] must review all documents for training implications.

A review by the Deployed Services Environmental Safety and Health – Weapons Facility Operations (DSESH-WFO) is required for activities in the Radiological Buffer Area (RBA) that have the potential for Radiological Hazards including those which are fully encompassed by WETF-AP-FRPR-34, *Facility Radiation Protection Requirements Weapons Engineering Tritium Facility (TA-16-205 & 450).*

ESH and/or security review may also be required.

The basis for the determination of hazard classification **SHALL** be documented and included in the Document History File (DHF). This is also incorporated in Section 3.1, Hazards.

This procedure does not address requirements for handling and controlling software or engineering drawings.

Document classification requirements are addressed in P204-2, *Classified Matter Protection and Control Handbook.*

Safety basis documents applicable to WETF are governed by LANL Safety Basis Procedure (SBP) 112 series and SBP 114 series documents.

1.3 Applicability

This Administrative Procedure (AP) applies to most procedures and/or documents developed at WETF.

1.4 References

DOE O 422.1	*Conduct of Operations*
DOE-STD-1029-92	*DOE Standard Writer's Guide for Technical Procedures*
NHHO-FORM-002	*NHHO-TR Systematic Approach to Training (SAT) Determination Form*
P101-8	*Explosives Safety*
P204-2	*Classified Matter Protection and Control Handbook*
P300	*Integrated Work Management*
P315	*Conduct of Operations Manual*, Chapter 16
P1020-2	*Laboratory Document Control*
SBP-112-3	*Unreviewed Safety Question (USQ) Process*
SBP-114-4	*Safety Basis Document Review*
WETF-AP-FRPR-34	*Facility Radiation Protection Requirements Weapons Engineering Tritium Facility (TA-16-205 & 450)*
WETF-AP-05	*WETF Operations Standard*
WETF-AP-11	*Alarm Response Procedures Development and Use*
WETF-AP-14	*Procedure Use*
WETF-AP-17	*Abnormal Operating Procedure Use*
WETF-AP-29	*WETF Document Control*
WETF-FORM-66	*Document Action Request*
WETF-FORM-69	*Procedure Verification Checklist*
WETF-FORM-71	*Procedure Validation Checklist*
WETF-FORM-73	WETF *Training Level Determination Form*
WETF-TSR-AC-06	*WETF Quality Assurance Program Plan (QAPP)*
10 CFR 830.3	*Definitions*

1.5 Acronyms and Abbreviations

AC	Administrative Control
ALARA	As Low As Reasonably Achievable
AOP	Abnormal Operating Procedure
AP	Administrative Procedure
ARP	Alarm Response Procedure
CoO	Conduct of Operations
CSE	Cognizant System Engineer
DATA	Data Collection Procedure
DAR	Document Action Request
DC	Derivative Classifier

1.5 Acronyms and Abbreviations (continued)

DCC	Document Control Coordinator
DCRM	Document Control Records Management
DHF	Document History File
DMS	Document Management System
DOE	Department Of Energy
DSA	Documented Safety Analysis
DSESH-WFO	Deployed Services Environmental Safety and Health – Weapons Facility Operations
DSME	Document Subject Matter Expert
DTW	Document Technical Writer
EDMS	Electronic Document Management System
EOP	Emergency Operating Procedure
EMP	Emergency Procedure
ERP	Emergency Response Procedure
EX	Exam
EXT	External Document
FOD	Facility Operations Director
IPC	Immediate Procedure Change
ISI	In Service Inspection
IV	Independent Verification
IWD	Integrated Work Document
IWM	Integrated Work Management
LANL	Los Alamos National Laboratory
MDL	Master Document List
P&ID	Piping And Instrumentation Diagram
PLAN	Plan
QAPP	Quality Assurance Program Plan
RBA	Radiological Buffer Area
RLM	Responsible Line Manager
RS	Round Sheet
SAC	Specific Administrative Control
SB	Safety Basis
SD	Software Documentation
SME	Subject Matter Expert
SMP	Safety Management Programs
SP	Specification
SR	Surveillance Requirement
SRLM	Security Responsible Line Manager

1.5 Acronyms and Abbreviations (continued)

SSC	Structure, System, and Component
SAT	Systematic Approach to Training
TLD	Training Level Determination
TP	Technical Procedure
TRN	Training Document
TSR	Technical Safety Requirement
UET	Use Every Time
USQ	Unreviewed Safety Question
USQD	Unreviewed Safety Question Determination
WETF	Weapons Engineering Tritium Facility

1.6 Definitions

Active	A document that is fully approved and authorized for use within the facility. (See deactivation and cancellation.)
Administrative Documents	Any written or pictorial information managed by WETF describing, defining, specifying, reporting, or certifying activities, requirements, procedures, instructions, or results. Attachments are considered part of a document and will be revised per this procedure. Documents types controlled within WETF are defined below; this list is not all-inclusive. Refer to WETF-AP-29, Appendix A, *Document Categories and Types*, for a list of document types. **AC**—An Administrative Control defines the provisions relating to organization and management, procedures, record keeping, assessment, and reporting necessary to ensure safe operation of a facility. **AP**—An Administrative Procedure describes the steps of processes that are primarily non-technical in nature (e.g. business practices, quality procedures, office and personnel procedures, etc.). APs include documents formally known as Quality Procedures (QPs). **EX**—An Examination is documentation of a process or technique (e.g., oral, written, or performance evaluations) used to evaluate the knowledge, skills, and performance of personnel working at WETF. **FORM**—A Form is a document that contains blanks for the insertion of details, information, and/or signatures; it becomes a record when completed. **PLAN**—A Plan is generated at the inception of a program or project. The plan describes the program and its applicable requirements. A plan typically lists the organizations involved in implementing the described activities. This includes documents formally known as Test Plans. **SD**—Software Documentation provides information about a software program/application. SDs may include Software Application Code, Software Configuration Management Plan, and Software User Documentation. **TRN**—A Training document describes training requirements for WETF personnel.

1.6 Definitions (continued)

Approval Date	The date on which an approval authority signifies acceptance that the document development process has been satisfactorily completed.
Cancellation	Cancellation is the permanent removal of a document from active status. Cancelled documents are archived.
Configuration Management	An integrated management process that establishes consistency among design requirements, physical configuration, and facility documentation. This consistency is maintained throughout the life of the facility/system and accounts for changes as they occur.
Controlled Area	Previously referred to as a Vault Type Room (VTR).
Controlled Document	A controlled document is one whose contents are maintained uniformly among the copies by an administrative control system. WETF controlled documents are designated as such by including the words "Controlled Copy" in red on the white cover.
Deactivation	Deactivation is the temporary withdrawal of a document from authorized use. For example, a document might be deactivated for the duration of an activity suspension or during temporary unavailability of a facility. Deactivated documents are exempt from periodic review requirements, but must be reviewed before reactivation if the normal review date has passed.
Document Action Request (DAR)	A form used to document and track the initiation, modification, or cancellation of a document.
Document History File (DHF)	Records that document the development, review, concurrence, and approval of a document in accordance with this procedure.
Document Subject Matter Expert (DSME)	The acknowledged expert in a given subject. The DSME owns the technical content and logistical structure of the document. Additionally, the DSME is responsible for technical content such as; procedural compliance with facility operating envelope (SB), mole limit compliance, Tritium Containment Vessel control, and classification considerations. The SRLM/RLM will identify the DSME on the DAR.
Document Technical Writer (DTW)	An individual familiar with the document preparation and approval process assigned to coordinate the activities associated with developing, revising, deactivating, or cancelling a controlled document as described in this procedure. Ensures document is written in compliance with standards such as P315, Attachment 16.
Editorial Revision	Nonsubstantive modifications to a document that change format, correct grammatical errors, update references or organizational names, or clarify without changing original intent.
Effective Date	The earliest date that any element of a document is approved to be implemented.
Ensure	To confirm and substantiate that an activity or condition has been implemented in conformance with the specified requirements when performing a procedure. Allows for manipulation of equipment, or instrumentation to conform to specified requirements. May be performed by reliable methods other than direct observation.

1.6 Definitions (continued)

First-Time Use Validation	When the SRLM/RLM deems that additional validation of the procedure is warranted, he/she may request that a "first time use" validation be performed. This validation is an actual performance of the procedure at the job site. It does not constitute a validation as described in P315, *Conduct of Operations Manual*, Section, 16.5.1.g Attachment 16. The results should be documented on WETF-FORM-71, *Procedure Validation Checklist*, or equivalent. It should be used only as a follow-up to one of the other validation methods. The Facility Operations Director (FOD) must approve first-time use. A hazard analysis must be performed and documented, evaluating the associated risks and defining the controls to compensate for them. FOD approval and restrictions must be documented on the approval page of the procedure. Care should be taken that the user is informed that the first use **WILL** be a validation, that he or she is attentive to the task, and knows the actions to take if a procedure deficiency is identified. The SRLM/RLM may assign an additional observer to assist the user-validator.
Immediate Procedure Change (IPC)	A change to an issued document made to address urgent operational needs that require expedited processing. Sometimes referred to as a Field Change.
Major Revision	Substantive modifications to a document that change the actual performance of the activity. Examples include changes in the hazard analysis or controls, the content or order of steps, the assignment of functional responsibilities, or the values of process parameters: • major change in scope, • previously unanticipated hazards or conditions, • failure of controls and/or changes in controls, and • any change that would impact the safety or Safety Basis (SB) of the facility or exceed established facility-operating limits.
Master File	The collection of records for a given version/revision of a document that provides evidence of the document's basis, accuracy, usability, approval, and proper processing. Also known as the DHF in document development.
Master Document List (MDL)	List of all WETF documents, includes Active, Deactivated, Cancelled, and Superseded documents. A listing of Active documents is available at the front of each controlled binder. An electronic copy may be found in PDMLink.

1.6 Definitions (continued)

Minor Revision

Nonsubstantive modifications to a document that change format, correct grammatical errors, update references or organizational names, or clarify without changing original intent. Minor revisions enhance usability but do not change the actual performance of the activity.

NOTE:

Changes in the order of performance that correct obvious administrative errors may be processed as minor revisions with SRLM/RLM approval (documented on the DAR).

Minor Revisions:

- must not increase risk,
- must not alter implementation of a source requirement,
- must not alter the purpose or scope,
- must not eliminate any required reviews or approvals, or
- must not alter the operating, technical, design, process, regulatory, or quality requirements.

Minor Revisions are limited to the following:

- correction of typographical, spelling, punctuation, or grammatical errors: provided the meaning or intent does not change,
- changes to acronyms, definitions, references,
- updates to position titles, individual names, organizational names, and contact information to reflect current responsibilities, changes to identified position titles with similar qualifications, or
- addition of clarifying text or notes to provide additional information or improve the document's readability as long as the work process is not technically changed. Steps cannot be added or deleted, the sequence cannot change and the intent of the step cannot be changed (except as identified above).

Operations Documents

Operations documents (governed by Conduct of Operations) are written to provide specific direction for operating systems and equipment during normal and postulated abnormal and emergency conditions. Refer to WETF-AP-29 for a list of document types. Operations documents include, but are not limited to:

AOP—An Abnormal Operating Procedure describes the action(s) personnel take in response to events that affect several plant systems, threaten the facility safety envelope, or require operator action to mitigate facility damage. The need for an AOP is determined by engineering evaluation of the events that could threaten safe facility operations but are less severe than the events covered by Emergency Operating Procedures (EOPs).

ARP—Alarm Response Procedures are required for alarms that require timely operator action/response to visible and audible alarms.

EXT—An External Document is a controlled document that has been generated by another LANL or non-LANL organization [e.g., Health Safety and (DSESH-WFO) Sandia National Laboratories, etc.] that receives WETF review and signature approval for use at WETF.

1.6 Definitions (continued)

Operations Documents (continued)	**EMP**—An Emergency Procedure describes the action(s) personnel take in response to an emergency condition which is commonly indicated by an alarm warning. **ISI**—The In Service Inspection program ensures the performance of design features in safety basis documents. An ISI procedure is used to ensure that these passive design features are inspected and maintained to satisfy the intended safety function. **RS**—Round Sheet is a record of system parameters that are recorded for equipment and process areas located within the responsibility of a particular operator. Round sheets contain information such as time of observation, maximum and minimum acceptable operating parameters, and normal operating ranges. Round sheets may include a narrative section used as the operating log for that position. **SR**—A Surveillance Requirement describes the test, calibration, or inspection necessary to ensure the operability and quality of safety Structures, Systems, and Components (SSCs) and their support systems that are required for safe operation are maintained. **TP**—A Technical Procedure describes the steps of processes that are primarily technical in nature (e.g. operating procedures and instructions, maintenance procedures, etc.). TPs include documents formally known as Acceptance Test Procedures (ATPs), Calibration Instructions (CIs), Calibration Procedures (CPs), Maintenance Instructions (MIs), Maintenance Procedures (MPs), Operating Instructions (OIs), Operating Procedures (OPs), and Standard Operating Procedures (SOPs).
Nuclear Facility	Nonreactor nuclear facility. Those facilities, activities, or operations that involve, or will involve, radioactive and/or fissionable materials in such form and quantity that a nuclear or nuclear explosive hazard potentially exists to workers, the public, or the environment, but does not include accelerators and their operations and does not include activities involving only incidental use and generation of radioactive materials or radiation such as check and calibration sources, use of radioactive sources in research and experimental and analytical laboratory activities, electron microscopes, and X-ray machines. (Ref: 10 CFR 830.3, Definitions)
PDMLink	Software tool used at WETF as the Document Management System (DMS) for the review, approval, and control of documents (e.g., procedures). Also used for management of Records.
Record	A completed document or other media that provides objective evidence of an item, service, or process. Refer to WETF-AP-29 for a detailed definition of a record.
Record File Copy	The original of a document that has been approved by the WETF SRLM/RLM as indicated by his/her signature.

1.6 Definitions (continued)

Reference Procedure	A usage designation for a procedure that is not required to be at the work site during performance of the activity. Reference procedures should be readily available and may be consulted as needed. If the Reference procedure is an IWD-equivalent procedure, it should be present at the job site. Reference procedures describe routine activities, "skill of the craft" activities, or generalized instructional material. These procedures do not require documented verification upon satisfactory completion of the individual steps. The Reference designation is appropriate for activities that can rely on training and expertise for successful performance. Sequential performance is mandatory unless the procedure allows otherwise. Steps must not be added or deleted without going through the formal change or revision process. These procedures may contain data sheets, provided the data sheets, when separated, contain sufficient instruction or detail to function without the entire reference procedure. This method can reduce user encumbrance and allow for minimization of potential waste within radiological areas.
Responsible Line Manager	The Responsible Line Manager is the group-level manager having the responsibility, authority, and accountability to plan, validate, coordinate, approve, execute, and close out work activities in accordance with P300.
Revision Bars	Changes, other than formatting and editorial changes, should be clearly communicated to the user. Place a vertical line (revision bar) in the margin, running the length of all changes. The IPC revision bars should be separate and distinct from any existing revision bars within the document. Only the marks for the most recent revision should appear in the revision. Major revisions do not receive revision bars.
SAC	A Specific Administrative Control provides a specific preventive or mitigating function for accident scenarios identified in the Documented Safety Analysis (DSA) where the safety function has importance similar to, or the same as, the safety function of a safety SSC (e.g. discrete operator actions, combustible loading program limits, hazardous material limits protecting hazard analyses or facility categorization).
SB	Safety basis documents describe those aspects of the facility design basis considered important to the safety of the facility operations and relied on by the Department of Energy (DOE) to authorize operation. These documents include the DSA, Technical Safety Requirements (TSRs), etc.
Structures, Systems, and Components (SSCs)	Structures are elements that provide support and enclosure such as buildings, freestanding tanks, basins, dikes, and stacks. Systems are collections of components assembled to perform a function such as the piping, heating, cooling, and air-handling units that make up the heating, ventilation, and air conditioning system. Components are specific pieces of equipment such as pumps, valves, relays, or elements of a larger array such as computer software, lengths of pipe, elbows, or reducers.

1.6 Definitions (continued)

Subject Matter Expert (SME)	Any individual recognized for technical expertise in a particular subject area or discipline.
STD	A Standard defines the technical requirements and guidelines for the selection, application, and quality assurance of materials that apply to tritium applications for WETF. Standards should provide requirements, which supplement those invoked by national codes and standards.
UET Procedure Use Designation	Use Every Time (UET) – A usage designation that requires the procedure or procedure section to be present and in use for each step performed. Verbatim compliance is required; that is, the procedure steps must be performed sequentially as written and without deviation from the instructions. Exceptions must be specifically identified in the procedure. Initials and/or sign-offs will be made, where required, at the time the step is performed or as provided in the attachment. The UET designation must be considered for a procedure or procedure section that: • has potential high consequence of error, • is complex, • is infrequently performed, • steps of the activity must be performed in sequence with no omissions, • has data taking or sign-offs required after certain steps during the performance of the activity, • has stringent quality or regulatory documentation requirements, or • an error during performance of the activity would result in unacceptable conditions. UET procedures must be present at the work site, either in the possession of the user or an assistant (Reader). The Reader-Worker method may be used for situations in which it is impracticable for the primary worker to have the procedure in their possession. Examples include glovebox work, work encumbered by Personal Protective Equipment (PPE), or work in adverse environments. In the Reader-Worker Method, the Reader has possession of the procedure. The Reader clearly communicates each step verbatim to the Worker, either by direct voice contact or by alternate means such as radio or two-way intercom. The Worker repeats each step, paraphrasing as appropriate, before performing the action. The Worker reports completion of each step to the Reader. The Reader marks the procedure as required. Entries, initials and/or sign-offs are made, where required, at the time the step is performed, or in special cases, as provided by the procedure. The absence of sign-offs within a procedure does not alter the requirement for procedure compliance. If it is not necessary to meet the conditions above, the procedure should be written as a Reference Procedure or Data Collection Procedure.

1.6 Definitions (continued)

Unreviewed Safety Question Determination (USQD)	The USQ process allows the facility to make changes to support day-to-day operations. It also provides a mechanism for keeping the facility safety basis current by reviewing potential USQs, reporting positive USQDs to DOE, and obtaining approval from DOE prior to taking any action that involves a USQ. Refer to SBP 112-3, *Unreviewed Safety Question (USQ) Process*. The following document types are being considered for exclusion from the USQ process: • EX-training examinations. • FORM-forms that do not contain work instructions.
Validation	A field review, usually performed as a walkdown or simulation, to confirm that a procedure can be used as written in the environment where the task is to be performed.
Verification	A table-top review performed to ensure that a document is technically accurate and meets editorial standards. A review performed to ensure that a document is compliant with P 315, Attachment 16 and DOE-STD-1029.
Verify	To confirm and substantiate that an activity or condition has been implemented in conformance with the specified requirements when performing a procedure. Manipulation of equipment or instrumentation to conform to the specified requirements is not permitted. Formal methods other than direct observation may be used.

2.0 RESPONSIBILITIES

2.1 Security Responsible Line Manager/Responsible Line Manager

NOTE 1: Gas Transfer Systems Group *(W-7)Group Management is designated as the WETF SRLM. The WETF Operations Manager is designated as the WETF RLM.*

NOTE 2: *The following are guidelines to help determine the approval authority:*

If the activity being performed is in the Controlled Area or affects the Controlled Area [previously referred to as a Vault Type Room (VTR)] of Building 205, W-7 must have the opportunity to review and approve any documents, Radiological Work Permits (RWPs), and Work Packages.

If the document involves Program Operations such as Function Tester, Auxiliary Maintenance Integrated Gas Operation system (AMIGOS), Gas Analyses System (GAnS), Materials control and Accountability (MC&A), Material Balance Area (MBA)-OP, Packaging, and training documents affiliated with these documents, W-7 SRLM (could also be the RLM for these activities) must be the primary approver and RLM for Operations the secondary approver on the DAR.

If the activity or procedure is being performed outside the Controlled Area, then only RLM approval is required.

The SRLM/RLM is responsible for the following:

- Determine the need for a procedure (see Appendix A, *Procedure Need Flow Chart*)
- Determine if procedure is "UET," "Reference," or “Data Collection”
- Determine the level of detail in procedure considering the skill level of the performer. This determination should be made for procedure revisions as well as for new procedures.
- Determine if the procedure will be subject to P300, *Hazard Grading Matrix,* by evaluating the activity against P300.
- Determine the appropriate organizations for review (used to promote documents in PDMLink).
- Ensure the method, extent, and scope of the Validation process is specified, as applicable.
- Ensure documents address applicable commitments [e.g., Price-Anderson, Performance Feedback and Improvement Tracking System (PFITS), etc.].
- Act as approval authority for assigned documents.
- Ensure hazard analyses is performed for new and revised procedure changes with hazards and resulting controls identified, dispositioned and incorporated into the document as part of the revision process.

2.1 Security Responsible Line Manager/Responsible Line Manager (continued)

- Ensure documents are generated and controlled in accordance with this procedure and WETF-AP-29.
- Ensure a high level of management attention is focused on document development: review, validation, verification, concurrence, Derivative Classifier (DC) review, final verification, USQ review, and final approval to ensure quality documents are produced.
- Assign documents to groups or individuals having primary responsibility for performance of a given procedure.
- Ensure DSMEs are responsible for the technical content of their documents.
- Specify review personnel or levels of authority for document review/concurrence for their respective organization.
- Review the proposed document for Independent Verifications (IV), or other critical step that warrants an independent confirmation prior to proceeding.
- Ensure appropriate resources are available to complete the document review and approval process.

2.2 Document Control Coordinator (DCC)

The DCC is responsible for coordinating document control activities. The DCC responsibilities include:

- Provide guidance, assistance, and consultation to the organization's personnel in the area of document control.
- Maintain the organization's DMS/Electronic Document Management System (EDMS), which manages and controls all organizational documents and records, as appropriate. The following is a list of DCC document management specific responsibilities at WETF.
  - Maintain configuration management of documents utilizing the PDMlink tool.
  - Assign WETF document numbers to new documents and ensure the current revision sequence is followed.
  - Perform a document quality check before finalizing a document. A quality check should include, but is not limited to the following:
    - Ensure proper numbering, labeling, formatting of the document.
    - Ensure the document bears the appropriate classified markings.
    - All changes require the approval of the DSME and DTW.
    - The SRLM/RLM and the DSME and DTW must determine if additional review is required (e.g. DC and USQ).
  - Assist in the tracking of documents through the finalization of a document utilizing PDMLink to complete the process.

2.2 Document Control Coordinator (DCC) (continued)

- Verify review and concurrence has been completed by all required reviewers, apply all proper signatures and obtain final DAR approval before controlling a document.
- Ensure all history documentation has been completed prior to final approval of document. [Training Level Determination (TLD), validation if required, verification, DC review and USQ review].
- Upload "final approved" document (in both PDF and native formats) to PDMLink along with any history documentation and relate references.
- Ensure the distribution of WETF controlled documents to the two designated locations; TA-16, Building 824, Room 161 and TA-16, Building 205, Room 110.
- File completed package in the Master File in accordance with LANL Records Management and Conduct of Operations requirements.
- Notify WETF personnel when documents have been approved.
- Maintain the WETF Master Document List (MDL).
- Establish initial periodic review dates for documents based on the original approval date and the criteria provided in WETF-AP-29, Section 10.0, *Periodic Reviews*, as appropriate.

- Serve as the organization's main point of contact for all organizational documents that are submitted by local document owners/users.
- Participate in the organization's management assessments of document control activities and assists management in the development of corrective action plans, as appropriate. This also includes providing feedback to management for the continuous quality improvement of document control activities.
- Ensure adequate protection and access controls to documents (and records) in the organization's DMS/EDMS.
- Participate in and maintain document control training as required.
- Ensure WETF-AP-29 is up-to-date in accordance with P1020-2, Laboratory Document Control, and P315.

2.3 Document Subject Matter Expert (DSME)

The DSME is designated by the SRLM/RLM, and is responsible for the technical content of the document. The DSME is responsible for the following:

- Develop a draft, for new or revised document.
- Ensure technical adequacy including accuracy of specified limits, entry conditions and symptom information, precautions and limitations, and acceptance criteria.
- Ensure incorporation of appropriate LANL requirements.
- Ensure hazards and their resulting controls identified as part of the IWD process are addressed in new and revised procedures.

2.3 Document Subject Matter Expert (continued)

- Complete the NHHO-FORM-002, *NHHO-TR Systematic Approach to Training (SAT) Determination Form*, to help with the initial decision whether formal training is required of new or revised documents, processes or activities. This form is intended as a first step in what can lead to an end product consisting of formal training, Conduct of Operations dissemination of information through briefings or required reading, or no action required.
- Complete the TLD WETF-FORM-73, WETF *Training Level Determination Form,* with training staff, when applicable.
- Ensure applicable measuring and test equipment (MT&E) is identified in the procedure.
- Identify document validator.
- Review the proposed document for the need of witness points.
- Review the proposed document for safeguards and security concerns or other issues as appropriate.

2.4 Document Technical Writer (DTW)

The DTW is responsible for the following:

- Follow the document preparation requirements of this document.
- Coordinate reviews, validation, verification, concurrence, DC review, final verification, USQ review, and final approval of documents.
- Ensure hazards and their resulting controls identified as part of the IWD process are addressed in new and revised procedures.
- Prepare the document to ensure applicable facility and LANL requirements (with DSME input) are incorporated.
- Identify document verifier.
- Track the document through the development process (reviews, validation, verification, concurrence, DC review, final verification, USQ review, and final approval).
- Coordinate and administer the comment resolution process with the oversight of the DSME. Resolving technical comments and document structure must be done with the consent of the DSME.
- Ensure verifications and validations are completed as required.
- Ensure the document has received a review for classification.
- Ensure proper numbering, labeling, and formatting of the document before its approval and distribution.
- DSME and DTW keep document on track to meet schedules.
- Provide management the status of documents including the number in routing for review and approval.
- Provide any hardcopy history documentation to the Document Control Records Management (DCRM).
- Independent DTW performs verifications (WETF-FORM-69, *Procedure Verification Checklist*).

2.5 WETF Personnel

WETF Personnel are responsible for:

- Identify the need for new documents or revisions to existing documents.
- Report procedural errors or deficiencies to their immediate management, and initiating a DAR, WETF-FORM-66, *Document Action Request*.

2.6 Document Reviewers

2.6.1 Subject Matter Experts

As determined on the DAR, SMEs review of the document may include the following (within their area of expertise):

- Review the new/revised document against the source documents for technical adequacy including accuracy of specified limits, entry conditions and symptom information, precautions and limitations, and acceptance criteria.
- Review the document to ensure incorporation of appropriate LANL requirements.
- Review the document for the need of any hold points, IV, or other critical step that warrants an independent confirmation prior to proceeding.
- Review the document history of revisions or document development records to ensure key steps added to the document are not inadvertently deleted.
- Participate in Validations (WETF-FORM-71) when assigned.

2.6.2 Cognizant System Engineers

As determined on the DAR, CSEs review of the document may include the following (within their area of expertise):

- Ensure Technical Safety Requirement (TSR)/Safety Management Programs (SMPs) requirements are correctly implemented (e.g. Pressure Safety, Emergency Management, and Hazard Material). These SMPs may be applicable to specific systems (e.g. Pressure Safety concerns with the Tritium Waste Treatment System and Tritium Gas Containment System) thus requiring the CSE and Safety Basis review.
- Ensure acceptance criteria not derived directly from the TSR's have approved calculations and are listed in the reference section of the procedure.
- Review the new/revised document against the source documents for technical adequacy including accuracy of specified limits, entry conditions and symptom information, precautions and limitations, and acceptance criteria.
- Review the document to ensure incorporation of appropriate LANL requirements.
- Review the document history of revisions or document development records to ensure key steps added to the document are not inadvertently deleted.

2.6.2 Cognizant System Engineers (continued)

- Evaluate any new or changed document that includes operations or experiments that involve heating which could lead to over pressurization, material failure or material compromise by over-temperature to ensure that over-temperature protection devices are installed in accordance with AC 5.6.9, *Pressure Safety Program*, of the WETF TSR.
- Identify events that require an Abnormal Operating Procedure (AOP) or an Alarm Response Procedure (ARP).
- Perform Validations (WETF-FORM-71) when assigned.

2.6.3 Environmental, Safety and Health (ES&H) Representative(s)

- Review the proposed document for safety, health, environmental concerns.
- Evaluate the document for as low as reasonably achievable (ALARA) considerations such as:
  - waste,
  - personnel exposures, and
  - tritium releases to the environment or to the applicable waste-processing stream.
- Ensure the Industrial Hygiene and Safety Division's SME on the Explosives Safety Program reviews all new and revised procedures involving explosives operations and materials. This review includes compliance with the requirements in P101-8, *Explosives Safety*, and safety issues that could present a danger to workers or the environment.
- Specify inspection requirements and appropriate acceptance criteria in procedures.
- Ensure DSESH-WFO review is required for documents involving radiological work. A DSESH-WFO representative for WETF reviews the document as an SME reviewer focusing on the associated radiological concerns and notifies the DSME/DTW of the need for any radiological hold points or if the DSESH-WFO representative will need to review and sign the document.

2.6.4 Electrical Safety Officer

Review is required on documents involving the installation, removal, or maintenance of electrical work. The WETF Electrical Safety Officer reviews the document as an SME reviewer focusing on the potential electrical energy hazards.

2.6.5 Training Staff

Perform a training determination assessment on the document based on the Systematic Approach to Training (SAT).

- Review documents for training implications based on SAT determination.
- Ensure proper training requirements have been established (e.g., required reading, on-the-job training, etc.).
- Develop training documentation in support of documents.

2.6.6 WETF Quality Assurance (QA)

QA personnel are responsible for the following:

- Review documents for compliance with the WETF Quality Assurance Program Plan (QAPP) and governing quality management documents.
- Review documents for the need of any QA Hold Points.
- Review and concur on all documents.
  - Ensure applicable MT&E is identified in the procedure.
  - Review all IPC changes.
  - Review documents that involve installation of quality components.

3.0 PRECAUTIONS AND LIMITATIONS

None

4.0 PREREQUISITES

None

5.0 PROCEDURAL STEPS

NOTE 1: *Per WETF-AP-29 under NO circumstances are controlled documents to be altered, changed, or revised without the required review and approval process.*

NOTE 2: *Sections in this procedure are independent of each other and may be performed as needed based on the activity required. Per WETF-AP-29, a change to the process may only be considered to meet time sensitive deliverables or for minor revisions. For more detailed information regarding changes to the process see WETF-AP-29.*

NOTE 3: *Formatting and content requirements and guidelines for WETF documents are addressed in Appendix E, Document Content and Format.*

5.1 Document Development/Processing

5.1.1 Determine need for document

Document Subject Matter Expert (DSME)/Anyone

[1] Use Appendix A, *Procedure Need Flow Chart*, to determine the need for a procedure.

5.1.2 Initiate DAR

NOTE 1: *A NHHO-TR Systematic Approach to Training (SAT) Determination Form **MUST** be completed by the DSME for all Document Types in this procedure. This will help determine Training's role in the document process.*

NOTE 2: *A DAR form **MUST** be submitted to the Document Control Coordinator (DCC) for any document action (new, revision, deactivation, cancellation, etc. (for IPCs GO TO Appendix D, IPC Changes) regardless of the trigger. Triggers include upcoming review date, new or changed processes or requirements, new information, an assessment, or an event.*

NOTE 3: *New and revised documents received from external sources are assigned a unique WETF document control number, attach a WETF document cover sheet and insert a history of revisions page. External documents WILL only undergo a Verification, USQ evaluation, and management approval.*

Anyone/Originator

[1] WHEN the need has been identified for a new document,
OR a revision to an existing document,
THEN With guidance from the DSME, Complete form NHHO-FORM-002 to determine Training's role in the document process,
AND Initiate and Submit a DAR, WETF-FORM-66, as follows:

- Complete Section # 1, *Originator Request*, of the DAR.
  - IF this is a new document,
    THEN Request a document number and revision number from the DCC.
- Enter a detailed description for the new document,
  OR changes to an existing document.
  - IF the change CANNOT be fully captured on the DAR,
    THEN Attach a draft or marked-up copy of the document to the DAR, showing proposed changes.
- IF the document is a procedure,
  THEN Determine if it will be a UET or reference procedure.
  - IF the procedure is UET,
    THEN Identify which sections will be UET.
- IF the document is a procedure,
  THEN Determine if any steps will require IV and list the details on the DAR.
- IF the document is NOT a procedure,
  THEN Check N/A in Block 3 of Section # 1
  AND No for IV.

5.1.2 Initiate DAR (continued)

Anyone/Originator

- With guidance from the DSME, complete Section # 2, *Affected Operation and/or System [to be completed by Weapon Engineering and Experiments Directorate (ADW) Representative]*.
- With guidance from the DSME, complete Block 1 of Section # 3, *ADW SRLM or NHHO RLM Approval for Processing*.
- Complete Section # 4, *Hazard Grading,* using the guidance in Section 1.2, *Scope,* of this procedure.
- Submit the DAR to the SRLM/RLM for review and approval.

SRLM/RLM

NOTE: *W-7 Group Management is designated as the WETF SRLM and RLM for W-7 activities. The WETF Operations Manager is designated as the WETF RLM.*

[2] Review the DAR for adequacy, accuracy, and necessity.

[3] Ensure that the activity or process being described is graded for hazard level according to P300, Attachment B, *Hazard Grading Table,* and WETF-AP-FRPR-34, *Facility Radiation Protection Requirements Weapons Engineering Tritium Facility (TA-16-205 & 450).*

[A] IF the activity is classified as Moderate Hazard or High Hazard/Complex, THEN the document **SHALL** meet the requirements for an IWD Part 1 equivalent procedure as described in P300, including a documented hazard analysis.

[4] Identify the required reviewers in Section # 5, *Required Reviewers*.

[A] Use Appendix B, *Document Reviewers,* to select reviewers for the document.

[5] IF the DAR is acceptable,
THEN Sign and Date.

[A] Forward the approved DAR to the DCC.

[6] IF the DAR is rejected,
THEN Record the reason for the rejection, Initial the form, and Return it to the Originator.

[A] IF additional pages are used,
THEN Reference additional pages in the Comment field (e.g., "see attached pages").

[B] IF a new document number was issued,
THEN Notify DCRM of the rejection.

[C] Terminate the document process.

5.2 DAR/Document Processing

NOTE 1: *For External documents GO TO Section **5.5**, Final Verification.*

NOTE 2: *If a DAR is for the Deactivation, Cancellation, or for Periodic Review requirements for a document, refer to WETF-AP-29 for processing.*

NOTE 3: *This section is used for the following types of document actions:*

- *New Document*
- *Major revision*
- *Minor revision*
- *Immediate Procedure Changes (IPCs), see Appendix D, IPC Changes*
- *Roll up of multiple IPCs*

NOTE 4: *IPC Rollup SHOULD be initiated when:*

- *The procedure is no longer workable, initiate a DAR in accordance with Section 5.1.2*
- *Five permanent IPCs have been received for any one procedure, initiate a DAR in accordance with Section 5.1.2*
- *Permanent IPCs have been active for six months; initiate a DAR in accordance with Section 5.1.2*

NOTE 5: *Further guidance on procedure content is provided in Appendix E, Procedure Content and Format, DOE Order 422.1, Conduct of Operations, Attachment 2, Program Requirements, 2. Specific Requirements, p. Technical Procedures, and P 315, Conduct of Operations Manual, Attachment 16, Technical Procedures. Where specific formatting conventions are NOT addressed, users are encouraged to apply the formatting guidelines in DOE-STD-1029-92, DOE Standard Writer's Guide for Technical Procedures, as applicable. For additional content and formatting, always use the latest procedure template, WETF Procedure Template, located in PDMlink in the WETF library in the Templates folder.*

NOTE 6: *The Review and Concurrence steps in the process may be combined with documented approval from the SRLM/RLM. See WETF-AP-29.*

Document Technical Writer (DTW)

[1] WHEN the DAR is received from DCC,
THEN Contact the DSME for a draft of the proposed document, if a draft was NOT provided by DCC.

5.2 DAR/Document Processing (continued)

NOTE: *The following types of documents MAY require a TLD:*

- *Administrative Controls*
- *Administrative Procedures*
- *Abnormal Operating Procedures*
- *Alarm Response Procedures*
- *Technical Procedures*
- *Emergency Procedures*
- *Emergency Operating Procedures*
- *In Service Inspections*
- *Plans*

DSME

[2] Coordinate with the WETF Training Office to determine if a TLD is required.

[A] IF a TLD is required,
THEN Complete a TLD, WETF-FORM-73 and Submit to DCRM staff.

DTW

[3] Develop the new document
OR Make changes to an existing document as described on the DAR.

[4] For minor changes, IPCs and IPC rollups, changes are annotated with revision bars during the revision process.

DSME

[5] Review the document and Determine readiness to start the approval process (review, validation, verification, concurrence, DC review, approval, USQ, and issue).

5.3 Upload the Document into PDMLink

DTW

[1] Upload the document into PDMLink.

5.4 Document Review, Concurrence and Approval

NOTE: *Validation and Verification are part of the review process.*

DTW

[1] Promote the document for Review in PDMLink.

5.4 Document Review, Concurrence and Approval (continued)

Reviewers

[2] Perform a Review of the document promoted in PDMLink (refer to WETF-AP-29, Appendix B, for guidance on locating the document in PDMLink).

[3] IF you have comments,
THEN Download (copy function) the document from PDMLink to your desktop.

[A] Document your comments in Microsoft WORD using TRACK changes,
OR Provide hardcopy comments to the DTW.

[B] Upload a copy of the document with TRACKED changes (your comments) into PDMLink (refer to WETF-AP-29, Appendix B, for guidance on uploading the document into PDMLink),
OR Provide hardcopy comments to the DTW.

DSME and DTW

[4] DTW **WILL** contact the DSME and together they **WILL** resolve and incorporate comments from reviewers.

DTW

[5] Ensure the latest version of the revised document (All comments and corrections incorporated) is loaded into PDMLink.

NOTE 1: *The Validation process only applies to active operations procedures* (subset of Operations Documents). *Cancellations and deactivations are exempt from Validation.*

NOTE 2: *See Appendix C, Methods of Validation, for more information.*

NOTE 3: *Unapproved procedures CANNOT be used to manipulate equipment or components.*

NOTE 4: *First Time Use Validation SHOULD be used only as a follow-up to one of the other validation methods. When the SRLM/RLM deems that additional validation of the procedure is warranted, he/she may request that a "first time use" validation be performed. This validation is an actual performance of the procedure at the job site. It does not constitute a validation as described in Conduct of Operations Manual, Attachment 16, Section 16.5.1.g. The results should be documented on WETF-FORM-71.*

[6] Promote the document for Validation in PDMLink.

[A] Prepare WETF-FORM-71 for the Validator.

5.4 Document Review, Concurrence and Approval (continued)

Validator

[7] Perform a Validation (review) of the document promoted in PDMLink (refer to WETF-AP-29, Appendix B, for guidance on locating the document in PDMLink).

[8] IF you have comments,
THEN Download (copy function) the document from PDMLink to your desktop.

[A] Document your comments in Microsoft WORD using TRACK changes,
OR Provide hardcopy comments to the DTW.

[B] Upload a copy of the document with TRACKED changes (your comments) into PDMLink (refer to WETF-AP-29, Appendix B, for guidance on uploading the document into PDMLink),
OR Provide hardcopy comments to the DSME and DTW.

[9] Complete WETF-FORM-71,
AND Obtain the SRLM/RLM signature.

[A] Return the form to the DTW,
OR DCC for inclusion in the DHF.

DSME and DTW

[10] DTW **WILL** contact the Document Subject Matter Expert (DSME)/CSE and together they **WILL** resolve and incorporate comments from Validation.

DTW

[11] Ensure the latest version of the revised document (All comments and corrections incorporated) is loaded into PDMLink.

[12] Promote the document for Verification in PDMLink.

Verifier

[13] Perform a Verification (review) of the document promoted in PDMLink (refer to WETF-AP-29, Appendix B, for guidance on locating the document in PDMLink).

[A] Complete WETF-FORM-69,
AND Return the form to the DTW,
OR DCC for inclusion in the DHF.

DSME and DTW

[14] DTW **WILL** contact the DSME and together they **WILL** resolve and incorporate comments from Verification.

5.4 Document Review, Concurrence and Approval (continued)

DTW

[15] IF NO comments were received during the review process, this includes validation, AND first verification,
THEN with written approval from the RLM GO TO Step **5.4[22]**.

[16] Ensure the latest version of the revised document (All comments and corrections incorporated) is loaded into PDMLink
AND Upload a Concurrence redline as an attachment.

[17] Promote the document for Concurrence in PDMLink.

Concurrers

[18] Perform a review of the document promoted in PDMLink (refer to WETF-AP-29, Appendix B, for guidance on locating the document in PDMLink).

[19] Address any document concerns with the DSME and DTW.

DSME and DTW

[20] DTW **WILL** contact the DSME and together they **WILL** resolve and incorporate comments from Concurrers.

DSME, DTW, and SRLM/RLM

[21] IF comments are incorporated,
THEN the DSME, DTW, and SRLM/RLM will determine if Re-concurrence is required,
AND IF required GO TO Step **5.4[11]**.

DTW

[22] Ensure the latest version of the revised document (All comments and corrections incorporated) is loaded into PDMLink,
AND Upload a DC Review redline as an attachment.

[23] Promote the document for DC Review in PDMLink.

DC Reviewer

[24] Perform a DC review (refer to WETF-AP-29, Appendix B, for guidance on locating the document in PDMLink),
AND Complete your promotion request in PDMLink

5.4 Document Review, Concurrence and Approval (continued)

DSME and DTW

[25] DTW **WILL** contact the DSME and together they **WILL** resolve and incorporate comments from DC review.

DSME, DTW, and SRLM/RLM

[26] IF comments are incorporated,
THEN the DSME, DTW, and SRLM/RLM will determine if Re-concurrence is required,
AND IF required GO TO Step **5.4[11]**.

DTW

[27] Complete your Change Notice Task in PDMLink.

5.5 Final Verification

NOTE 1: *NO technical content **WILL** be changed; verification is for formatting, grammar, etc. ONLY.*

NOTE 2: *Document will be automatically routed to the assigned reviewer for a verification review, complete WETF-FORM-69. Any formatting or grammar changes may be made that do NOT change the technical content of the document, the form is submitted to the DCRM office as part of the history documentation.*

Verifier

[1] Perform a Verification of the document in PDMLink (review task on your home page).

[A] SLRM/RLM and the DSME **MUST** review any change to determine if the document needs reprocessing (Re-validation, Re-verification, Re-concurrence, Re-DC review, and Re-submittal to DCRM).

DTW/Verifier

[2] Ensure the latest version of the revised document (All comments and corrections incorporated) is loaded into PDMLink

5.6 DCRM Final processing

Document Control Coordinator

[1] Finish processing document for final approval and Issue (refer to WETF-AP-29, for a more detailed description of finalizing a document for release).

6.0 REQUIRED RECORDS

No records are generated by the performance of WETF-AP-10, however; records are generated by the applicable implementation documents.

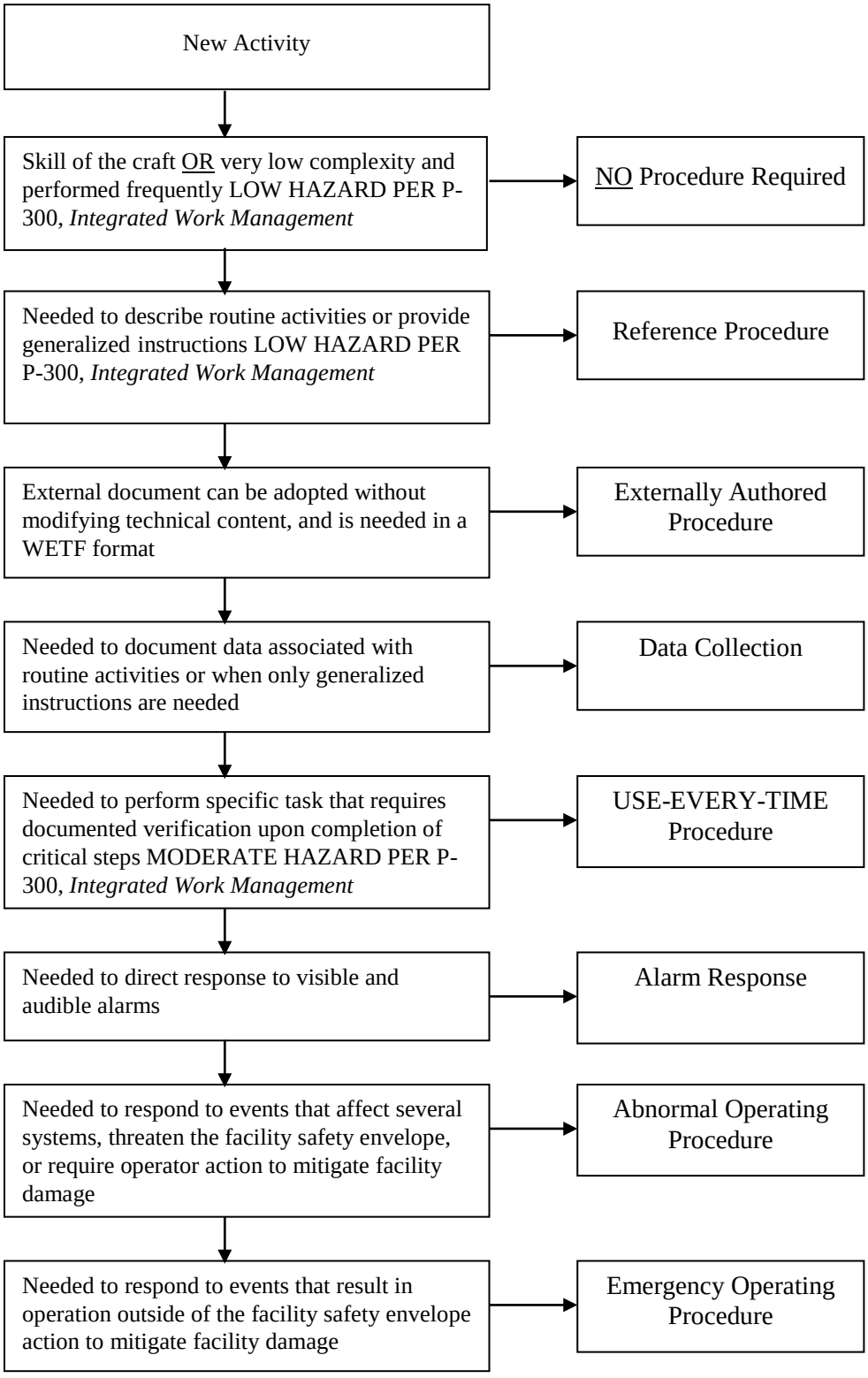
7.0 APPENDICIES

Appendix A, *Procedure Need Flow Chart*
Appendix B, *Document Reviewers*
Appendix C, *Methods of Validation*
Appendix D, *IPC Changes*
Appendix E, *Procedure Content and Format*

8.0 ATTACHMENTS

None

APPENDIX A: PROCEDURE NEED FLOWCHART



APPENDIX B: DOCUMENT REVIEWERS

When initiating a DAR, coordinate with the SRLM/RLM (approval signature on the DAR) as needed to determine the appropriate reviewers.

IF the document is a procedure,
AND is a new or major revision,
THEN the minimum set of reviewers SHOULD be the following:

- Cognizant System Engineer (CSE) for documents that implement safety basis requirements (Vital Safety Systems).
- SME or person with thorough knowledge of the subject for documents that implement non-safety basis requirements.
- ES&H representative.
- A quality specialist.
- Operations representative.
- Training representative as determined by the SAT.
- Other engineering representatives, as applicable.
- Other appropriate members from a High Hazard Analysis Team.
- Management review is performed concurrent with approval.

IF the document is NOT a procedure or is a minor revision to a procedure,
THEN the minimum set of reviewers is**:**

- Operations representative as determined by the SAT.
- Training representative.
- A quality specialist.
- One SME/CSE or person with thorough knowledge of the subject.
- Management review is performed concurrent with approval.

IF the change needed is an IPC,
THEN the minimum set of reviewers is:

- The SRLM/RLM reviews the IPC and determines DSME/CSE review as deemed necessary to ensure the need, technical accuracy, and completeness of the proposed document modification.
- Training representative as determined by the SAT.
- A quality specialist.
- Management review is performed concurrent with approval.

APPENDIX C: METHODS OF VALIDATION

Determine Validation scope as follows:

- Major revisions that involve manipulation of systems or equipment typically require validation of the entire procedure.
- The Validation can be limited to select sections where the change(s) occur provided the changes do NOT impact other (unchanged) sections.

Select the appropriate Validation method or combination of methods:

- Walkdown Validation Method
- Simulation (if a simulator or mock-up is available)
- Tabletop Validation Method
- First Time Use Validation (performed after formal approval).

IF the Validation method selected is the First Time Use Validation (used only to supplement a formal validation),
THEN Perform the following:

a. Handle the document as a classified document (i.e., confidential or secret), if validating a document which was confidential or secret after data entry and data was entered as part of the validation.
b. Obtain FOD approval to perform the First Time Use Validation.
c. Ensure WETF Management has verified the CSE has reviewed the procedure and the USQ process has been implemented as required by SBP 112-3, *Unreviewed Safety Question (USQ) Process*.
d Stamp or write “APPROVED FOR VALIDATION USE ONLY”
AND Initial and Date on cover page of the Validation copy.
e. Validate by actual performance.
f. Perform the procedure as often as necessary to ensure it is correct for all equipment and tasks covered.
g. Identify any additional hazards and necessary protective measures.
h. Complete all applicable data forms.
i. Correct all errors that prevent the procedure from being performed as written.
j. Submit Validation comments.
k. Forward a copy of validated procedure and applicable forms to the procedure preparer for resolution of comments.

APPENDIX C: METHODS OF VALIDATION (continued)

Method:	Walkdown/Simulation Validation	Tabletop Validation	First Time Use Validation
Description	A walkdown involves user(s) of the procedure performing a systematic enactment of procedure actions with no changes to facility configuration or operational conditions, reading the procedure line by line, and enacting procedure performance by walking to each device, control, or control station in the described sequence. The actual facility equipment is addressed but manipulation of equipment is dramatized or simulated. The Validation Checklist is completed. A simulation involves the use of a simulator or mock-up.	A review of the procedure using a talk-through process. This method is selected when equipment manipulated by the procedure is inaccessible or where ALARA considerations, safety considerations, or facility status do NOT allow for a walkdown. The procedure is read/evaluated line by line and performance is talked-through by knowledgeable individuals including intended procedure users using the following as applicable: P&IDs; electrical or other approved system drawings; system descriptions; vendor information; modification package(s); photographs; current effective copy of the subject procedure; integrated system diagrams.	This validation is actual performance of the procedure at the job site. It SHOULD be used only as a follow-up to one of the other validation methods. Care SHOULD be taken that the user is informed that the first use will be a validation, that he or she is attentive to the task, and knows the actions to take if a procedure deficiency is identified. The Responsible Manager may assign an additional observer to assist the user-validator. Performed only after formal approval.
Evaluates:	- Information contained in the procedure is adequate. - Information contained in the procedure is understandable and easy to comprehend. - The procedure is compatible with the facility configuration. - The procedure is compatible with the specified manpower. - The sequence of procedure steps is correct and efficient. - The communication methods used in the procedure are adequate. - Hazard identification and mitigating controls included in the procedure are appropriate and adequate.		

Evaluate for the following during Validation:

- During procedure validation, all equipment/tools/components necessary to perform the evolution are required to be present in the field for validations. It is recommended that procedure validation not occur without all of the required equipment/tools/components. Mock ups should be used when available and simulations of steps should be as close to the performance of steps as possible (e.g. touching valves without manipulating).
- A procedure writer (not directly involved in procedure development) or an independent qualified performer (not involved in the procedure development process) should be involved with the procedure validation in the field. The validation should involve workers at all levels of experience and not always the SME or most senior worker. A graded approach should be applied as to when a procedure writer/independent person is required to be present during validation (e.g. major revision or new procedure).

APPENDIX C: METHODS OF VALIDATION (continued)

Evaluate for the following during Validation (continued):

- Steps in the procedures should be simple and provide flexibility through general notes and statements (such as "as necessary", "as required", "steps may be repeated/worked out of order", etc…). The use of bulleted lists should be utilized instead of a sequential list of steps when appropriate. Too much detail in steps is often provided, but not necessarily required.
- The use of flow charts should be used for complex procedures or new procedures to illustrate the process flow and assist in the development and validation of procedures. This also assists when "do loops" exist.
- Usability of the procedure, including operational effectiveness, access requirements, response time, and environmental conditions (temp, contamination, ergonomics, etc.).
- Accuracy of task performance, which is a measure of the extent to which a task is completed without error, where an error is defined as any action which exceeds the limits of tolerance for the system. For the purposes of procedure validation, this definition is expanded to include any aspect of the technical content, structure, organization or language of the procedure which has the potential to diminish the probability of meeting the stated objective of the procedure.
- Errors of commission in which a step is performed incorrectly. This includes both performing the correct step in an incorrect manner; performing a step correctly, but out of sequence; and performing a step correctly, and in the right sequence, but taking more time than is available.
- Errors of omission in which a step is skipped.
- Navigational errors in which the user branches to the wrong procedure, or to the wrong step within the right procedure. Navigational errors may take the form of errors of commission or omission.
- Incorrect or incomplete directions within the procedure.
- Inconsistent terminology with equipment and systems the procedure references.
- Vague, ambiguous, or non-standard terminology is used in the procedure.
- Response time, which refers to the elapsed time from an initiating event to an effective system response. Some facility operations, particularly those involving responses to emergency situations, may be constrained in terms of the amount of time available to perform the operation. For procedure Validation, there are two separate and distinct response times of interest:
  - The response time required for the user to read and interpret the content of the procedure, which is an indication of procedure usability, and
  - The response time required for the user to perform the actions dictated by the procedure, which is an indication of procedure complexity.

APPENDIX D: IPC CHANGES

NOTE: *Immediate Procedure Changes (IPCs)*

- *An IPC CANNOT be used to change EOPs, the purpose or scope of procedures, to approve total rewrites of any procedure, or to approve new procedures.*
- *IPC changes are limited to those required to continue work in progress (may be an administrative procedure), support temporary modifications, for critical activities as identified by the procedure preparer, or where a major revision is in process and an IPC is required to correct the procedure.*
- *For IPCs, the Responsible Manager role may be delegated to the Shift Operations Supervisor, Shift Operations Manager, Operations Manager, Person-In-Charge (PIC), or other on-shift manager.*
- *Content that is safety-basis related CANNOT be changed without required Safety Basis reviews.*
- *An IPC changes the existing revision number on the modified procedure (only for the page that the change is on, and the History of Revisions). For example: revision A becomes A.1, or revision B.2 becomes B.3.*
- *A USQ is required for IPCs of procedures at WETF.*

Process the IPC, using WETF-FORM-67, *Immediate Procedure Change (IPC).*

Mark up a copy of the procedure as follows (typed or hand-written in ink):

a. Make all changes on a current copy of the affected procedure.
b. Draw a single line through the information to be deleted or changed.
c. Enter changes as close as possible to where they apply in the procedure.
d. Make permanent changes as follows:
   - Update the history of revisions of the procedure.
   - Place the IPC revision number in the header of the affected page(s) of the procedure (example Rev. A becomes Rev. A.1).
   - Place a change bar in the right hand margin that runs the length of the change.
   - Identify all steps changed by the IPC by recording the IPC number next to the change bar (example IPC #1).

APPENDIX D: IPC CHANGES (continued)

If it is NOT practical to enter all information due to space restrictions or other reasons, attach a copy of the changes as insertable pages and associate each affected step in the procedure, for example – "See IPC Number____"; or, physically cut and paste the changes into the procedure and adjust the page numbers (i.e., 5a, 5b, 5c, etc.).

e. Procedure writer will get concurrence from the reviewers listed on Section 2 of the IPC Form. Hardcopy signatures.

f. Procedure writer will get the training staff to complete the training section at bottom of the IPC form

g. Procedure writer will incorporate changes per WETF-AP-10 and upload the IPC into PDMLink. Since the document will be at a release state, the procedure writer will need to change the state to "In Work."

   NOTE: *If the IPC is needed after normal work hours or weekends, and there is no DCRM staff available, the procedure writer may promote the IPC to USQ and obtain the final signatures on the IPC Form.*

h. Procedure Writer will notify DCRM that the IPC is ready to be promoted to USQ for review, and turn in the completed IPC form to DCRM.

APPENDIX E: PROCEDURE CONTENT AND FORMAT

A. Procedure Types

Procedure types are identified in the definitions section of this procedure.

Further guidance on procedure content is provided in DOE Order 422.1, *Conduct of* Operations, Attachment 2, *Program Requirements*, 2. *Specific Requirements*, p. *Technical Procedures*; and P315, Attachment 16. Where specific formatting conventions are NOT addressed, users are encouraged to apply the formatting guidelines in DOE-STD-1029-92, as applicable. For additional content and formatting, always use the latest procedure template, *WETF Procedure Template*, located in PDMlink in the WETF library under the TAB Templates.

There are two types of procedures discussed in this guidance; operations procedures (subset of Operations Documents) and administrative procedures. The following sections in this appendix provide guidance/expectations for developing both types of procedures.

WETF has other types of controlled documents (e.g. training documents, administrative controls, System Design Descriptions, etc.). Templates for these documents can also be found in the PDMLink WETF library or in the Engineering Standards Manual. WETF management may specify and/or tailor other formats or templates as appropriate. Qualification/Certification Training Standards have their own template and do NOT follow Appendix E requirements.

A.1 Technical Procedures

TPs are based on design controls (specifications, drawings), operational controls (DSA, technical specifications), management controls (industrial safety, training), and experience (lessons learned). They provide direction and information on how to accomplish the technical tasks. Lockout/Tagouts identified in the procedure will include independent verification.

A.2 Emergency and Alarm Response Procedures

Emergency and Alarm Response Procedures define the action steps to take when an abnormal condition exists and are deemed a type of operations procedure.

Emergency Procedures (EMPs) address conditions that require immediate and absolute attention to mitigate problems, reestablish safety boundaries, and bring operations and equipment back within established operating parameters.

ARPs define the action steps trained/qualified operators are required to take in response to an alarm, annunciator, or other type of facility display that indicates an abnormal condition.

EMPs and ARPs SHOULD be readily accessible by operators who use them. They SHOULD be brief (typically one or two pages) and focus on the immediate and subsequent actions necessary to properly respond to and recover from the specific abnormal condition.

Emergency procedures SHOULD be formatted differently from other procedures to readily distinguish them from other document types.

A.2.1 Emergency Operating Procedures (EOPs) Content

EOPs are developed for events that would result in operation outside the facility safety envelope. The need for an EOP is determined by an engineering evaluation from the design basis events identified in the Safety Analysis Report.

The CSE determines any required inspection criteria for the facility due to damage caused by severe natural phenomena and any actions required to put the facility in a safe condition after such damage. These requirements may be put into an EOP.

The Facility Manager may identify other events outside of those identified by the CSE.

A.2.2 Abnormal Operating Procedures (AOPs) Content

AOPs are developed for events that affect several plant systems, threaten the facility safety envelope, or require operator action to mitigate facility damage. The need for an AOP is determined by engineering evaluation of the events that could threaten safe facility operations but are less severe than the events covered by EOPs.

The CSE determines any required inspection criteria for the facility due to damage caused by severe natural phenomena and any actions required to put the facility in a safe condition after such damage. These requirements may be put in an AOP.

The Facility Manager may identify other events outside of those identified by the CSE.

Additional details on the use and control of WETF AOPs is provided in WETF-AP-17, *Abnormal Operating Procedure Use.*

A.2.3 Alarm Response Procedures (ARPs) Content

This section provides guidelines for ARP content and administration for all organizations producing ARPs. Process Control Status Lights (On, Off, etc.) and advisory alarms do NOT require ARPs.

ARPs have five major functions:

- direct the response of personnel to visible and audible alarms
- provide corrective action(s) to respond to the alarm condition, or send the operator to the document that has the corrective action(s) to respond to the alarm condition
- provide information that enhances the operating crew's ability to respond to alarms when no preplanned strategy has been developed or those developed are inadequate
- provide a reference source for plant information specifically related to the system or equipment in the alarm condition
- supplement operator training and reduce the amount of memorized material required for correct operator response

Alarms are evaluated to determine ARP needs.

A.2.3 Alarm Response Procedures (ARPs) Content (continued)

ARPs are developed such that the required operator response is clearly defined.
NOT all alarms require operator action. Examples of alarms, which may require development of an ARP, are:

- alarms on Operations Center annunciator panels.
- alarms displayed electronically which require action (e.g., Computer Control Systems (CCS), Process Logic Controls (PLC), or Distributive Control Systems (DCS).
- alarms on local control panels, including lighted alarms that show deviation from normal running conditions.
- summary alarms on Operations Center panels indicating alarm status on a local panel.

ARPs may be stand-alone procedures or refer personnel to another procedure after alarm confirmation. A single procedure may be used for multiple alarms for which the alarm responses are similar (i.e., high sump level, tritium room monitor alarm, fire alarm, etc.).

ARPs SHOULD be limited to short exact instructions:

- level of detail SHOULD be consistent with the scope of operator training
- spaces for check offs or initials are NOT required

ARPs do NOT duplicate Emergency Response or Abnormal Operating Procedures.

ARPs have a unique identification system. ARPs **WILL** list entry condition information as follows:

- Alarm – this provides the alarm device(s) identification number directly related to the alarm, such as a Level Switch Loop number.
- Setpoint – this provides the alarm setpoint(s). Equipment, whose alarm setpoints may constantly vary (such as storm water monitors) may provide an acceptable nominal range, which establishes satisfactory performance parameters.
- Alarm Wording – each ARP **WILL** have the exact wording and letter case as shown on the alarm window or screen display.

ARPs contain the following operator action:

- steps to place system in safe configuration.
- steps to ensure Automatic Functions are completed.

Probable Causes and References are optional sections. Probable Causes or the conditions likely to have caused the alarm may be listed in order of severity. References may be listed to indicate the major documents available in the Operations Center or other designated areas that can provide additional alarm response information for troubleshooting the alarm cause. These may include procedures, sketches, manuals, etc. Additional details on the use and control of WETF ARPs is provided in WETF-AP-11, *Alarm Response Procedures Development and Use*.

A.3 Administrative Procedures

Administrative procedures provide formal direction for accomplishing interactions, maintaining communications, and ensuring consistency of operations. They describe management's philosophy of operation and how operations will be accomplished. Administrative procedures define processes required to ensure the goals and objectives of the organization's programs are implemented. They are NOT directly used to operate or maintain facilities or equipment; they translate policy into action.

B. Developing a Procedure

Before actually writing a procedure, it is important to research requirements, assess the application of the procedure, and recognize the users' needs for each procedure. Answers to the following questions are a beginning step to determine those needs:

- What requirements are to be met? How does the procedure fulfill technical and management control requirements and commitments?
- What materials, equipment, and facilities are to be used? What is necessary for the activities to be performed?
- What tasks are to be accomplished? What precisely must be done?
- What are the hazards, and how do you control them? What hazards must be monitored and recorded?
- Why must the tasks be accomplished? What is the relationship of this procedure or task to other related procedures or tasks?
- Are there specific times or circumstances that dictate when to use the procedure? How are the tasks to be performed? Are there different methods or techniques available to complete the tasks?

B.1 Preparing to Write a Procedure

A procedure provides a process (method) to accomplish a specific task.
Use information gathered in the process analysis to define the process, define the activities that make up the process, and organize the activities into related sections. These sections will become the subsections and action steps within the procedure. The following list describes the activities that SHOULD be completed before writing a procedure.

1. Establish the research and planning process.
   - Identify the type of procedure to be written. Is it a technical or administrative procedure?
   - Plan the research process.
   - Document the technical basis of the procedure.
   - Establish a record of the methods, calculations, user feedback, and other pertinent data collected during the development process.

B.1 Preparing to Write a Procedure (continued)

2. Determine the requirements applicable to the procedure, with an understanding of the technical and administrative control basis of the procedure.
   - Research upper-tier documents, such as DOE Orders and LANL and facility policies to determine administrative requirements and commitments.
   - Determine the technical requirements that may apply by examining the following:
     - approved vendor information
     - other procedures that perform similar functions, including those that may be obtained from outside organizations
     - technical literature and specifications
     - engineering documents
     - records of the basis for and development of methods and calculations
     - nuclear safety documents, such as operational safety requirements and safety analysis reports
3. Ensure the technical adequacy and accuracy of the process and equipment information in the procedure by performing a detailed check.
   - Watch as someone uses a similar, existing procedure, and identify any information that is NOT apparent when reading the procedure.
   - Research and identify potential hazards and problems in performing the activities by conducting a job safety analysis or other hazard analysis.
   - Interview potential users to assess varying degrees of experience.
   - Learn about past problems.
   - Obtain suggestions on ways to improve the process.
   - Determine how often and to what extent the procedure must be used.
   - Consider the consequences of improperly performing the procedure.
   - Identify the administrative processes, such as verifications, inspections, and notifications that interact with the procedure processes.
   - Ensure all pertinent safety rules are included or other appropriate sources are referenced.

B.1 Preparing to Write a Procedure (continued)

4. Perform an analysis of the activities that make up the process to identify the requirements of the activity and the functions that **MUST** be accomplished to meet the process objectives. While performing a process analysis, consider the rationale behind the activities, activity frequency and complexity, the consequences of an error, and the relationship of training to successful performance of the activity. The activities are translated into action steps in the performance sections of the procedure. Determine the following as applicable:
   - The principal users of the procedure and other participants in the process, including support functions such as health physics and LANL services.
   - The level of detail to be used in writing the procedure based on user training and qualifications.
   - Assess
   - The performer's familiarity with terms, abbreviations, acronyms, and symbols.
   - The completed general and specific training, as well as additional training needed by the principal performers.
   - The comprehension level of the performers based on their expected training and qualifications.
   - Research potential hazards, problems, and controls, in performing the activities by conducting a job safety analysis or other hazard analysis in accordance with P 300.

5. Develop the process section of the procedure:
   - Divide the process into activities, divide the activities into tasks, and divide the tasks into step-by-step actions.
   - Determine the responsible parties for each of the actions and validation requirements.
   - Establish a detailed outline containing
   - A clear statement of the overall purpose, as well as clear purposes for each activity or section of the procedure
   - Other documents, forms, and definitions that are necessary for understanding or performing the requirements or processes or the procedure
   - Detailed section/subsection headings
   - Group activities in order of performance.

C. Operations Procedure Content

Further guidance on procedure content is provided in DOE Order 422.1, *Conduct of* Operations, Attachment 2, *Program Requirements*, 2. *Specific Requirements*, p. *Technical Procedures*, and P315, Attachment 16. Where specific formatting conventions are NOT addressed, users are encouraged to apply the formatting guidelines in DOE-STD-1029-92, as applicable. For additional content and formatting, always use the latest procedure template, *WETF Procedure Template*, located in PDMlink in the WETF library under the TAB Templates.

C. Operations Procedure Content (continued)

To provide uniformity in procedures (subset of Operations Documents), the content of procedures SHOULD conform to the above guidelines. The procedure aspects described above SHOULD be followed when developing, surveillance requirements, in-service inspections, round sheets, and any "procedure" document except for administrative procedures.

C.1 Preparing a Revision History

The revision history provides a history of the procedure and specifies the revision designator, description, and date of the revision. Affected pages may also be included for ease of identification of where the changes have occurred. Although the revision history may be initiated at any point in developing a procedure, it CANNOT be completed until the procedure is approved. Revision history description entries that no longer provide a benefit to users may be replaced with "On Record".

- Provide a specific statement of the reason for the revision. Generalizations, such as general revision, do NOT provide meaningful information.
- List the procedure(s) that the new procedure replaces or requirements that the procedure implements.
- If the number of the procedure changes, cite the old number in the revision history to provide appropriate history and cross referencing.
- Add the approval date to the description of the revision for use in tracking periodic reviews.

C.2 Section Headings

- Headings break the text of the procedure into sections of related information. Sections help users locate information in the procedure, break up long series of actions into manageable portions, and track their progress through the procedure. Each type of procedure has its own defined set of first-level headings; second- and third-level headings are left to the discretion of the author and are based on the content of the procedure.
- Limit the number of heading levels to three, for example, 1.1.1. Excessive levels result in complex section numbers.
- Identify first-, second-, and third-level headings by a decimal numbering system.
- Begin all levels of headings at the left margin of the text block.
- Identify all first-level headings with all capital letters and bold type (see appropriate procedure template attached to this document for more details).
- Identify second- and third-level headings with initial capital letters of words (excluding prepositions, articles, conjunctions) and bold type.
- Be consistent in the grammatical form of the verbs used in all headings (e.g., all gerunds [verb form ending in "ing"], all action verbs [open, close] etc.)
- Use lists to organize material other than action steps under headings and action steps.

C.3 Prerequisites

- Detail prerequisites and initial conditions. Give careful consideration to the location of this information within the procedure in order to help ensure that the intent of the procedure is understood. In addition, verify any hoses, tools, or other temporary testing equipment as operable, calibrated, or inspected and in good condition where possible, before implementing any test procedure, to ensure that they function as expected during the test. Identify these verifications in the prerequisite section, with completion sign-offs required.

C.4 Level of Detail

- Ensure procedures contain sufficient but NOT excessive detail. Write procedures to a level of detail consistent with the qualifications and training of the expected users, the level of risk and complexity of the task, the frequency of task performance, and the degree of standardization desired. Job task analyses and training records provide information useful in assessing the level of detail required. When in doubt, write to the lowest common denominator. For ease of use and to reduce confusion, only include information in the procedure that relates directly to completing the task that is the subject of the procedure. Excessive detail may prompt users to ignore instructions and perform tasks from memory which is inappropriate. Too little detail can force users to seek outside assistance or can cause tasks to be performed inconsistently or incorrectly.
- Clearly delineate "Hold" points (requiring independent verification and/or approval). Hold point sign offs may be in the body of the procedure or in Attachments.
- Answer the following questions to determine if the amount and kind of information provided is adequate for the intended users:
  - Can the procedure be performed in the sequence it is written?
  - Can the user locate and identify all equipment referred to in the procedure?
  - Can the user explain in detail how to perform general instructions?
- Be specific on component or system shutdown and restoration requirements following shutdown or a surveillance or test activity controlled by the procedure.
- Develop procedures with consideration for the human-factor aspects of their intended use. For example, references to components SHOULD exactly match drawing and label-plate identifiers, units SHOULD be the same as those marked on applicable instrumentation, and make charts and graphs easily read and interpreted. Highlight important factors (such as operating limits, warnings, cautions, attentions, etc.).
- Provide technical and administratively accurate procedures (i.e., provide correct instructions and information; correctly identify referenced documents; and present necessary instructions to guide the user when transferring between procedures).
- Tables, figures, illustrations, charts, or graphs SHOULD be provided as applicable.
- The procedure DSME and DTW with concurrence of WETF management determines the necessary level of procedure complexity. To determine the appropriate level the "skill of the craft," as defined above, the performer **MUST** be considered.
- Ensure document contents are legible, consistently formatted, clearly organized, and minimize the use of referencing and branching.

C.5 Writing Style, Language, Terms, Definitions, Acronyms, and Abbreviations

Narrative prose and paragraph style are inappropriate for writing procedures.
Users of some types of procedures may be working under difficult or stressful conditions, therefore procedures SHOULD be written so that users can grasp the intended meaning quickly and easily. Use the following guidelines when writing the procedure:

- Facility-specific terms, definitions, acronyms, and abbreviations SHOULD be used to ensure consistent interpretation by the user.
- Define terms used in the procedure that are beyond skill of the craft.
- Use action statements to communicate procedure instructions to users.
- Maintain consistency in language (words, definitions) and format among instrument labeling, procedures, and training.
- Write instructions clearly. The users SHOULD NOT have to infer the meaning.
- Select vocabulary carefully. Use simple, common vocabulary that accurately reflects intended meaning and which is common and familiar in the context of the training users receive. Use technical terms when they are the most common and familiar terms to the users.
- Adhere to grammatical conventions and to the punctuation rules of standard American English, where practical.
- If necessary, rewrite sentences to avoid excessive punctuation.
- Avoid ambiguous words (e.g., "the right valve" SHOULD be rephrased as the "right-hand valve" and augmented by the specific valve name or number).
- Avoid vague adjectives and adverbs that are subject to interpretation. Specify quantities whenever possible (e.g., "Draining the tank at 10 gallons/minute" is preferable to "Drain the tank slowly").
- Limit the use of acronyms and abbreviations, particularly for short, simple words and terms. If an acronym or abbreviation is used, it **MUST** and have a standardized and unique meaning and be easily understood by the users.
- Use emphasis techniques (e.g., bold, italics, or underlining) to highlight important information, with the following constraints:
  - Do NOT use all capital letters for blocks of text
  - Do NOT capitalize the first letter of any words unless they are formal, proper nouns in accordance with standard American English usage or they are the first word of a sentence
  - avoid the overuse of multiple emphasis techniques
- Avoid using a separate section devoted to terms, definitions, and acronyms in technical procedures. Users SHOULD be adequately trained and familiar with the terms used in the technical procedure.

C.6 Numerical Information

- Maintain consistency in using numbers (e.g., 0, 1, 2) and spelled-out numbers (e.g., zero, one, two). Use spelled-out numbers when one number (less than 10) without a specified unit of measure is followed directly by one with a unit of measure (e.g., "Energize one 4.16 kV bus").

C.7 Basic Action Steps

The basic element of an action step is a command to perform a specific action.
An action step answers the question "what is to be done?" Different types of action steps add precision to instructions.

- If someone other than the primary procedure user is responsible for performing an action step, identify the person to perform the task directly above the affected action step.
- Start the basic action step with a singular present tense action verb such as "open".
- Write action steps using words that are easily understandable by the users.
- Complete the basic action step with supportive information about the action and the object of the action. Supportive information includes further description of the object.
- Use main action steps to allow users to quickly comprehend the purpose of the action step. Use action sub-steps to provide specific details for performance. Identify each action step with bold typeface number (e.g., 1, 2, etc.) and each action sub-step with bold typeface lower-case letters (e.g., a, b, etc.).
- Restructure the actions as needed to avoid using action sub-sub-steps. Break one section into two or more sections to simplify the action step structure if necessary.
- Include articles (a, an, the) when referring to a general item; omit the article when referring to specific items (e.g., "Open the valve," "Open valve V-167").

C.8 Conditional Action Steps

Conditional action steps are used when a decision is based upon the occurrence of a condition or a combination of conditions. The use of conditional action steps is extremely important in technical procedures as they structure the decisions required by the operator. Describe the condition first and then the action to be taken if that condition applies.

Conditional action steps use the following logic terms:

- IF or WHEN to present the condition to the user
- THEN to present the action
- OR or AND to present more complex conditions
- NOT to negate the condition

C.8 Conditional Action Steps (continued)

Additional rules for conditional action steps:

- Emphasize conditional terms in procedures.
- If two conditions are required and both of these conditions **MUST** be met, then place the conditional term AND between the conditions. Begin a new line when presenting the second condition and begin it with THEN and the action.
- If two conditions are involved and one or both of these conditions **MUST** be met before the action is taken, place the conditional term OR between the conditions. Begin a new line when presenting the second condition and begin it with THEN and the action.
- If there or more conditions are described, consider using a decision table or a listing format.
- Avoid using AND or OR in the same conditional statement as the resulting logic can be ambiguous and difficult to understand.
- Use only AND and OR to join conditions that include both a subject and a verb. If two subjects apply to the same verb (e.g., "IF temperature and pressure are stable…") or one subject takes two verbs (e.g., "IF level is stable or falling,…") use the un-emphasized conjunctions "and" or "or" rather than the special emphasized logic terms.
- For a negative condition, use the conditional term NOT. Avoid using NOT if a single word can be used and the condition can be stated in a positive manner (e.g., "IF the valve is open…" is preferable to "IF the valve is NOT closed…").

Other words (e.g., except, unless, but, only) SHOULD never be used to present conditional information.

C.9 Non-sequential Action Steps

- Procedure users SHOULD perform the action steps in the order they are written unless they are specifically directed to perform action steps in another order. When the objectives of the action steps will be met regardless of the sequence they are performed, then sequence the action steps according to usability criteria, such as according to equipment or layout, to reduce opportunities for error. Use a NOTE before the action steps to identify that the next series of action steps can be performed non-sequentially.

C. 10 Time-dependent Action Steps

- Some action steps contain actions that impose time requirements on the user by specifying the duration of actions or actions that **MUST** be completed within a specific period of time. Include guidance to identify the actions to take in the event that the time-dependent action step CANNOT be performed within the specified time. Use a NOTE before the actions steps to be timed in order to alert the user.

C.11 Concurrent Action Steps

- Concurrent action steps contain actions that **MUST** be performed at the same time. For example, parameters may have to be monitored or checked while the user accomplishes another action, or two performers in different locations may have to execute actions simultaneously.
- If concurrent action steps are to be performed by one person, place those actions in one action step that describes precisely the relationship between the action steps.
- If concurrent action steps are to be performed by more than one person, place a NOTE before the first concurrent action step, as appropriate, identifying:
  - concurrent action steps,
  - personnel needed to perform each concurrent action step,
  - locations where the action steps are performed, and/or
  - means of communication between locations.

C.12 Continuous Action Steps

- Continuous action steps are conditional action steps where the conditions they describe **MUST** be monitored throughout a procedure or a portion of a procedure. For example, a user may need to monitor a gauge and take a specific action if the gauge, at any point during the procedure, indicates a reading above or below a specific level.
- Place continuous action steps in the procedure at the point at which they first apply. Repeat the action steps periodically, as appropriate. Format continuous action steps as conditional action steps and state the portion of the procedure during which they are applicable. (e.g., IF at any time while performing Action steps [9] through [17] condition X exists, THEN take action Y.)
- Notify the user when continuous action steps are to be discontinued.

C.13 Action Steps Containing Verifications, Ensure Statements, Checks, Notifications, and Data Recording

- Verification action steps assure a specific activity has occurred or a stated condition exists.
  - If the condition to be verified or checked is NOT found, provide the appropriate actions to take.
  - Specify required independent verification and inspection action steps (the number of independent verification and inspection action steps increase as the consequences of performance error increase).
- Ensure action steps allow for manipulation by the user.
- Check action steps call for a comparison with stated requirements; and no manipulation by the user occurs.

C.13 Action Steps Containing Verifications, Ensure Statements, Checks, Notifications, and Data Recording (continued)

- Notification action steps require reporting when given criteria are met. Include directions for notifying other personnel as discrete action steps. Actions requiring notifications of others often include:
  - Systems to be removed from or returned to service.
  - Alarms and alarm setpoints that may annunciate as a result of performing the procedure.
  - Equipment actuations that are expected to occur during performance of the procedure.
- The effects of precautions and limitations on the operating conditions, noting which equipment will be inoperative and which lights, alarms, or annunciators will react.
- Data recording action steps assure desired data are recorded.
- Provide an appropriate space or table for entering data, preferably in a data sheet attachment to the procedure.

C.14 Actions Steps Directing Users Elsewhere – Branching and Referencing

To perform a task, sometimes users must branch or reference another procedure, section, or appendix. Branching routes the procedure user to other action steps or sections within the procedure or to other procedures, and the user does NOT return to the original position.

Referencing routes the procedure user to other action steps or sections within the procedure or to other procedures and, then back to the original position in the base procedure.

Branching and referencing increase the potential for error that could have safety and administrative consequences. Therefore, they are highly discouraged. Use branching and referencing only when it is necessary to direct the user to information that is vital to the performance of the activity and it is NOT appropriate to incorporate that information into the base procedure.

- Evaluate the following to determine if branching or referencing is appropriate. If the answer to all of the following is "NO", then branching or referencing may be appropriate.
  - Can action steps be readily incorporated rather than referenced?
  - Will branching and referencing decrease user comprehension and ease of use?
  - Will users be directed to small, isolated sections, rather than whole procedures or appendixes?
  - Will branching and referencing cause users to bypass prerequisites or precautions and limitations that affect the section to which they are being directed?

C.14 Actions Steps Directing Users Elsewhere – Branching and Referencing (continued)

- If branching or referencing is appropriate, then use the following methods.
- Make it clear to the users that they are being directed to other material. Do NOT expect them to know implicitly that other material is being referenced.
- Fully specify the location the user is to go when cross-referencing. If the user is being sent to another procedure, identify the procedure number, title, and section of the procedure. If the user is being sent to another location in the base procedure, identify the specific location in the procedure.
- If referencing, use the term "GO TO" presented in all capital letters to indicate departure from the base procedure and use the term "RETURN TO" to indicate the reentry point in to the base procedure. These terms are to be used in the same action step.

C.15 Action Steps with Acceptance Criteria

- Acceptance criteria provide a basis for determining the success or failure of an activity. Acceptance criteria may be qualitative (specify a given event that does or does NOT occur) or quantitative (specify a value or value range).
- State the location of acceptance criteria, whether located at individual action steps (used when criteria are satisfied at the time of performance) or located in data sheets. Include instructions for notifications to be made or actions to be taken immediately by the user, in the event that specified acceptance criteria are NOT met. Ensure these actions are consistent with administrative instructions.

C.16 Lists

- Nonsequential lists use bullets when the order of performance is NOT mandatory.
- Sequential lists use numbers or alphabetic characters when the order of performance is mandatory.

C.17 Warnings, Cautions, Attentions, and Notes

Warnings, cautions, attentions, and notes SHOULD be easily identifiable (each highlighted in a distinct, consistent manner) and SHOULD NOT contain action statements. Warnings, cautions, attentions and notes precede the step or steps to which they apply and **SHALL** appear on the same page.

C.17.1 Warnings and Cautions

Warnings and cautions attract attention to information that is essential to safe performance; they usually consist of the conditions, design limitations, practices, and procedures to be complied with to avoid loss of life, personal injury, health hazards, or damage to equipment.

- Warnings alert users to potential hazards to personnel.
- Cautions alert users to potential hazards to products or equipment.
- Warnings and cautions SHOULD provide a description of the hazardous condition, the consequences of failing to heed the warning or caution, and any critical time considerations.

C.17.2 Notes

Notes call attention to important supplemental information. The information can be a reminder of preparatory information needed to perform the activities of a procedure or action step. Notes pertain to action steps and precede the step or steps to which it applies. Place notes after warnings and cautions whenever more than one type is used at the same point in a procedure.

- Use notes to present information that assists the user in making decisions or improving task performance.
- Position notes so they are complete on one page and appear immediately before and on the same page as the action step(s) to which they apply.
- Do NOT include action steps in notes. Embedded actions are removed from the note and written as action steps.
- Include only one topic in each note.
- Avoid overuse of notes.

C.18 Instrument/Component Information

- Refer to instruments and components using both the equipment name and number. The equipment name is the verbatim equipment label. Ideally, there SHOULD only be one name in use for any given piece of equipment. Set the numeric identifier apart from the equipment name by placing it in parentheses after the common usage name.
- Do NOT require users to interpret ambiguous descriptors, such as “approximately” and “slowly” when referring to instrument information,
- Specify numbers in procedures at the same precision and the same units of measure that they are presented on instrument panel displays.
- Avoid requiring users to make conversions from one unit of measure to another whenever possible. Provide an aid for the user if conversions are essential.

C.19 Styles for Procedure Elements

Further guidance on procedure content is provided in DOE Order 422.1, *Conduct of Operations*, Attachment 2, *Program Requirements*, 2. *Specific Requirements*, p. *Technical Procedures*; and P315, Section 16. Where specific formatting conventions are NOT addressed, users are encouraged to apply the formatting guidelines in DOE-STD-1029-92, as applicable. For additional content and formatting, always use the latest procedure template, *WETF Procedure Template*, located in PDMlink in the WETF library under the TAB Templates. Qualification/Certification Training Standards have their own template and do NOT follow Appendix E requirements. Procedure Margins: Top 1.00", Bottom 1.00", Left 1.00", Right 1.00".

Cover (Title Page) Sheet	
TITLE	Font: Arial, 16 pt, Bold, All Caps, Centered, Line spacing: At least 12 pt, Space Before: 24 pt, After: 30 pt
Document Number	Font: Arial, 16 pt, Bold, All Caps, Centered, Line spacing: At least 12 pt, Space Before: 0 pt, After: 26 pt
Effective/Next Review Date	Font: Arial, 12 pt, Indent: Left 3.25", Line spacing: At least 12 pt, Before 0 pt, After 12 pt
Hazard Class	Font: Arial, 12 pt, Indent: Left, Line spacing: At least 12 pt, Before 0 pt, After 12 pt
Usage Mode	Font: Arial, 12 pt, Indent: Left, Line spacing: At least 12 pt, Before 0 pt, After 12 pt
Signatures	Font: Arial, 12 pt, Indent: Left, Line spacing: At least 12 pt , Before 0 pt, After 12 pt
Users have the ultimate responsibility...	Font: Arial, 12 pt, Bold, All Caps, Font Color: Dark red, Centered, Line spacing: At least 12 pt, Before 0 pt, After 12 pt
History of Revisions	
Header	Font: Times New Roman, 10 pt, Line spacing: At least 12 pt *Title*: Italic, Left Number, Before 0 pt, After 0 pt, Right, Date, Before 0 pt, After 0 pt, Right, Page: Before 0 pt, After 0 pt Underlined, Right, After 6 pt
Table Heading	Font: Times New Roman, 12 pt, Bold, Centered, Line spacing: At least 12 pt Space Before: 0 pt, After: 12 pt
Table Column Headers	Font: Times New Roman, 12 pt, Bold, Centered, Line spacing: At least 12 pt, Space Before: 3 pt, After: 3 pt,
Table Text	Font: Times New Roman, 12 pt, Left, Line spacing: At least 12 pt, Space Before: 3 pt, After: 3 pt

C.19 Styles for Procedure Elements (continued)

Table of Contents	
Header	Font: Times New Roman, 10 pt, Line spacing: At least 12 pt *Title*: Italic, Left Number, Before 0 pt, After 0 pt, Right, Date, Before 0 pt, After 0 pt, Right, Page: Before 0 pt, After 0 pt Underlined, Right, After 6 pt
Heading	Font: Times New Roman, 12 pt, Bold, Centered, Line spacing: At least 12 pt, Space Before: 0 pt, After: 12 pt
Table of Contents Text	Font: Times New Roman, 11 pt, Left, Font Color: Black, Hyperlink, Line spacing: At least 12 pt LEVEL ONE HEADING: ALL CAPS, Space Before: 0 pt, After: 6 pt Level Two Heading: Capitalize Each Word, Left Indent: 0.5”, Space Before: 0 pt, After: 4 pt Level Three Heading: Left Indent: 1.00”, Space Before: 0 pt, After: 4 pt
Procedure	
Header	Font: Times New Roman, 10 pt, Line spacing: At least 12 pt *Title*: Italic, Left Number, Before 0 pt, After 0 pt, Right, Date, Before 0 pt, After 0 pt, Right, Page: Before 0 pt, After 0 pt Underlined, Right, After 6 pt, continuous page numbering
SECTION LEVEL 1.0 HEADER	Font: Times New Roman, 12 pt, ALL CAPS, Bold, Left, Line spacing: At least 12 pt, Space Before: 0 pt, After: 12 pt
Section Level 1.1 Header	Font: Times New Roman, 12 pt, Bold, Left, Line spacing: At least 12 pt, Space Before: 0 pt, After: 12 pt
Section Level 1.1.1 Header	Font: Times New Roman, 12 pt, Bold, Left, Line spacing: At least 12 pt, Space Before: 0 pt, After: 12 pt
Body Text	Font: Times New Roman, 12 pt, Left, Line spacing: At least 12 pt, Space Before: 0 pt, After: 12 pt
Numbered List	Font: Times New Roman, 12 pt, Left 0.5", Hanging: 0.25”, Line spacing: At least 12 pt, Space Before: 0 pt, After: 4 pt
● Bullet List Level 1	Font: Times New Roman, 12 pt, Left 0.5", Hanging: 0.25”, Line spacing: At least 12 pt, Space Before: 0 pt, After: 4 pt, Bullet aligned: 0.5”, Tab after: 0.25”, Indent: 0.75”

C.19 Styles for Procedure Elements (continued)

Procedure (continued)	
➢ Bullet List Level 2	Font: Times New Roman, 12 pt, Left 0.75", Hanging: 0.25", Line spacing: At least 12 pt, Space Before: 0 pt, After: 4 pt, Bullet aligned: 0.75", Tab after: 0.25", Indent: 1.00"
– Bullet List Level 3	Font: Times New Roman, 12 pt, Left 1.00", Hanging: 0.25", Line spacing: At least 12 pt, Space Before: 0 pt, After: 4 pt, Bullet aligned: 1.00", Tab after: 0.25", Indent: 1.25"
Figure Caption	Font: Times New Roman, 12 pt, Bold, Centered, Line spacing: At least 12 pt, Space Before: 6 pt, After: 12 pt,
Table Caption	Font: Times New Roman, 12 pt, Bold, Centered, Line spacing: At least 12 pt, Space Before: 6 pt, After: 12 pt,
Table Column Headings	Font: Times New Roman, 12 pt, Bold, Centered, Line spacing: At least 12 pt, Space Before: 3 pt, After: 3 pt,
Table Title	Font: Times New Roman, 12 pt, Bold, Centered, Line spacing: At least 12 pt, Space Before: 3 pt, After: 3 pt,
Table Text	Font: Times New Roman, 12 pt, Left, Line spacing: At least 12 pt, Space Before: 3 pt, After: 3 pt,
Attachment/Appendix Title	Font: Times New Roman, 12 pt, Bold, Centered, Line spacing: At least 12 pt, Space Before: 0 pt, After: 12 pt,
Attachment/Appendix Text	Font: Times New Roman, 12 pt, Left, Line spacing: At least 12 pt, Space Before: 0 pt, After: 12 pt,

C.20 Use-Every-Time (UET) Procedure

Use-Every-Time (UET) procedures are used to perform specific evolutions or activities. These procedures provide step-by-step instructions for the performance of an activity or evolution, and require documented verification upon completion of selected steps. UET **SHALL** be placed in the header (for the applicable Sections or Attachments) to alert the user . UET procedure **MUST** be in hand during the performance of the procedure.

C.21 Data Collection Procedure

Data collection procedures are used when data **MUST** be collected, but only generalized instructional material is needed. Data Collection procedures are written to allow documentation of data and decisions made while performing steps. Data collection steps are written in accordance with reference procedure content. Performance of action steps can be done in accordance with reference procedure guidelines with data recording in accordance with Use-Every-Time procedure guidelines.

Round Sheets are <u>NOT</u> considered Data Collection Procedures.

C.22 Reference Procedure

Reference procedures describe routine activities, often referred to as generalized instructional material. These procedures do NOT require documented verification upon satisfactory completion of the individual steps or the complete task. Reference procedures are NOT required to be located at the work location but **MUST** be readily available upon request.