U.S. Department of Energy
Washington, D.C.

ORDER

DOE O 422.1

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Chg 1: 6-25-2013
Chg 2: 12-3-2014
Certified: 12-3-2014
Chg 3 (MinChg): 10-4-2019
Chg 4 (LtdChg): 2-3-2022

SUBJECT: CONDUCT OF OPERATIONS

1. PURPOSE. The objective of this Order is to define the requirements for establishing and implementing Conduct of Operations Programs at Department of Energy (DOE), including National Nuclear Security Administration (NNSA), facilities and projects. A Conduct of Operations Program consists of formal documentation, practices, and actions implementing disciplined and structured operations that support mission success and promote worker, public, and environmental protection. The goal is to minimize the likelihood and consequences of human fallibility or technical and organizational system failures. Conduct of Operations is one of the safety management programs recognized in the Nuclear Safety Rule [Title 10 Code of Federal Regulations (CFR) Part 830, Nuclear Safety Management], but it also supports safety and mission success for a wide range of hazardous, complex, or mission-critical operations, and some conduct of operations attributes can enhance even routine operations. It supports the Integrated Safety Management (ISM) System by providing concrete techniques and practices to implement the ISM Core Functions of Develop and Implement Hazard Controls and Perform Work Within Controls. It may be implemented through facility policies, directives, plans, and safety management systems and need not be a stand-alone program.

   The term "operations" encompasses the work activities of any facility or organization, from building infrastructure, to print shops and computer centers, to scientific research, and to nuclear facilities. While many hazards can be dealt with through engineered solutions, people still have to perform operations, and they can and do make mistakes. The purpose of this Order is to ensure that management systems are designed to anticipate and mitigate the consequences of human fallibility or potential latent conditions and to provide a vital barrier to prevent injury, environmental insult or asset damage, and to promote mission success.

2. CANCELLATION. DOE O 5480.19, *Conduct of Operations Requirements for DOE Facilities,* dated 7-9-90.

   Cancellation of a directive does not, by itself, modify or otherwise affect any contractual or regulatory obligation to comply with the directive. Contractor Requirements Documents (CRDs) that have been incorporated into a contract remain in effect throughout the term of the contract unless and until the contract or regulatory commitment is modified to either eliminate requirements that are no longer applicable or substitute a new set of requirements.

3. APPLICABILITY.

a. Departmental Applicability. This Order applies to all Departmental elements involved in operation of

(1) DOE Hazard Category 1, 2, and 3 nuclear facilities per DOE Technical Standard (DOE-STD) 1027-92 Change 1, Hazard Categorization and Accident Analysis Techniques for Compliance with DOE Order 5480.23, Nuclear Safety Analysis Reports.

(2) Accelerator, explosives, laser, nanotechnology, biohazard, chemical, or other facilities only when designated by DOE Line Management.

(3) The Administrator of the National Nuclear Security Administration (NNSA) must assure that NNSA employees comply with their responsibilities under this directive. Nothing in this directive will be construed to interfere with the NNSA Administrator's authority under section 3212(d) of Public Law (P.L.) 106-65 to establish Administration-specific policies, unless disapproved by the Secretary.

b. DOE Contractors. Except for the equivalencies/exemptions in paragraph 3.c, the Contractor Requirements Document (CRD), Attachment 1, sets forth requirements of this Order that will apply to contracts that include the CRD.

(1) The CRD must be included in contracts that involve operation of DOE Hazard Category 1, 2, or 3 nuclear facilities.

(2) The CRD must be included in other contracts that involve operation of accelerator, explosives, laser, nanotechnology, biohazard, chemical, or other facilities only when designated by DOE Line Management.

c. Equivalencies/Exemptions for DOE O 422.1. Equivalencies and exemptions to this Order are processed in accordance with DOE O 251.1, *Departmental Directives Program*, current version. Central Technical Authority (or designee) concurrence is required for both exemptions and equivalencies to this Order for nuclear facilities.

(1) Equivalency. In accordance with the responsibilities and authorities assigned by Executive Order 12344, codified at 50 USC sections 2406 and 2511 and to ensure consistency throughout the joint Navy/DOE Naval Nuclear Propulsion Program, the Deputy Administrator for Naval Reactors (Director) will implement and oversee requirements and practices pertaining to this Directive for activities under the Director's cognizance, as deemed appropriate.

(2) Exemption. In accordance with Section 302 of the Department of Energy Organization Act (Public Law 95-91), the Secretary operates and

maintains the Power Marketing Administration (PMA) electric power transmission systems by and through the PMA Administrators. The PMAs have in place operations management programs which are geared to the special needs of utility operations, are responsive to coordinated multi-utility system requirements, and are in conformance with prudent utility practice. In view of the unique nature of the Administrators' obligations to meet their statutory and public utility responsibilities for the safety, security, and reliability of electric power transmission and of their legal and contractual obligation, the Administrators shall determine the appropriate operations management program for their facilities, which will include consideration of appropriate parts of the criteria set forth by this Order.

(3) Exemption. This Order does not apply to facilities that are subject to regulation by other Federal agencies such as the U.S. Nuclear Regulatory Commission.

4. REQUIREMENTS. The general approach to implementing this Order is for contractors (or DOE organizations in the case of Government owned-Government operated (GO/GO) facilities) to develop, for DOE line management approval, documentation demonstrating implementation of the requirements in the CRD (or Attachment 2 for GO/GOs). DOE line management means the federal officials such as Secretarial Officers and Heads of Field Elements responsible for DOE facilities and operations. It is not necessary to develop new documents to demonstrate implementation, but at a minimum to provide a Conduct of Operations Matrix, which is a list of CRD requirements, citing the specific documentation (e.g., procedure, manual) that implements each item, or providing justification for each item that is not implemented.

a. DOE line management must determine which facilities, other than Hazard Category 1, 2, and 3 nuclear facilities, require implementation of this Order, considering the hazards, consequences of operational mishaps, and impact of disruptions to mission. Hazard Category 1, 2, and 3 nuclear facilities are subject to this Order automatically.

b. DOE line management must provide appropriate oversight of conduct of operations. Field organizations must assign DOE facility representatives to oversee conduct of operations in accordance with DOE–STD-1063-2021, *Facility Representatives*.

c. DOE line management must review and approve documentation prepared by the contractor demonstrating conformance to the requirements in the CRD.

d. When reviewing the documentation cited in paragraph 4.c. above, DOE line management must refer to this Order and should be familiar with the cited DOE Technical Standards that detail applicable good practices for each of the specific requirements areas in the CRD.

e. DOE line management must review and approve the documentation cited in paragraph 4.c. above at its inception, when changes in conditions require changes in the documentation, and at least every three years or as directed by the field element manager. It is not intended that minor administrative changes and corrections or routine updates to cited documents would require new DOE approval.

f. For activities and programs at GO/GO facilities, DOE line management must perform the requirements in Attachment 2 and the review and approval per paragraphs 4.c., d., and e. above. Review and approval must be performed by officials in a management tier above the organization performing Attachment 2 items

g. Full implementation of the requirements in this Order must be accomplished within one year of its issuance, unless a different implementation schedule is approved by the Program Secretarial Officer with concurrence of the Central Technical Authority per DOE O 410.1, *Central Technical Authority Responsibilities Regarding Nuclear Safety Requirements*, current version.

5. RESPONSIBILITIES.

a. Program Secretarial Offices (PSOs).

(1) Determine the applicability of this Order to those facilities under their cognizance that are other than Hazard Category 1, 2, or 3 nuclear facilities.

(2) For GO/GO activities under their cognizance, approve or designate the approval authority for conduct of operations documentation prepared in accordance with Attachment 2.

b. Office of Environment, Health Safety and Security.

(1) Develops formal interpretations of the requirements of this Order.

(2) Develops, promulgates, and maintains conduct of operations policy, standards, and guidance materials, and conducts training, as necessary, for implementing the requirements of this Order.

c. Office of Enterprise Assessments.

Plans and conducts assessments to determine compliance with the requirements of this Order, in accordance with DOE O 227.1, *Independent Oversight Program*, current version.

d. Heads of Field Elements.[1]

(1) Notify contracting officers to incorporate the CRD into the affected contracts (considering the hazards and mission impact of the operations) via the Laws, regulations, and DOE directives clause (DEAR 970.5204-2) for those contracts that contain this clause. For contracts that do not contain DEAR 970.5204-2, request that the contracting officer attempt to get the CRD incorporated into the contract via a contract modification. Notify contracting officers in advance to include the requirements of the CRD in the terms and conditions of any request for proposals for any new contracts.

(2) Provide direction and oversight for the development and implementation of conduct of operations applicability matrices, manuals, plans, procedures, and programs consistent with the provisions of this Order. Perform oversight of the contractor's conduct of operations performance.

(3) Review and approve the documentation prepared by the contractor demonstrating conformance to the specific requirements stated in the CRD.

(4) Assign DOE facility representatives to oversee conduct of operations in accordance with DOE-STD-1063-2021, *Facility Representatives*.

e. Contracting Officers. Modify contracts to incorporate the Contractor Requirements Document.

6. INVOKED STANDARDS. The following DOE technical standards and industry standards are invoked as required methods in this Order in accordance with the applicability and conditions described within this Order. Any technical standard or industry standard that is mentioned in or referenced by this order, but is not included in the list below, is not invoked by this Order. Note: DOE O 251.1D, Appendix J provides a definition for "invoked technical standard."

DOE-STD-1063-2021, *Facility Representatives*. This DOE Technical Standard is required to be used by DOE Field Elements for the management of Facility Representative programs.

7. REFERENCES.

a. Title XXXII of P.L. 106-65, National Nuclear Security Administration Act, as amended, which established a separately organized agency within the Department of Energy.

[1] Operations offices, service centers, site offices, area offices, field offices, project management offices, and regional offices of federally staffed laboratories.

b. DOE O 151.1 *Comprehensive Emergency Management System*, current version.

c. DOE O 205.1, *Department of Energy Cyber Security Program*, current version.

d. DOE O 225.1, *Accident Investigations*, current version.

e. DOE O 226.1, *Implementation of Department of Energy Oversight Policy*, current version.

f. DOE O 227.1, *Independent Oversight Program*, dated current version.

g. DOE O 232.2, *Occurrence Reporting and Processing of Operations Information*, current version.

h. DOE O 251.1, *Departmental Directives System*, current version.

i. DOE O 410.1, *Central Technical Authority Responsibilities Regarding Nuclear Safety Requirements*, current version.

j. DOE O 470.4B, *Safeguards and Security Program*, current version.

k. DOE-STD-1027-92 (CH-1), *Hazard Categorization and Accident Analysis Techniques for Compliance with DOE Order 5480.23, Nuclear Safety Analysis Reports.*

l. DOE-STD-1063-2021, *Facility Representatives.*

m. National Fire Protection Association (NFPA) 70E: *Standard for Electrical Safety in the Workplace.*

n. Title 29, Code of Federal Regulations Part 1910, *Occupational Safety and Health Standards.*

o. Title 29, Code of Federal Regulations Part 1926, *Safety and Health Regulations for Construction.*

p. Procedure Professionals Association Standard PPA AP-907-001, *Procedure Process Description*, Revision 2 dated January 2016 (available at www.ppaweb.org).

q. Procedure Professionals Association Standard PPA AP-907-005, *Procedure Writer's Manual,* Revision 2 dated February 2016 (available at www.ppaweb.org).

8. DEFINITIONS.

a. At-the-Controls Area. A designated area where special access and controls are necessary. Examples are the space in front and to the immediate sides of a control

panel, control station, computer terminal, etc., or the area where facility, work station, or experiment controls (e.g., switches, knobs, buttons) are located. (DOE-STD-1042-93 (CH-1))

b. Certification. The process by which facility management provides written endorsement of the satisfactory achievement of qualification of a person for a position. (DOE O 426.2)

c. Concurrent Dual Verification. A method of checking an operation, an act of positioning, or a calculation, in which the verifier independently observes and/or confirms the operation or calculation. (DOE-STD-1036-93 (CH-1))

d. Conduct of Operations Program. The formal documentation, practices, and actions implementing disciplined and structured operations that support mission success and ensure worker, public, and environmental protection. The program goal is to minimize the likelihood and consequences of human fallibility or technical and organizational system failures.

e. Control Area. The physical area (e.g., room, booth, desk) where the facility or portions of the facility operations are monitored and controlled. (DOE-STD-1042-93 (CH-1).

f. Facility Representative. An individual assigned responsibility by the Field Element Manager (or designee) for monitoring the safe and efficient performance of the site/facility and its operations. This individual is the primary point of contact with the contractor for operational and safety oversight and is responsible to the site's/facility's DOE Line Manager. (DOE-STD-1063-2021)

g. Independent Verification. The act of checking, by a separate qualified person, that a given operation or component position conforms to established criteria. (DOE-STD-1036-93 CH-1)

h. Interrelated Processes. Those 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.

i. Operations. The general term to encompass the work activities accomplished by the facility or project. Examples include, but are not limited to, operating science and technology machines, operating equipment, construction, decontamination and decommissioning, dismantlement, environmental characterization and monitoring activities, waste handling, research and development, maintenance, and laboratory analysis activities.

j. Operator Aids. Approved, posted information used to assist personnel in performing a task. Examples are copies of procedures (portion or pages thereof), system drawings, information tags, curves, graphs, or prints. (DOE-STD-1043-93 (CH-1)

k. Qualification. Education, experience, training, examination, and any special requirements necessary to perform assigned responsibilities for a given position. (DOE O 426.2)

l. Shift. The normal period of work for an individual or group, e.g. 8:00am to 5:00 pm. (DOE STD 1041-93 (CH-1)

9. CONTACT. Questions concerning this Order should be addressed to the Office of Nuclear Safety at 301-903-3331.

BY ORDER OF THE SECRETARY OF ENERGY:

DAN BROUILLETTE
Deputy Secretary

CONTRACTOR REQUIREMENTS DOCUMENT
DOE O 422.1, *Conduct of Operations*

Regardless of the performer of the work, the contractor is responsible for complying with the requirements of this CRD. The contractor is responsible for flowing down the requirements of this CRD to subcontractors at any tier to the extent necessary to ensure the contractor's compliance with the requirements.

Contractors must implement the requirements set forth in Attachment 2, Conduct of Operations Program Requirements, which provides program requirements applicable to contracts in which this CRD is inserted.

PROGRAM REQUIREMENTS

This Attachment provides Conduct of Operations program requirements applicable to contracts in which the CRD (Attachment 1 to DOE O 422.1) is inserted. This Attachment also provides the program requirements applicable to Government Owned-Government Operated (GO/GO) facilities subject to DOE O 422.1, Paragraph 4, Requirements.

In Paragraph 2, Specific Requirements, of this Attachment, each topic references the related DOE Technical Standard or a consensus standard to provide further explanatory material and examples, but not requirements. Each topical area of the specific requirements is expanded into detailed program attributes in Appendix A, Detailed Conduct of Operations Matrix. Throughout this Attachment, the term "operator" means the contractor or federal entity or organization responsible for operation of a facility.

1. GENERAL REQUIREMENTS.

   a. Conduct of Operations Program Development:

      (1) For Hazard Category 1, 2, and 3 nuclear facilities, the operator must develop and implement a conduct of operations program using the specific requirements in paragraph 2 below and the attributes of the Detailed Conduct of Operations Matrix in Appendix A, unless a different set of detailed attributes is approved by the Program Secretarial Officer with concurrence of the Central Technical Authority per DOE O 410.1, *Central Technical Authority Responsibilities Regarding Nuclear Safety Requirements*, current version.

      (2) For other than Hazard Category 1, 2, and 3 nuclear facilities, DOE line management may specifically direct development and implementation of a conduct of operations program using the specific requirements in paragraph 2 below, and, if further directed by DOE line management, the detailed attributes of Appendix A.

      (3) Implementation is demonstrated by providing, at a minimum, a Conduct of Operations Matrix, consisting of entries for each specific requirement in paragraph 2 [and, if required by 1.a.(1) or 1.a.(2) above, each detailed attribute in Appendix A], with either a citation of the specific documentation (e.g., procedure, manual) that implements the item, or a justification for each item that is not implemented. This justification is not considered an "exemption" under DOE O 251.1, *Departmental Directives Program*, current version, and does not invoke that process. The Conduct of Operations Matrix may be provided through direct use of Appendix A or by use of equivalent documents or electronic systems.

   b. The operator must obtain DOE line management approval of the Conduct of Operations Matrix or other documentation demonstrating conformance with the specific requirements.

c. An operator with an approved Conduct of Operations Matrix previously submitted in accordance with DOE O 5480.19 must submit either an addendum or page changes to the matrix to reflect the changes made as a result of the implementation of this Attachment. If no changes are needed, a memorandum to that effect may be submitted as the addendum. Changes or requests for time extensions must be submitted to DOE for approval within 90 days from the date this Attachment becomes binding.

d. The operator must review, update, and obtain approval of documentation demonstrating conformance at inception, when changes in conditions require changes in the documentation, and at least every three years or as directed by DOE. If after the review, no changes are required to the documentation demonstrating conformance to the requirements, a memorandum to that effect may be submitted. It is not intended that minor administrative changes and corrections or routine updates to cited documents would require new DOE approval.

2. SPECIFIC REQUIREMENTS.

a. Organization and Administration. (DOE-STD-1032-92 (CH-1), *Guide to Good Practices for Operations Organization and Administration*)

The operator must establish policies, programs, and procedures that define an effective operations organization, including the following elements:

(1) organizational roles, responsibilities, authority, and accountability;

(2) adequate material and personnel resources to accomplish operations;

(3) monitoring and self-assessment of operations (See DOE O 226.1, *Implementation of Department of Energy Oversight Policy*, current version)

(4) management and worker accountability for the safe performance of work;

(5) management training, qualification, succession, and, when appropriate, certification;

(6) methods for the analysis of hazards and implementation of hazard controls in the work planning and execution process; and

(7) methods for approving, posting, maintaining, and controlling access to electronic operations documents (procedures, drawings, schedules, maintenance actions, etc.) if electronic documents are used.

b. Shift Routines and Operating Practices. (DOE-STD-1041-93 (CH-1), *Guide to Good Practices for Shift* Routines *and Operating Practices*)

The operator must establish and implement operations practices to ensure that shift operators are alert, informed of conditions, and operate equipment properly, addressing the following elements:

(1) prompt notification to operating personnel and supervisors of changes in the facility status, abnormalities, or difficulties encountered in performing assigned tasks;

(2) adherence by operating personnel and other workers to established safety requirements;

(3) awareness by operating personnel of the status of equipment through inspection, conducting checks, and tours of equipment and work areas;

(4) procedures for completing round sheets or inspection logs, responding to abnormal conditions, and periodic supervisory reviews of round sheets or inspection logs;

(5) procedures for protecting operators from personnel hazards, e.g. chemical, radiological, laser, noise, electromagnetic, toxic, or nano-scale materials;

(6) prompt response to instrument indications, including the use of multiple indications to obtain parameters;

(7) procedures for resetting protective devices;

(8) authorization to operate facility equipment;

(9) designating shift operating bases and providing equipment for them; and

(10) professional and disciplined operator performance of duties.

c. Control Area Activities. (DOE-STD-1042-93 (CH-1), *Guide to Good Practices for Control Area Activities*)

The operator must establish and implement operations practices that promote orderly, business-like control area operations and address the following elements:

(1) control-area access;

(2) formality and discipline in the control and at-the-controls areas;

(3) surveillance of control panels and timely response to determine and correct the cause of abnormalities/out-of-specification conditions;

(4) limitation of the number of concurrent evolutions and duties, and

(5) authorization to operate control area equipment.

d. Communications. (DOE-STD-1031-92 (CH-1), *Guide to Good Practices for Communications*)

The operator must establish and implement operations practices that ensure accurate, unambiguous communications among operations personnel and address the following elements:

(1) provision of communications systems for emergency and normal operations;

(2) administrative control of communications equipment, including authorization to use the public address system and allowable locations and purposes for radio use;

(3) methods for control areas to contact operators and supervisors;

(4) use of abbreviations and acronyms; and

(5) use of oral instructions and communications, including use of repeat-backs and sender/receiver identifications.

e. On-Shift Training. (DOE-STD-1040-93 (CH-1), *Guide to Good Practices for Control of On-Shift Training*)

The operator must establish and implement operations practices that control on-shift training of facility operators, prevent inadvertent or incorrect trainee manipulation of equipment, and address the following elements:

(1) on-shift training program;

(2) authorization and documentation of training activities;

(3) supervision and control of personnel under instruction by qualified personnel; and

(4) facility conditions and controls for conducting training during operational activities, including suspension of training during unanticipated or abnormal events.

f. Investigation of Abnormal Events, Conditions, and Trends. (DOE-STD-1045-93 (CH-1), *Guide to Good Practices for Notifications and Investigation of Abnormal Events*)

The operator must establish and implement operations practices for investigating events to determine their impact and prevent recurrence, addressing the following elements:

(1) specific events requiring investigation, and criteria for identifying other events or conditions to be investigated;

(2) designation of investigators and their training and qualification;

(3) investigation process and techniques;

(4) causal analysis and corrective action determination;

(5) event investigation reporting, training, and trending; and

(6) response to known or suspected sabotage.

Operators should integrate related requirements in DOE O 232.2, *Occurrence Reporting and Processing of Operations Information*, current version, and DOE O 225.1, *Accident Investigations,* current version.

g. Notifications. (DOE-STD-1045-93 (CH-1), *Guide to Good Practices for Notifications and Investigation of Abnormal Events*)

The operator must establish and implement operations practices to ensure appropriate event notification for timely response, addressing the following elements.

(1) procedures for internal, DOE, and external notifications, including events, persons to be notified, persons responsible to make notifications, contact information, and recordkeeping; and

(2) communications equipment for notifications.

Operators should integrate related requirements found in DOE O 232.2, *Occurrence Reporting and Processing of Operations Information*, current version; DOE O 151.1, *Comprehensive Emergency Management System*, current version; DOE O 470.4, *Safeguards and Security Program*, current version; and DOE O 205.1, *Department of Energy Cyber Security Program*, current version, and applicable regulatory notification requirements.

h. Control of Equipment and System Status. (DOE-STD-1039-93 (CH-1), *Guide to Good Practices for Control of Equipment and System Status*)

The operator must establish and implement operations practices for initial equipment lineups and subsequent changes to ensure facilities operate with known, proper configuration as designed, addressing the following elements:

(1) authorization for, and awareness of, equipment and system status changes;

(2) initial system alignment, and maintaining control of equipment and system status through startup, operation, and shutdown, and documentation status;

(3) use and approval of lockouts and tagouts for administrative control of equipment status (see also paragraph 2.i);

(4) operational limits compliance and documentation;

(5) management of equipment deficiencies, maintenance activities, post-maintenance testing, and return to service;

(6) awareness and documentation of control panel and local alarm issues;

(7) control of temporary equipment modifications and temporary systems; and

(8) configuration control and distribution of engineering documents.

i. Lockout and Tagouts. (DOE-STD-1030-96, *Guide to Good Practices for Lockouts and Tagouts*)

(1) The operator must establish and implement operations practices that address the following elements for the installation and removal of lockout/tagouts for the protection of personnel:

(a) procedures, roles and responsibilities associated with the development, documentation, review, installation, and removal of a lockout/tagout;

(b) compliance with Occupational Safety and Health Administration Rules, 29 CFR Part 1910 and/or 29 CFR Part 1926, requirements for the protection of workers using Lockout/Tagout;

(c) compliance with National Fire Protection Association Standard 70E electrical safety requirements using lockout/tagout;

(d) description and control of the tags, locks, lockboxes, chains, and other components utilized for the lockout/tagout program; and

(e) training and qualification in lockout/tagout and special considerations for DOE facilities, e.g., operational limitations, or seismic issues from the mass of locks or chains.

(2) The operator must establish and implement operations practices that address the following elements for the installation and removal of caution tags for equipment protection or operational control:

(a) roles and responsibilities associated with the development, documentation, review, installation, and removal of caution tags to convey operational information or equipment alignments for protection of equipment;

(b) description and control of the tags; and

(c) measures to prevent relying on caution tags for personnel protection.

j. Independent Verification. (DOE-STD-1036-93 (CH-1), *Guide to Good Practices for Independent Verification*)

The operator must establish and implement operations practices to verify that critical equipment configuration is in accordance with controlling documents, addressing the following elements:

(1) structures, systems, components, operations, and programs requiring independent verification;

(2) situations requiring independent verification;

(3) methods for performing and documenting independent verification;

(4) situations, if any, allowing concurrent dual verification; and

(5) methods for performing concurrent dual verification, if used.

k. Logkeeping. (DOE-STD-1035-93 (CH-1), *Guide to Good Practices for Logkeeping*)

The operator must establish and implement operations practices to ensure thorough, accurate, and timely recording of equipment information for performance analysis and trend detection, addressing the following elements:

(1) narrative logs at all key positions, as defined by management, for the recording of pertinent information;

(2) prompt and accurate recording of information;

(3) type, scope, and format for log entries;

(4) method for recording late entries and correcting erroneous entries without obscuring the original entry;

(5) periodic supervisory reviews for accuracy, adequacy, and trends; and

(6) document retention requirements.

l. Turnover and Assumption of Responsibilities. (DOE-STD-1038-93 (CH-1), *Guide to Good Practices for Operations Turnover*)

The operator must establish and implement operations practices for thorough, accurate transfer of information and responsibilities at shift or operator relief to ensure continued safe operation, addressing the following elements:

(1) definitions for all key positions requiring a formal turnover process;

(2) turnover of equipment/facility status, duties, and responsibilities that results in the safe and effective transfer of equipment status and in-progress or planned activities from one shift or workgroup to the next; and

(3) process for reliefs during a shift.

m. Control of Interrelated Processes. (DOE-STD-1037-93 (CH-1), *Guide to Good Practices for Operations Aspects of Unique Processes*)

The operator must establish and implement operations practices to ensure that interrelated processes do not adversely affect facility safety or operations, addressing the following elements:

(1) defined responsibilities with respect to the control of interrelated processes (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);

(2) operator training and qualification to understand interrelated processes, to interpret instrument readings, and provide timely corrective action for process-related problems; and

(3) establish lines of communication between operating personnel, process support personnel, and other interrelated process operators for coordination of activities.

n. Required Reading. (DOE-STD-1033-92 (CH-1), *Guide to Good Practices for Operations and Administration Updates Through Required Reading*)

The operator must establish and implement operations practices for an effective required reading program to keep operators updated on equipment or document changes, lessons learned, or other important information, addressing the following elements:

(1) identification of material to be distributed via required reading;

(2) identification of which personnel are required to read specific required reading items; and

(3) distribution of required reading to appropriate personnel and documentation of their timely completion.

o. Timely Instructions/Orders. (DOE-STD-1034-93 (CH-1), *Guide to Good Practices for Timely Orders to Operators*)

The operator must establish and implement operations practices for timely written direction and guidance from management to operators, addressing the following elements:

(1) appropriate circumstances for the use of timely instructions/orders;

(2) designated levels of review and approval prior to issuance;

(3) configuration control of timely instructions/orders; and

(4) distribution of timely instructions/orders to appropriate personnel and documentation of their receipt and understanding.

p. Technical Procedures. (Procedure Professionals Association Standards PPA AP-907-001, *Procedure Process Description,* Rev 2, Jan 2016; and PPA AP-907-005, *Procedure Writer's Manual,* Rev 2, Feb 2016)

The operator must establish and implement operations practices for developing and maintaining accurate, understandable written technical procedures that ensure safe and effective facility and equipment operation, addressing the following elements:

(1) expectations for the use of procedures to perform operations;

(2) a process for procedure development;

(3) procedure content, including consistent format and use of terms (e.g. prerequisites, warnings, cautions, notes, hold points, etc.), detail sufficient for accomplishing the operation, technically accurate procedures capable of performance as written, and procedure conformance with the facility design and manufacturer documentation;

(4) a process for procedure changes (pen and ink or page changes) and revisions (complete reissues);

(5) a process for training personnel on new, revised, or changed procedures;

(6) a process for approval of new, revised, or changed procedures;

(7) initial-issue and periodic review and testing of procedures;

(8) availability and use of the latest revisions of procedures; and

(9) specified and defined procedure use requirements, i.e., reader-worker method, reference use only, use-each-time, and emergency response.

q. Operator Aids. (DOE-STD-1043-93 (CH-1), *Guide to Good Practices for Operator Aid Postings*)

The operator must establish and implement operations practices to provide accurate, current, and approved operator aids, addressing the following elements:

(1) technical evaluation and management approval of operator aids;

(2) operator aids serve as conveniences, not operational requirements;

(3) operator aids do not obscure equipment;

(4) administrative control of installed operational aids; and

(5) periodic review for adequacy and correctness.

r. *Component Labeling*. (DOE-STD-1044-93 (CH-1), Guide to Good Practices for Equipment and Piping Labeling)

The operator must establish and implement operations practices for clear, accurate equipment labeling, addressing the following elements:

(1) components that require a label;

(2) label information that uniquely identifies components and is consistent with regulations, standards, and facility documents;

(3) durable and securely attached labels that do not interfere with controls or equipment; and

(4) administrative control of labels, including a process for promptly identifying and replacing lost or damaged labels, preventing unauthorized or incorrect labels, and control of temporary labels.

3. DEFINITIONS.

a. At-the-Controls Area. A designated area where special access and controls are necessary. Examples are the space in front and to the immediate sides of a control panel, control station, computer terminal, etc.; or the area where facility, work station, or experiment controls (e.g., switches, knobs, buttons) are located. (DOE-STD-1042-93 CH-1)

b. Certification. The process by which facility management provides written endorsement of the satisfactory achievement of qualification of a person for a position. (DOE O 426.2)

c. Concurrent Dual Verification. A method of checking an operation, an act of positioning, or a calculation, in which the verifier independently observes and/or confirms the operation or calculation. (DOE-STD-1036-93 (CH-1))

d. Conduct of Operations Program. The formal documentation, practices, and actions implementing disciplined and structured operations that support mission

success and ensure worker, public, and environmental protection. The program goal is to minimize the likelihood and consequences of human fallibility or technical and organizational system failures.

e. Control Area. The physical area (e.g., room, booth, desk) where the facility or portions of the facility operations are monitored and controlled. (DOE-STD-1042-93 CH-1)

f. Independent Verification. The act of checking, by a separate qualified person, that a given operation or component position conforms to established criteria. (DOE-STD-1036-93 CH-1)

g. Interrelated Processes. Those 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.

h. Operations. The general term to encompass the work activities accomplished by the facility or project. Examples include, but are not limited to, operating science and technology machines, operating equipment, construction, decontamination and decommissioning, dismantlement, environmental characterization and monitoring activities, waste handling, research and development, maintenance, and laboratory analysis activities.

i. Operator Aids. Approved, posted information used to assist personnel in performing a task. Examples are copies of procedures, (portion or pages thereof), system drawings, information tags, curves, graphs, or prints. (DOE-STD-1043-93 (CH-1))

j. Qualification. Education, experience, training, examination, and any special requirements necessary to perform assigned responsibilities for a given position. (DOE O 426.2)

k. Shift. The normal period of work for an individual or group, e.g. 8:00am to 5:00 pm. (DOE STD 1041-93 (CH-1)

APPENDIX A. CONDUCT OF OPERATIONS
DETAILED CONDUCT OF OPERATIONS MATRIX

This Appendix consists of a series of tables comprising a Conduct of Operations Matrix for documenting implementation of conduct of operations requirements at Hazard Category 1, 2, and 3 nuclear facilities, plus others as designated by DOE Line Management. Each of the topics in the specific requirements in Attachment 2, Conduct of Operations Program Requirements, is expanded to list program attributes that implement that Conduct of Operations Program topic. The Paragraph 2 specific requirements are listed in Column 1, and detailed attributes of these high-level requirements are listed in Column 2. Column 3 is for entering the document citation where the item is implemented, or for entering the justification for its non applicability, or, if the item is partially applicable, both a citation and a justification.

Instructions for filling out the Matrix:

Use the boxes in Column 1 and on the right of Column 2 to indicate whether the item is Applicable (A), Not Applicable (N) or Partially Applicable (P).

If an entire topic (top item of each topic's Column 1) is deemed Not Applicable, mark it and enter the justification only once. Otherwise leave the box blank and address the remaining items in Column 1, since it is assumed they could have different citations in Column 3.

If an item is marked Applicable in Column 1, all items in Column 2 are to be implemented, and the implementing document(s) are entered in Column 3. It is not necessary to repeatedly list the same implementing document for the detailed attributes under a higher-level item.

For items marked Partially Applicable in Column 1, indicate in Column 2 whether each item is Applicable, Not Applicable, or Partially Applicable in the same manner as for Column 1.

For items marked Applicable or Partially Applicable, enter the operator's implementing document citation in Column 3.

For items marked Partially Applicable or Not Applicable, enter the justification for this determination in Column 3.

If an entire Column 1 item is marked Applicable, enter the document citation only once, unless different attributes are in different documents.

If an entire Column 1 item is marked Not Applicable, enter the justification only once.

Organization and Administration, Attachment 2 Paragraph 2.a			
1 Requirements, Attachment 2 ¶ 2.a	2 Detailed Attributes		3 Doc Citation /Justification
2.a. The operator must establish policies, programs, and procedures that define an effective operations organization, including the following elements: ☐			
2.a.(1) Organizational roles, responsibilities, authority, and accountability ☐	a. Written policies state goals for operations, safety, and security, the means to achieve them, and the controls instituted for the Conduct of Operations Program.		
	b. Policies and procedures implement DOE requirements for operations.		
	c. Policies and procedures implement DOE safety requirements.		
	d. Policies and procedures implement DOE security requirements.		
	e. Personnel and organizations are assigned responsibilities for implementing policies.		
	f. Policies clearly define operations personnel authority, accountability, and relationships with other groups, including Stop-Work authority.		
2.a.(2) Adequate material and personnel resources to accomplish operations ☐	a. Sufficient qualified operators are available to complete assigned tasks without excessive overtime.		
	b. Adequate technical personnel are assigned to support operations.		
	c. Staff development, retention, and succession are managed under a long-range staffing plan.		
	d. Adequate material, tooling, equipment, safety gear, and facilities are available for safe operations.		

Organization and Administration, Attachment 2 Paragraph 2.a			
1 Requirements, Attachment 2 ¶ 2.a	2 Detailed Attributes		3 Doc Citation /Justification
2.a.(3) Monitoring and self-assessment of operations ☐	a. Operating problems are documented and evaluated, and corrective actions are taken.		
	b. Supervisors and managers directly observe operations frequently and provide feedback.		
	c. Appropriate outside organizations such as Quality Assurance or other oversight organizations observe operations and provide feedback.		
	d. Assessment and observation issues are tracked and corrected.		
	e. Auditable, measurable, realistic, and challenging safety, environmental, and operations goals are set. Examples are safety system operability; radiological or other exposure; facility operational availability; unscheduled shutdowns; overtime; staffing; qualification, and training; waste production; and plant instrumentation alarms and warnings.		
	f. Facilities develop an action plan to achieve safety, environment, and operations goals with input from operations personnel, and review and approval by management.		
	g. Facilities monitor and report to line and DOE management their progress on completing the action plan and achieving goals. Goals and plans are adjusted and modified as needed.		
2.a.(4) Management and worker accountability for the safe performance of work ☐	a. Management systems are designed to minimize the effects of human performance failures.		
	b. Personnel involved in repeated or willful violations of operating practices are counseled, retrained, or disciplined as appropriate.		

Organization and Administration, Attachment 2 Paragraph 2.a			
1 Requirements, Attachment 2 ¶ 2.a	2 Detailed Attributes		3 Doc Citation /Justification
	c. Personnel are recognized for notable safety improvement actions or ideas.		
	d. Supervisory performance appraisals and promotions take operational and safety performance into consideration.		
2.a.(5) Management training, qualification, succession, and, when appropriate, certification ☐	a. Formal supervisory and management training is provided for first-line and shift supervisors.		
	b. Development, qualification, retention, and succession for supervisors are managed under a long-range staffing plan.		
	c. Supervisors achieve certification when required for their duties.		
2.a.(6) Methods for the analysis of hazards and implementation of hazard controls in the work planning and execution process ☐	a. The DOE Integrated Safety Management System is used to plan work.		
	b. Operations personnel are trained in, and understand, integrating safety into work planning.		
2.a.(7) Methods for approving, posting, maintaining, and controlling access to electronic operations documents (procedures, drawings, schedules, maintenance actions, etc.) if electronic documents are used. ☐	a. Management approves electronic document accessibility on both internal and public computer systems, considering security and privacy concerns.		
	b. Procedures define the methods and positions responsible for approving, revising, and posting electronic documents.		

Shift Routines and Operating Practices, Attachment 2 Paragraph 2.b			
1 Requirements, Attachment 2 ¶ 2.b	2 Detailed Attributes		3 Doc Citation / Justification
2.b. The operator must establish and implement operations practices to ensure shift operators are alert, informed of conditions, and properly operate equipment, addressing the following elements: ☐			
2.b.(1) Prompt notification to operating personnel and supervisors of changes in the facility status, abnormalities, or difficulties encountered in performing assigned tasks. ☐	a. Supervisors and Operators keep each other informed of facility status changes, abnormalities, or difficulties.		
	b. Operators keep Supervisors informed of unexpected situations.		
2.b.(2) Adherence by operating personnel and other workers to established safety requirements ☐	a. Operators comply with safety programs, e.g. industrial, chemical, explosive, pressure, temperature, confined space, or others applicable to the facility.		
	b. Operators use proper personal protective equipment (PPE).		
	c. Operators use ladders or other approved means for overhead access in the absence of permanent ladders or catwalks.		
	d. Operators do not routinely climb or walk on components.		
	e. Operators use appropriate electrical safety procedures.		

Shift Routines and Operating Practices, Attachment 2 Paragraph 2.b			
1 Requirements, Attachment 2 ¶ 2.b	2 Detailed Attributes		3 Doc Citation / Justification
2.b.(3) Awareness by operating personnel of the status of equipment through inspection, conducting checks, and tours of equipment and work areas ☐	a. Operators regularly tour their assigned areas on a frequency determined by management, normally early in each shift. Tours are thorough enough to provide detailed equipment status.		
	b. Routine security concerns do not override tour responsibilities.		
	c. Operators inspect equipment status and condition during tours for proper operation, for operability of standby equipment, and any work planned or in progress.		
	d. Operators recognize, document, and report abnormal conditions and take action to correct the conditions. Examples include leaks, fire or safety hazards, clogged drains, cleanliness issues, or building deficiencies.		
	e. Operators periodically check alarm and annunciator functionality.		
2.b.(4) Procedures for completing round sheets or inspection logs, responding to abnormal conditions, and periodic supervisory reviews of round sheets or inspection logs ☐	a. Management approves round sheets, including frequency and time of instrument readings and allowable delay (normally one hour or less).		
	b. Round sheets cover the operator's area and equipment parameters; data entry blocks follow the tour route.		
	c. Round sheets provide normal and max/min expected equipment instrumentation readings where appropriate.		
	d. Round sheets provide safety limits where appropriate.		
	e. Data readings outside the normal or max/min range are circled or otherwise highlighted and reported to the supervisor. Operators, and supervisors when appropriate, take corrective action to restore proper functioning.		

Shift Routines and Operating Practices, Attachment 2 Paragraph 2.b			
1 Requirements, Attachment 2 ¶ 2.b	2 Detailed Attributes		3 Doc Citation / Justification
	f. Operators make narrative records of important events, abnormal conditions and corrective actions, on round sheets or logbooks.		
	g. Data entries on round sheets are made at the specified time. If readings are delayed beyond the allowable range, the actual time and explanation for the delay are recorded.		
	h. Supervisors review round sheets for trends, abnormalities, and proper data and narrative entries during each shift.		
	i. Supervisors periodically monitor operator rounds for proper execution and for any changes needed for changed facility conditions.		
2.b.(5) Procedures for protecting operators from personnel hazards, e.g. chemical, radiological, laser, noise, electromagnetic, toxic or nano-scale materials ☐	a. Operators are appropriately qualified for expected hazards and know protection practices to maintain personnel exposure as low as reasonably achievable and within facility controls for radiation, chemicals, electromagnetic fields, toxic materials, and other personnel hazards.		
	b. Operators comply with all posted personnel protection requirements and precautions.		
	c. Operators properly use appropriate monitoring instruments when required.		
	d. Operators remain aware of their radiological, toxic, or other exposures and take action to minimize them.		
	e. Operators properly use appropriate administrative controls such as work permits, radiological work permits, and confined space permits.		

Shift Routines and Operating Practices, Attachment 2 Paragraph 2.b			
1 Requirements, Attachment 2 ¶ 2.b	2 Detailed Attributes		3 Doc Citation / Justification
	f. Operators promptly report and take corrective action for radiological or hazardous material protection deficiencies.		
	g. Operators and Supervisors notify protection personnel prior to activities that affect the protection status (Industrial Hygiene, Radiological, etc.).		
	h. Supervisors periodically review exposure trends of operators to detect and correct adverse factors that contribute to personnel exposures.		
2.b.(6) Prompt response to instrument indications, including the use of multiple indications to obtain parameters ☐	a. Operators believe their indications unless proven otherwise.		
	b. Operators check other indicators when possible to confirm unexpected readings.		
	c. Operators take prompt action to investigate and correct abnormal conditions.		
	d. Operators identify inaccurate or malfunctioning instruments and inform appropriate supervisors and repair organizations.		
	e. In case of doubtful readings, operators place safety above production.		
2.b.(7) Procedures for resetting protective devices ☐	a. Operators attempt to determine the cause of protective device trips (Breakers, fuses, relief valves, safety systems, etc.).		
	b. Supervisors and management provide guidance on addressing protective device trips; normally, devices are reset only after assuring that no abnormal condition exists that would cause a trip.		

Shift Routines and Operating Practices, Attachment 2 Paragraph 2.b			
1 Requirements, Attachment 2 ¶ 2.b	2 Detailed Attributes		3 Doc Citation / Justification
	c. Management investigates protective system trips and unplanned shutdowns.		
2.b.(8) Authorization to operate facility equipment ☐	a. Designated supervisors direct the overall operation of the facility, including load changes.		
	b. Personnel operating equipment have appropriate qualification and certification.		
	c. Operators and Supervisors are aware of all activities affecting equipment.		
	d. Management designates routine operations that do not require permission for performance.		
	e. Supervisors approve non-routine operation of facility or process controls.		
	f. During emergencies, Operators may take immediate actions for worker, public, and environmental protection without permission, and inform supervisors promptly.		
	g. Operators achieve plant safety over production for normal, emergency and abnormal operations.		
2.b.(9) Designating shift operating bases and providing equipment for them ☐	a. Shift operating bases, the normal location for operator(s) when not otherwise performing evolutions, are established for all feasible shift positions.		
	b. Shift operating bases are equipped with communications, references, and office materials and equipment needed for facility operations, and are conveniently located within the operating area.		
	c. Shift turnovers normally occur at the operating base and operators return there when not performing		

Shift Routines and Operating Practices, Attachment 2 Paragraph 2.b			
1 Requirements, Attachment 2 ¶ 2.b	2 Detailed Attributes		3 Doc Citation / Justification
	operations at equipment locations or touring.		
2.b.(10) Professional and disciplined operator performance of duties ☐	a. Potential distractions such as electronic devices (radio, TV, music players, games), personal telephone calls, game playing, and horseplay are prohibited.		
	b. Non-work-related written materials are prohibited. Operators may read training bulletins, technical manuals, or operating experience information or review other written, audible, or visual materials that relate to operator duties.		
	c. Supervisors ensure operators' primary duties are not compromised and provide guidance on potentially distracting materials and devices.		

Control Area Activities, Attachment 2 Paragraph 2.c.			
1 Requirements, Attachment 2 ¶ 2.c	2 Detailed Attributes		3 Doc Citation /.Justification
2.c. The operator must establish and implement operations practices that promote orderly, business-like control area operations and address the following elements: ☐			
2.c.(1) Control-area access ☐	a. Control Areas and at-the-controls areas are clearly identified and boundaries are understood		
	b. Control area access is limited to persons on official business only. Access to the at-the-controls area is further limited to persons who need to be in the area.		
	c. Entry to control and at-the-controls areas is granted by designated persons whose identity is known to persons desiring entry.		
2.c.(2) Formality and discipline in the control and at-the-controls area ☐	a. All persons in the area display professional and disciplined behavior. Only activities essential to operations and authorized by management are permitted in the area.		
	b. Potential distractions such as electronic devices (radio, TV, music players, games), personal telephone calls, game playing, and horseplay are prohibited.		
	c. Non-work-related discussions are minimized.		

Control Area Activities, Attachment 2 Paragraph 2.c.			
1 Requirements, Attachment 2 ¶ 2.c	2 Detailed Attributes		3 Doc Citation /.Justification
2.c.(3) Surveillance of control panels and timely response to determine and correct the cause of abnormalities/out-of-specification conditions ☐	a. Operators are alert and attentive to control panel indicators and alarms and monitor panels frequently.		
	b. Operators closely monitor indications and conditions and trend them to detect problems early.		
	c. Operators take timely alarm response actions to address and correct alarming conditions.		
	d. Concurrent operations that affect control panel indications are limited so that operators' ability to detect and respond to abnormal conditions is not compromised.		
	e. Operators are ready to take backup control of automated or computer systems.		
2.c.(4) Limitation of the number of concurrent evolutions and duties ☐	a. Operator ancillary duties are limited to prevent interference with monitoring control panel indicators and alarms.		
	b. Tasks such as tagouts, work authorizations, procedure review, maintenance, or required reading do not constitute a major portion of operators' shift responsibilities.		
	c. Control panel operator administrative workload is minimized. Other operators continue monitoring when one operator has necessary administrative work.		
2.c.(5) Authorization to operate control area equipment	a. Operation of control area equipment is performed only by persons specifically authorized in writing.		

Control Area Activities, Attachment 2 Paragraph 2.c.			
1 Requirements, Attachment 2 ¶ 2.c	2 Detailed Attributes		3 Doc Citation /.Justification
☐	b. Trainees operating control area equipment do so only under the direct supervision of the normally assigned operator.		

Communications, Attachment 2 Paragraph 2.d			
1 Requirements, Attachment 2 ¶ 2.d	2 Detailed Attributes		3 Doc Citation / Justification
2.d. The operator must establish and implement operations practices that ensure accurate, unambiguous communications among operations personnel and address the following elements: ☐			
2.d.(1) Provision of communications systems for emergency and normal operations ☐	a. All facility personnel are promptly alerted to facility emergencies.		
	b. Communications systems are in place to support normal operations.		
	c. Alternate methods are provided for areas where public address or emergency signals cannot be heard.		
	d. Communications systems are periodically tested.		
	e. Control areas can override other communications system users for emergencies.		
2.d.(2) Administrative control of communications equipment, including authorization to use the public address system and allowable locations and purposes for radio use ☐	a. Public address system use is controlled to maintain its effectiveness and prevent it becoming commonplace.		
	b. Point-to-point communications are the preferred method wherever practical.		
	c. Radio usage is controlled to prevent electronic interference with facility equipment. Radio-prohibited areas are defined and marked.		
	d. Radio frequency or channel assignments are controlled and readily available to users.		

Communications, Attachment 2 Paragraph 2.d			
1 Requirements, Attachment 2 ¶ 2.d	2 Detailed Attributes		3 Doc Citation / Justification
	e. Where appropriate, dedicated radio or pager channels are assigned to specific functions such as emergency communications or security.		
2.d.(3) Methods for control areas to contact operators and supervisors ☐	a. Policies define how to notify operators or supervisors to contact the control area.		
	b. Emergency and normal notification methods are distinctive.		
2.d.(4) Use of abbreviations and acronyms ☐	a. Acronyms and abbreviations are developed and promulgated for oral and written communications.		
	b. Only approved abbreviations and acronyms are allowed to be used.		
2.d.(5) Use of oral instructions and communications, including use of repeat-backs and sender/receiver identifications ☐	a. Policies require clear and concise oral communications.		
	b. Policies define when repeat-backs are appropriate and how they are implemented.		
	c. Policies define protocols for transmitting information and identifying senders and receivers.		

On-shift Training, Attachment 2 Paragraph 2.e			
1 Requirements, Attachment 2 ¶ 2.e	2 Detailed Attributes		3 Doc Citation / Justification
2.e. The operator must establish and implement operations practices that control on-shift training of facility operators, prevent inadvertent or incorrect trainee manipulation of equipment, and address the following elements: ☐			
2.e.(1) On-shift training program ☐	a. The Operations Manager approves the operator qualification program and coordinates changes with the Training Department.		
	b. For positions requiring operator certification, candidates receive one-on-one instruction on station.		
	c. On-shift training is conducted by persons both qualified to operate equipment and authorized to train others. Authorization to train others may require special instructor qualifications.		
2.e.(2) Authorization and documentation of training activities ☐	a. Training activities during operations are specifically identified in the training program, including knowledge requirements and trainee actions such as perform, simulate, etc.		
	b. Qualification program completion is formally documented; on-shift and classroom training activities are documented as they occur.		

On-shift Training, Attachment 2 Paragraph 2.e			
1 Requirements, Attachment 2 ¶ 2.e	2 Detailed Attributes		3 Doc Citation / Justification
2.e.(3) Supervision and control of personnel under instruction by qualified personnel. ☐	a. Qualified operator-instructors supervise trainees to prevent misoperation of equipment.		
	b. Early-stage trainees discuss operations, procedures, and actions before performing actual operations. More proficient trainees point and describe actions before taking them. Operator-instructors always monitor trainees and remain capable of intervention.		
	c. Operator-instructors verify trainee entries on official round sheets and logs, and discuss any out of specification readings or unfavorable trends.		
2.e.(4) Facility conditions and controls for conducting training during operational activities, including suspension of training during unanticipated or abnormal events. ☐	a. Training activities are conducted only when facility conditions permit, and as authorized by facility management.		
	b. Training activities and trainee operation of equipment is suspended immediately during emergency or unanticipated abnormal conditions, or when deemed appropriate for safety or operational conditions.		
	c. Management establishes the maximum number of trainees allowed during operations and the maximum number of trainees per operator-instructor.		

Investigation of Abnormal Events, Conditions, and Trends, Attachment 2 Paragraph 2.f			
1 Requirements, Attachment 2 ¶ 2.f	2 Detailed Attributes		3 Doc Citation / Justification
2.f. The operator must establish and implement operations practices for investigating events to determine their impact and prevent recurrence, addressing the following elements: ☐			
2.f.(1) Specific events requiring investigation, and criteria for identifying other events or conditions to be investigated ☐	a. Violation of a safety documentation design limit (e.g., design feature or safety limit).		
	b. Abnormal or unexpected system performance that adversely affects operations or safety (e.g. improper instrument readings, automatic control failure, chemical analysis, etc.)		
	c. Abnormal or unexpected safety conditions (e.g. stray voltage, safety feature or interlock malfunction, etc.)		
	d. Discovery of mispositioned valves, switches, or components.		
	e. Events reportable to DOE or other agencies (e.g. EPA, DOT, State regulators, etc.)		
	f. Unplanned shutdown or significant loss of operation		
	g. Procedural violation or personnel error with actual or potential personnel injury, facility damage, or facility safety degradation		
	h. Equipment failure that could affect safety or mission		
	i. Radiological or toxic material release limits are exceeded or material is lost		

Investigation of Abnormal Events, Conditions, and Trends, Attachment 2 Paragraph 2.f			
1 Requirements, Attachment 2 ¶ 2.f	2 Detailed Attributes		3 Doc Citation / Justification
	j. Recorded data is out-of-specification or shows unexpected trends, with actual or potential adverse impact on operations or safety.		
	k. Actual or suspected sabotage.		
	l. Lost special nuclear material.		
	m. Repetitive problems.		
	n. Measuring and test equipment is found to be out of calibration, with actual or potential impact on operations or safety.		
	o. As directed by appropriate authority, particularly for near-miss situations.		
2.f.(2) Designation of investigators and their training and qualification ☐	a. A senior manager is responsible for investigations; they may delegate investigations or portions of investigations to others, but retain overall responsibility for rigor and consistency of investigations.		
	b. Investigators are experienced and technically qualified.		
	c. Investigators have no bias or vested interest in the results of the investigation.		
	d. Investigators are trained in facility systems, operations, and investigation techniques.		
2.f.(3) Investigation process and techniques ☐	a. Timely data collection by a designated person: initial conditions, operator statements, pertinent computer/instrument printouts or charts, pertinent documentation and records, and other appropriate information.		
	b. Records and data are annotated to prevent misinterpretation.		

Investigation of Abnormal Events, Conditions, and Trends, Attachment 2 Paragraph 2.f			
1 Requirements, Attachment 2 ¶ 2.f	2 Detailed Attributes		3 Doc Citation / Justification
	c. Investigation data is permanently recorded for future reference.		
	d. Data collection does not interfere with facility operation unless vital to understanding the event.		
	e. The facts of the event are reconstructed chronologically from the data.		
	f. The event is analyzed to determine equipment and personnel response, procedure and equipment adequacy, human performance factors, and safety impact.		
	g. Management determines the appropriate restart process (if applicable).		
2.f.(4) Causal analysis and corrective action determination ☐	a. The causes are determined.		
	b. Appropriate corrective actions to prevent recurrence of the event are determined.		
	c. Corrective actions are approved by the responsible manager and tracked to completion.		
2.f.(5) Event investigation reporting, training, and trending ☐	a. Investigation reports are timely.		
	b. Investigation Reports contain a description of the event, its impact, root cause, lessons, and corrective actions.		
	c. Investigation Reports note any positive aspects of the event.		
	d. Investigation Reports are approved by the responsible manager and reviewed by appropriate managers and safety personnel.		
	e. Investigation Report lessons are shared with appropriate operators, support staff, other facility organizations, and other facilities.		

Investigation of Abnormal Events, Conditions, and Trends, Attachment 2 Paragraph 2.f			
1 Requirements, Attachment 2 ¶ 2.f	2 Detailed Attributes		3 Doc Citation / Justification
	f. Events are evaluated for inclusion in training programs.		
	g. Processes include a method to train operators on serious events upon their return to work.		
	h. Procedure problems, operator errors, and other appropriate events are part of the facility trend analysis program. Periodic summaries of event analysis and trends are provided to managers. Training programs include appropriate material from event reports and trend analysis.		
2.f.(6) Response to known or suspected sabotage ☐	a. Actual or suspected sabotage is immediately investigated.		
	b. The condition of potentially affected systems is determined, and safety system operability is confirmed.		
	c. Management determines whether continued operation is justified and if safe shutdown is viable or advisable.		
	d. Management takes action to minimize the impact of sabotage and deter future acts.		

Notifications, Attachment 2 Paragraph 2.g			
1 Requirements, Attachment 2 ¶ 2.g	2 Detailed Attributes		3 Doc Citation / Justification
2.g. The operator must establish and implement operations practices to ensure appropriate event notification for timely response, addressing the following elements: ☐			
2.g.(1) Procedures for internal, DOE, and external notifications, including events, persons to be notified, persons responsible to make notifications, contact information, and recordkeeping ☐	a. Responsibilities for making notifications are specifically assigned to positions or persons.		
	b. Events requiring notification are identified and documented.		
	c. Notification timeliness standards are established.		
	d. Primary and alternate personnel to be notified for each event are identified and documented.		
	e. Contact information for the personnel to be notified is kept current and available to notifying personnel.		
	f. All notifications are documented in formal records that include date, time, reason, person notified, and person making notification.		
2.g.(2) Communications equipment for notification ☐	a. Adequate equipment for making notifications is available at the main control area and/or other appropriate location.		

Control of Equipment and System Status, Attachment 2 Paragraph 2.h			
1 Requirements, Attachment 2 ¶ 2.h	2 Detailed Attributes		3 Doc Citation / Justification
2.h. The operator must establish and implement operations practices for initial equipment lineups and subsequent changes to ensure facilities operate with known, proper configuration as designed, addressing the following elements: ☐			
2.h.(1) Authorization for, and awareness of, equipment and system status changes ☐	a. Operations supervisor is responsible for maintaining proper configuration and authorizing status changes for major equipment.		
	b. Operations supervisor may delegate status change authorizations for support or less-important systems and equipment.		
	c. Status changes are communicated to affected operators and organizations.		
	d. Status changes resulting from operations or work are reported to cognizant supervisors.		
2.h.(2) Initial system alignment, maintaining control of equipment and system status through startup, operation, and shutdown, and documentation of status ☐	a. Components and systems are aligned prior to first operation.		
	b. Checklists are used to guide initial alignments and rechecks, and include equipment identification matching installed labels, required component position, data entry space for actual position and any deviations, and documentation of alignment or recheck.		
	c. Supervisors review and approve completed alignment checklists.		

Control of Equipment and System Status, Attachment 2 Paragraph 2.h			
1 Requirements, Attachment 2 ¶ 2.h	2 Detailed Attributes		3 Doc Citation / Justification
	d. Management determines the need for alignments and rechecks. Examples of situations that may need alignments or rechecks are startup from complete shutdown, outage recovery, or mode changes.		
	e. Restoration of safety-related systems following maintenance includes functional testing of their capability.		
	f. Records of equipment and system alignments are retained for operators' reference.		
	g. Deviations from the reference alignment, including lockouts and tagouts, are tracked and controlled by a status board or other effective system.		
2.h.(3) Use and approval of lockouts and tagouts for administrative control of equipment ☐	a. Supervisors approve lockouts and tagouts in their facility and remain aware of status changes that result.		
	b. Personnel are trained in their responsibilities concerning changing system or equipment status and operation of locked or tagged components.		
2.h.(4) Operational Limits compliance and documentation ☐	a. Compliance with operational limits, including safety basis Limiting Conditions for Operations, is established through administrative controls. Compliance and actions taken to restore operation within limits are documented in facility records.		
	b. Supervisors are aware of and direct completion of actions to comply with operational limits.		
	c. Operational limit entry conditions and actions are documented in appropriate operating records.		

Control of Equipment and System Status, Attachment 2 Paragraph 2.h			
1 Requirements, Attachment 2 ¶ 2.h	2 Detailed Attributes		3 Doc Citation / Justification
	d. Operating personnel are kept informed of any limiting conditions and their required actions.		
	e. Operating personnel periodically review Limiting Conditions for Operation and Action Statements in effect for proper implementation.		
2.h.(5) Management of equipment deficiencies, maintenance activities, post-maintenance testing, and return to service ☐	a. Operators note equipment deficiencies, document them in work control systems for correction, and identify them to other operators by tags, logs, status boards, or other effective method.		
	b. Designated managers authorize in writing the work control documents for all activities, including maintenance on equipment important to safety, on equipment that affects operations, or that changes control indications or alarms.		
	c. The status of work in progress is documented and available for review by operators.		
	d. Work control documents specify retest requirements to ensure, prior to restoration to service, proper functioning, effectiveness of the maintenance, and that no new problems were introduced.		
	e. Supervisors assure themselves of proper equipment operation before authorizing its return to service after maintenance, testing, or emergency/abnormal event.		
2.h.(6) Awareness and documentation of control panel and local alarm issues ☐	a. Operators and supervisors are aware of inoperable alarms, alarms with temporary set points, multiple-input alarms that do not provide indication of a subsequent condition, or other limitations.		

Control of Equipment and System Status, Attachment 2 Paragraph 2.h			
1 Requirements, Attachment 2 ¶ 2.h	2 Detailed Attributes		3 Doc Citation / Justification
	b. Deficient alarms are documented for information to all affected personnel and entered into work control systems for correction.		
	c. Operators take appropriate actions to monitor conditions when alarms are unreliable.		
	d. Operators and supervisors are aware of alarms expected during normal operations.		
2.h.(7) Control of temporary equipment modifications and temporary systems ☐	a. Administrative systems control temporary modifications; examples include electrical jumpers or lifted leads, pulled circuit cards, disabled alarms, piping jumpers or blocks, disabled relief valves, strainers or filters temporarily installed or removed, temporary shielding, blocked drains, and others.		
	b. Administrative systems control temporary systems.		
	c. Administrative controls include:		
	1. Appropriate engineering review and approval of the design and safety of the modification before installation.		
	2. Written authorization for installation.		
	3. Independent verification of installation and removal.		
	4. Documentation of the modifications.		
	5. Completion of any training, procedure changes, or labeling required.		
	6. Periodic audits of installed temporary modifications.		

Control of Equipment and System Status, Attachment 2 Paragraph 2.h			
1 Requirements, Attachment 2 ¶ 2.h	2 Detailed Attributes		3 Doc Citation / Justification
2.h.(8) Configuration control and distribution of engineering documents ☐	a. Administrative systems provide for configuration control of engineering documents per applicable DOE directives.		
	b. Processes provide for designating safety structures, systems, and components and their quality assurance requirements to support system engineer and maintenance needs.		
	c. Processes control safety software per applicable DOE directives.		
	d. Operations personnel and all other affected organizations have access to current, approved engineering documents.		

Lockouts and Tagouts, Attachment 2 Paragraph 2.i			
1 Requirements, Attachment 2 ¶2.i	2 Detailed Attributes		3 Doc Citation / Justification
2.i.(1) The operator must establish and implement operations practices that address the following elements for the installation and removal of lockout/tagouts for the protection of personnel: ☐			
2.i.(1)(a) Procedures, roles and responsibilities associated with the development, documentation, review, installation, and removal of a lockout/tagout ☐	1. Procedures and/or Lockout/Tagout Program implements OSHA Rules and is designed to control hazardous energy and materials during servicing, maintenance, or whenever unexpected operation or energization could cause injury.		
	2. Procedures include provisions that only authorized, qualified personnel perform lockout/tagouts.		
	3. Personnel are trained on their responsibilities regarding tags and locks.		

Lockouts and Tagouts, Attachment 2 Paragraph 2.i			
1 Requirements, Attachment 2 ¶2.i	2 Detailed Attributes		3 Doc Citation / Justification
2.i.(1)(a) Procedures, roles and responsibilities (continued)	4. Procedures include provisions for documenting lockout/tagouts, including: • An indexing/numbering system • Identification of the reason for the lockout/tagout • Applicable work packages or other documents • Equipment covered • all components and their position • Authorization for installing the lockout/tagout • Placement and verification of locks/tags • Authorization for removing the entire lockout/tagout or individual locks/tags • Documenting the removal of locks/tags • Designating the component position after clearing locks/tags, and • Documenting the repositioning of components after clearing locks/tags.		
	5. Procedures designate the manager responsible for lockout/tagout records.		
	6. Procedures include provisions for periodic management reviews of lockout/tagout records.		
	7. Procedures include provisions for checking component positions of equipment outside the lockout/tagout necessary to support restoring locked/tagged equipment to service.		
	8. Procedures include periodic audits of active lockout/tagouts to ensure locks and tags are properly attached and components are in the correct position.		

Lockouts and Tagouts, Attachment 2 Paragraph 2.i			
1 Requirements, Attachment 2 ¶2.i	2 Detailed Attributes		3 Doc Citation / Justification
	9. Procedures include techniques for verifying the position of locked components, with preference for the use of a hands-on check or position indicator.		
	10. Procedures include provisions for authorizing and documenting the repositioning of locked components for a lockout/tagout.		
	11. Procedures include provisions for returning removed tags to the authorizing manager and documenting the manager's final check that all locks and tags are removed.		
	12. Procedures include provisions that permit, but discourage, temporary clearance of locks/tags per OSHA Rules.		
2.i.(1)(b) Compliance with Occupational Safety and Health Administration Rules, 29 CFR Part 1910 and/or 29 CFR Part 1926, requirements for the protection of workers using lockout/tagout ☐			
2.i.(1)(c) Compliance with National Fire Protection Association Standard 70E electrical safety requirements using lockout/tagout ☐			

Lockouts and Tagouts, Attachment 2 Paragraph 2.i			
1 Requirements, Attachment 2 ¶2.i	2 Detailed Attributes		3 Doc Citation / Justification
2.i.(1)(d) Description and control of the tags, locks, lockboxes, chains, and other components utilized for the lockout/tagout program ☐	1. Procedures contain provisions that when key operated locks are used, access to the keys is restricted to authorized personnel.		
	2. Procedures contain provisions that when key operated locks are used, keys are readily available to appropriate personnel.		
2.i.(1)(e) Training and qualification in lockout/tagout and special considerations for DOE facilities, e.g. operational limitations, or seismic issues from the mass of locks or chains ☐	1. Training programs comply with applicable OSHA Rules and support qualification of personnel to perform lockout/tagouts.		
	2. Training includes material on how lockouts can hinder facility operations, particularly when local component operations are necessary while remote controls are locked out.		
	3. Training includes material on how the mass of locks or chains may impair seismic design features of components.		
2.i.(2) The operator must establish and implement operations practices that address the following elements for the installation and removal of caution tags for equipment protection or operational control. ☐			
2.i.(2)(a) Roles and responsibilities associated with the development, documentation, review,	1. Personnel are formally designated to prepare, approve, and install tags.		
	2. Personnel are trained on their responsibilities regarding tags.		

Lockouts and Tagouts, Attachment 2 Paragraph 2.i			
1 Requirements, Attachment 2 ¶2.i	2 Detailed Attributes		3 Doc Citation / Justification
installation, and removal of caution tags to convey operational information or equipment alignments for protection of equipment ☐	3. Procedures include provisions for documenting caution tags, including: • An indexing/numbering system • Effective date and time • The precaution or information applicable to the situation or equipment • Location of tags by component name • Number or other identification • Authorization for installing the tags • Documentation of placement and verification of the tags • Authorization for removing tags • Documentation of removal		
	4. Procedures designate the manager responsible for caution tag approval and location of records for review by appropriate personnel.		
	5. Procedures contain provisions for management determination that instructions on caution tags comply with facility procedures, technical safety requirements, or other specifications.		
	6. Situations requiring caution tags are brought to the attention of responsible managers, who approve them if necessary.		
	7. Procedures contain provisions for a documented periodic review of all active caution tags to determine their continued need, that the records are correct, and that appropriate action is taken to remedy conditions requiring tags for long periods (over three months).		

Lockouts and Tagouts, Attachment 2 Paragraph 2.i			
1 Requirements, Attachment 2 ¶2.i	2 Detailed Attributes		3 Doc Citation / Justification
2.i.(2)(b) Description and control of the tags ☐	1. Procedures contain provisions for caution tags to be uniquely identifiable and easily distinguished from other tags.		
	2. Procedures contain provisions for caution tag placement so as to not obscure indications or controls, while remaining readily apparent to operators.		
2.i.(2)(c) Measures to prevent relying on caution tags for personnel protection ☐	1. Procedures contain provisions restricting the use of caution tags to situations where a component or system is functional, but some precaution or item(s) of information is necessary prior to operation.		
	2. Procedures contain provisions for management determination that caution tags are appropriate and that they are not used instead of more appropriate administrative controls or a lockout/tagout.		

Independent Verification, Attachment 2 Paragraph 2.j			
1 Requirements, Attachment 2 ¶ 2.j	2 Detailed Attributes		3 Doc Citation / Justification
2.j. The operator must establish and implement operations practices to verify that critical equipment configuration is in accordance with controlling documents, addressing the following elements: ☐			
2.j.(1) Structures, systems, components, operations, and programs requiring independent verification ☐	a. Procedures or other authoritative documents explicitly identify components whose positions must be independently verified.		
	b. Management uses accepted safety analysis methods (for example, fault tree or probability risk analysis) and/or expert opinion to develop the list of equipment/components requiring independent verification.		
	c. Facility management considers all safety-related system components for independent verification.		
	d. Procedures allow exemption from independent verification for components whose mispositioning does not affect system performance, whose mispositioning is immediately known to operators, or where significant radiation exposure would be required for verification. Alternate means of determining position are considered, and any such exemptions are approved by senior operations management.		

Independent Verification, Attachment 2 Paragraph 2.j			
1 Requirements, Attachment 2 ¶ 2.j	2 Detailed Attributes		3 Doc Citation / Justification
	e. Management considers independent verification for components whose mispositioning could challenge safety-related equipment, cause shutdowns or other undesirable results, or lead to unintended toxic or radioactive material release.		
	f. Management specifies safety management programs and other functions such as training and procedure development that will be independently appraised to verify their continued conformance with regulations and directives.		
2.j.(2) Situations requiring independent verification ☐	a. Procedures require independent verification when equipment must be available and it is reasonably possible that components were mispositioned.		
	b. Procedures require independent verification of lineups to take equipment out of service or return it to service, e.g. isolation boundaries, equipment under maintenance or repair, instrumentation lineups for testing and their restoration, work on backup components and their restoration, etc.		
	c. Procedures include appropriate independent verification for system lineups.		
	d. Procedures include appropriate routine periodic verification of critical components during operation, which would not normally need a second check.		

Independent Verification, Attachment 2 Paragraph 2.j			
1 Requirements, Attachment 2 ¶ 2.j	2 Detailed Attributes		3 Doc Citation / Justification
	e. Procedures include provisions for dealing with mispositioned components found during routine periodic checks or lineups, including appropriate management approval for repositioning and subsequent independent verification.		
2.j.(3) Methods for performing and documenting independent verification ☐	a. Management develops and approves verification techniques appropriate to facility-specific equipment, using manufacturer's recommendations and expert operators.		
	b. Operators are trained in techniques appropriate to the facility's equipment.		
	c. Procedures provide reference documentation explaining how to perform verification of the facility's components, e.g. manual, solenoid-, motor- and air-operated valves, circuit breakers, blank flanges, removable links and fuses, control power availability, and any other specific component position or condition required.		
2.j.(3) Independent Verification Methods (continued)	d. Procedures specify how to achieve independence, including having each check include identification of the component and determining both its required and actual position, and minimizing interactions between operators positioning components and those verifying position, except in special situations for throttled valves or to reduce radiation or toxic exposure (concurrent dual verification).		

Independent Verification, Attachment 2 Paragraph 2.j			
1 Requirements, Attachment 2 ¶ 2.j	2 Detailed Attributes		3 Doc Citation / Justification
2.j.(3) Independent Verification Methods (continued)	e. Procedures favor direct local position checks over remote indications, absent exposure considerations or other overriding factors.		
	f. Procedures favor direct local position checks over process indications such as flow, pressure, or voltage, absent exposure considerations or other overriding factors. Any such indirect methods are specifically authorized in procedures.		
	g. Procedures specify how to check throttled valves. Local mechanical position indicators, scribe marks, or other authorized methods are preferred over shutting and then opening a prescribed number of turns. If shutting/opening is necessary, facility procedures consider concurrent dual verification.		
	h. Procedures favor direct local position checks over surveillance testing to show component positions. If surveillance tests are used, they must conclusively prove component position and must be specifically approved by operations management.		
	i. Procedures specify that components danger tagged per the lockout/tagout program will not be manipulated for independent verification.		
	j. Procedures specify that verifiers do not change component position or status to correct an inconsistency.		

Independent Verification, Attachment 2 Paragraph 2.j			
1 Requirements, Attachment 2 ¶ 2.j	2 Detailed Attributes		3 Doc Citation / Justification
	k. Procedures specify how to document independent verification, including component identification; normal or expected position, desired position, final position, identification and signature or initials of positioners and verifiers for each item, and supervisory review.		
2.j.(4) Situations, if any, allowing concurrent dual verification ☐	a. Procedures specify situations where concurrent dual verification is used. Examples are throttled valves that must be repositioned to determine position, or sequential operations such as a bolt torquing pattern.		
2.j.(5) Methods for performing concurrent dual verification, if used. ☐	a. Procedures specify how concurrent dual verification is done, if at all.		
	b. Procedures for concurrent dual verification (if used) include provisions for maintaining independence to the maximum extent possible, and facility policies include provisions preventing the use of concurrent dual verification unless specifically authorized. [An example for a throttled valve: the operator would shut the valve, the verifier would verify the shut position, then the operator would open the valve the specified number of turns while the observer observes and counts turns silently, with both not influencing the other, and both record the position separately.]		

Logkeeping, Attachment 2 Paragraph 2.k			
1 Requirements, Attachment 2 ¶ 2.k	2 Detailed Attributes		3 Doc Citation / Justification
2.k. The operator must establish and implement operations practices to ensure thorough, accurate, and timely recording of equipment information for performance analysis and trend detection, addressing the following elements: ☐			
2.k.(1) Narrative logs at all key positions, as defined by management, for the recording of pertinent information ☐	a. Procedures include provisions for narrative logs maintained by the operations supervisor or control area operator (or equivalent) at a minimum.		
	b. Procedures include provisions for narrative logs at stations staffed part-time to provide continuity and information pass-down.		
	c. Procedures include provisions for narrative sections on round sheets when a separate narrative log is not maintained.		
2.k.(2) Prompt and accurate recording of information ☐			

Logkeeping, Attachment 2 Paragraph 2.k			
1 Requirements, Attachment 2 ¶ 2.k	2 Detailed Attributes		3 Doc Citation / Justification
2.k.(3) Type, scope, and format for log entries ☐	a. Management provides written direction on information to be recorded in each log, including the following elements to be recorded in at least one log, but not necessarily all in the same log:		
	1. Facility mode changes		
	2. Criticalities and criticality information (for reactors or critical experiments)		
	3. Abnormal facility configurations		
	4. Status changes of safety-related or other major equipment		
	5. Occurrence of reportable events		
	6. Starting and completing surveillance tests		
	7. Entering and exiting Limiting Conditions for Operations		
	8. Security incidents		
	9. Out-of-specification chemistry or process analysis results or measurements		
	10. Shift reliefs		
	11. Significant information concerning emergencies, abnormal, or unexpected events, but not to interfere with taking appropriate response actions.		
	b. Management provides written direction on the format for log entries, including legible, permanent, smear-proof, entries capable of machine copying.		
	c. Management provides written direction on electronic log entries, if used.		

Logkeeping, Attachment 2 Paragraph 2.k			
1 Requirements, Attachment 2 ¶ 2.k	2 Detailed Attributes		3 Doc Citation / Justification
2.k.(4) Method for recording late entries and correcting erroneous entries without obscuring the original entry ☐	a. Management provides written direction on how to make late entries, including noting the actual time late entries are made and prohibiting rewriting logs to make entries appear timely.		
	b. Management provides written direction on how to make log corrections. A widely-accepted industry standard is to make a single lineout through the incorrect entry without obscuring it and writing the correct entry in a nearby space, with the date and initials of the person making the correction.		
2.k.(5) Periodic supervisory reviews for accuracy, adequacy, and trends ☐	a. Management provides written direction for periodic supervisory review of logs for accuracy, completeness, timeliness, trends, and conformance with management direction.		
	b. Log review practices include periodic operations supervisor review of control area logs, and periodic review of operating station logs outside the control area by the control area supervisor or other appropriate manager.		
2.k.(6) Document retention requirements ☐	a. Management provides written direction on keeping logs available for operator review after return from periods of absence.		
	b. Management provides written direction on log storage and preservation for the expected life of the facility or as directed by DOE and National Archives and Records Administration regulation.		
	c. Management provides written direction on how to retrieve stored logs.		

Turnover and Assumption of Responsibilities, Attachment 2 Paragraph 2.l			
1 Requirements, Attachment 2 ¶ 2.l	2 Detailed Attributes		3 Doc Citation / Justification
2.l. The operator must establish and implement operations practices for thorough, accurate transfer of information and responsibilities at shift or operator relief to ensure continued safe operation, addressing the following elements: ☐			
2.l.(1) Definitions for all key positions requiring a formal turnover process ☐	a. Procedures contain provisions for using a turnover process for at least the supervisory positions.		
	b. Procedures contain provisions for using a turnover process for key positions, including appropriate stations staffed part-time.		
2.l.(2) Turnover of equipment/facility status, duties, and responsibilities that results in the safe and effective transfer of equipment status and in-progress or planned activities from one shift or workgroup to the next ☐	a. Turnover procedures contain provisions for documenting a review of checklists or other documents that record key information appropriate for the position, either operational or supervisory, such as: • Facility operating mode and status • Key process parameters • Key tank or vessel levels • Status of safety equipment • Operational limits in effect • Limiting Conditions for Operations in effect, either normal or abnormal • Any procedures, either standard or temporary, in progress		

Turnover and Assumption of Responsibilities, Attachment 2 Paragraph 2.l			
1 Requirements, Attachment 2 ¶ 2.l	2 Detailed Attributes		3 Doc Citation / Justification
2.l.(2) Shift turnover procedures (continued)	• Changes in radiological or hazardous material conditions • Waste management status • Required samples or analyses Upcoming or in-progress maintenance, testing, or evolutions		
	b. Turnover procedures contain provisions for operators and supervisors to complete document reviews before assuming responsibility for their position, reviewing in enough detail to understand status, important history, and plans. Such reviews normally extend back the shorter of 24 hours or their last shift.		
	c. Turnover procedures contain provisions for operators and supervisors to walk down appropriate control panels and computer displays to determine facility status, alarms, lineups, and equipment configuration. For control areas, the oncoming and offgoing personnel jointly walk down the control panels and displays. Supervisors and operators walk down panels early in the shift and preferably before turnover.		
	d. Turnover procedures contain provisions for offgoing and oncoming operators and supervisors to discuss, during stable facility conditions whenever possible, turnover documentation and clarify any questions.		
	e. Turnover procedures contain provisions that when all turnover items are complete and the oncoming person understands the status, they formally state that they assume responsibility and make a narrative log entry to that effect.		

Turnover and Assumption of Responsibilities, Attachment 2 Paragraph 2.l			
1 Requirements, Attachment 2 ¶ 2.l	2 Detailed Attributes		3 Doc Citation / Justification
	f. Turnover procedures contain provisions for operations supervisors to conduct briefings as needed for their oncoming shift operators and appropriate support personnel (vendors, maintenance, crafts) to review status, problems, upcoming work, or other appropriate topics.		
2.l.(3) Process for reliefs during a shift 	a. Turnover procedures contain provisions for conducting operator and supervisor reliefs during shifts. These turnovers may include a less exhaustive process than the regular shift change as long as the oncoming person is at least as knowledgeable as they would be from a regular turnover.		

Control of Interrelated Processes, Attachment 2 Paragraph 2.m			
1 Requirements, Attachment 2 ¶ 2.m	2 Detailed Attributes		3 Doc Citation / Justification
2.m. The operator must establish and implement operations practices to ensure interrelated processes do not adversely affect facility safety or operations, addressing the following elements: ☐			
2.m.(1) Defined responsibilities with respect to the control of interrelated processes (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) ☐			
2.m.(2) Operator training and qualification to understand interrelated processes, to interpret instrument readings, and provide timely corrective action for process-related problems ☐			

Control of Interrelated Processes, Attachment 2 Paragraph 2.m			
1 Requirements, Attachment 2 ¶ 2.m	2 Detailed Attributes		3 Doc Citation / Justification
2.m.(3) Establish lines of communication between operating personnel, process support personnel, and other interrelated process operators for coordination of activities ☐			

Required Reading, Attachment 2 Paragraph 2.n			
1 Requirements, Attachment 2 ¶ 2.n	2 Detailed Attributes		3 Doc Citation / Justification
2.n. The operator must establish and implement operations practices for an effective required reading program to keep operators updated on equipment or document changes, lessons learned, or other important information, addressing the following elements: ☐			
2.n.(1) Identification of material to be distributed via required reading ☐	a. Directives contain provisions for a required reading program, including, as appropriate, procedure changes, equipment design changes, operating experience information, and other facility-specific items.		
	b. Directives for the required reading program include provisions for listing designated items, screening them for appropriate content, and procuring copies of the documents.		
2.n.(2) Identification of which personnel are required to read specific required reading items ☐	a. Directives for the required reading program include provisions for designating specific items for specific operators or groups of operators.		
	b. Directives for required reading program include provisions for ready access to required reading materials.		

Required Reading, Attachment 2 Paragraph 2.n			
1 Requirements, Attachment 2 ¶ 2.n	2 Detailed Attributes		3 Doc Citation / Justification
2.n.(3) Distribution of required reading to appropriate personnel and documentation of their timely completion ☐	a. Directives for the required reading program include provisions for assigning due dates for items, including, where appropriate, completion before operators go on shift again.		
	b. Directives for the required reading program include provisions for documenting and tracking completion of designated specific items for specific operators or groups of operators.		
	c. Directives for required reading program include provisions for retaining documentation of completion and for periodic management review for timely assignment completion.		
	d. Directives for the required reading program include provisions for removing completed items from distribution.		

Timely Instructions/Orders, Attachment 2 Paragraph 2.o			
1 Requirements, Attachment 2 ¶ 2.o	2 Detailed Attributes		3 Doc Citation / Justification
2.o. The operator must establish and implement operations practices for timely written direction and guidance from management to operators, addressing the following elements: ☐			
2.o.(1) Appropriate circumstances for the use of timely instructions/orders ☐	a. Directives for timely instructions/orders specify appropriate information items such as special operations, administrative directions, special data collection campaigns, or notification of expected visitors.		
	b. Directives for timely instructions/orders specify appropriate orders such as direction to perform special evolutions or tests, limitations on performing certain operations, direction to perform maintenance actions, or other direction.		
	c. Directives for timely instructions/orders include provisions to prevent the use of timely instructions/orders as a substitute for administrative or operational procedure revisions.		
2.o.(2) Designated levels of review and approval prior to issuance ☐	a. Directives for timely instructions/orders include designation of review and approval authorities.		

Timely Instructions/Orders, Attachment 2 Paragraph 2.o			
1 Requirements, Attachment 2 ¶ 2.o	2 Detailed Attributes		3 Doc Citation / Justification
2.o.(3) Configuration control of timely instructions/orders ☐	a. Directives for timely instructions/orders include segregation of timely instructions/orders into daily and long term categories.		
	b. Directives for timely instructions/orders include provisions for removing or canceling superseded or outdated items.		
	c. Directives for timely instructions/orders include provisions for periodic management reviews that only appropriate and current items are distributed, and that appropriate personnel review them within time limits.		
2.o.(4) Distribution of timely instructions/orders to appropriate personnel and documentation of their receipt and understanding ☐	a. Directives for timely instructions/orders include provisions for distribution of timely instructions/orders to appropriate operators.		
	b. Directives for timely instructions/orders include provisions for appropriate operators to review items before or early in shift.		
	c. Directives for timely instructions/orders include provisions for documenting operator reviews every shift for daily items, including those that are delayed or remain in force longer than a day, and periodic and as-changed reviews of long term items.		

Technical Procedures, Attachment 2 Paragraph 2.p			
1 Requirements, Attachment 2 ¶ 2.p	2 Detailed Attributes		3 Doc Citation / Justification
2.p. The operator must establish and implement operations practices for developing and maintaining accurate, understandable written technical procedures that ensure safe and effective facility and equipment operation, addressing the following elements: ☐			
2.p.(1) Expectations for the use of procedures to perform operations. ☐	a. Management policies establish the expectation that operators will use written procedures for operations, will perform them as written, and will stop work and notify management when procedures cannot be executed as written.		
2.p.(2) A process for procedure development ☐	a. Directives include a written process for procedure development, including format, clear language standards, and configuration control.		
	b. Management policies designate procedures to be developed for all anticipated operations, evolutions, tests, and abnormal or emergency situations.		
	c. Management policies direct alarm/annunciator response procedures to be developed for all alarm panels.		
	d. Directives designate a senior manager responsibility for procedure development, and include provisions for the capabilities and experience of procedure writers.		

Technical Procedures, Attachment 2 Paragraph 2.p			
1 Requirements, Attachment 2 ¶ 2.p	2 Detailed Attributes		3 Doc Citation / Justification
2.p.(2) A process for procedure development (continued)	e. Directives include a process for completing and documenting procedure review and approval of both hard-copy and electronic procedures.		
	f. Directives specify that procedures will provide administrative and technical direction to effectively conduct the operation, 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.		
	g. Procedure preparation records contain documentation of the reason for key steps so they are not inadvertently deleted or changed in revisions and changes.		
2.p.(3) Procedure content, including consistent format and use of terms (e.g. prerequisites, warnings, cautions, notes, hold points, etc.), detail sufficient for accomplishing the operation, technically accurate procedures capable of performance as written, and procedure conformance with the facility design and manufacturer documentation ☐	a. Procedure scope and applicability are readily apparent.		
	b. Procedures for multiple equipment trains are clearly distinguishable from each other.		
	c. Emergency procedures are clearly distinguishable from normal operating procedures.		
	d. Procedures incorporate appropriate information from applicable source documents, including design, safety basis, and vendor technical documents.		
	e. Prerequisites and initial conditions are clearly specified.		
	f. Tools, equipment, and materials are specified and procedures provide measures to document their calibration or condition before use.		
	g. Hold points requiring independent verification or approval are clearly indicated.		

Technical Procedures, Attachment 2 Paragraph 2.p			
1 Requirements, Attachment 2 ¶ 2.p	2 Detailed Attributes		3 Doc Citation / Justification
2.p.(3) Procedure content (continued)	h. Procedure language is clear, definitions are explained, and detail is appropriate for the operators' skill, experience, and training.		
	i. Procedure format standards: One action per step; Warnings, Notes, and Cautions are clear, do not contain actions, and precede the applicable step; Warnings, Notes, Cautions, and headings appear on the same page as the applicable step.		
	j. Procedures are technically and administratively accurate: instructions and information are correct; referenced documents are correctly identified; and instructions for transferring between procedures are clear.		
	k. Critical steps include signature/initial/checkoff blocks, with only one action per block.		
	l. Instrument readings and tolerances are specified and conform to instrument scales or readability.		
	m. Procedures contain explicit parameters and do not require mental arithmetic to determine acceptability. Any calculations are clearly explained and procedures provide space to record them.		
	n. Procedure step sequence conforms to normal operational sequence.		
	o. Procedures reflect human factors considerations such as procedure callouts exactly matching equipment labels, units in procedures match instrument markings, charts and graphs easily read, and important steps or information highlighted.		

Technical Procedures, Attachment 2 Paragraph 2.p			
1 Requirements, Attachment 2 ¶ 2.p	2 Detailed Attributes		3 Doc Citation / Justification
2.p.(3) Procedure content (continued)	p. Emergency procedures provide guidance for both single and multiple casualties.		
	q. 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.		
	r. Procedures specify the restoration or shutdown steps for equipment following tests or other operations.		
2.p.(4) A process for procedure changes (pen and ink or page changes) and revisions (complete reissues) ☐	a. Directives include a documented process for review and approval of revisions and changes. Directives may also use only a revision process or may use an electronic publishing process. In all cases, configuration control must be maintained.		
	b. Procedure changes intended for more than one-time use are documented in a location readily available for operator reference and noted in timely orders/instructions and/or turnover documents.		
	c. Directives contain provisions for initiation of changes or revisions if procedure problems are found, including provisions for emergent changes or revisions necessary to proceed with operations when a procedure is faulty.		
	d. Directives contain provisions for initiating a procedure revision when changes remain in effect for extended periods (e.g. more than 6 months) or when several changes have accumulated (e.g. more than 5).		
	e. Directives contain provisions for including all outstanding changes in any procedure's revision.		

Technical Procedures, Attachment 2 Paragraph 2.p			
1 Requirements, Attachment 2 ¶ 2.p	2 Detailed Attributes		3 Doc Citation / Justification
	f. Directives include provisions for implementing revisions for permanent equipment modifications or replacements, and implementing changes for temporary equipment modifications.		
	g. Directives include provisions to review procedure development records of the reason for key steps to prevent inadvertent deletion or change.		
	h. Directives include provisions to use walkthroughs (procedure execution with actual or simulated operation of components by subject matter expert(s)) to validate procedure changes and revisions.		
2.p.(5) A process for training personnel on new, revised, or changed procedures ☐	a. Directives include provisions for communicating important procedure changes and revisions to operating personnel through required reading or other appropriate method.		
	b. Directives include provisions for communication of procedure changes and revisions to the training department to update training courses.		
	c. Directives include provisions for communication of procedure changes and revisions to the organizations responsible for personnel qualification to update qualification requirements.		
2.p.(6) A process for approval of new, revised, or changed procedures ☐	a. Directives include provisions for operations supervisor or manager approval of new or revised procedures prior to use, with reviews of revisions to at least the depth as the initial version.		

Technical Procedures, Attachment 2 Paragraph 2.p			
1 Requirements, Attachment 2 ¶ 2.p	2 Detailed Attributes		3 Doc Citation / Justification
	b. Directives include provisions for safety committee or safety manager or equivalent, and, if applicable, emergency manager, review of procedures that affect safety-related equipment or emergency response.		
	c. Directives include provisions defining appropriate circumstances for expeditious approval of minor procedure changes and the process, with a minimum of at least one designated senior qualified operator and one senior operations manager approval, followed up by standard review and approval within a short period, up to 2 weeks.		
	d. Directives include provisions for using the standard review and approval process for changes that do not meet the facility's criteria for minor changes.		
2.p.(7) Initial-issue and periodic review and testing of procedures ☐	a. Directives include provisions for review of new and revised procedures prior to use and periodically for technical accuracy and human factors considerations.		
	b. Directives specify the frequency of periodic procedure reviews, considering the complexity of the operation, maturity of operations, and facility life cycle.		
	c. Directives include provisions for reviewing procedures after a significant occurrence, either human error or equipment upset.		
	d. Procedure reviews include comparison to source documents to verify accuracy.		
	e. Procedure reviews include validation walkthroughs.		

Technical Procedures, Attachment 2 Paragraph 2.p			
1 Requirements, Attachment 2 ¶ 2.p	2 Detailed Attributes		3 Doc Citation / Justification
2.p.(8) Availability and use of the latest revisions of procedures ☐	a. Directives include provisions for maintenance of a controlled copy of all operating procedures at the control area for operator reference, and selected procedure controlled copies at appropriate locations outside the control area.		
	b. Directives include provisions for verifying working copies of procedures against controlled copies for use during evolutions, and controlling working copies to prevent using outdated procedures.		
	c. Directives include provisions for maintenance of controlled copies of alarm and annunciator response procedures readily accessible to operators for alarm response.		
	d. Directives detail how operators obtain current copies of electronic or hard-copy procedures for performing evolutions, and how to determine procedure approval and revision status.		
2.p.(9) Specified and defined procedure use requirements, i.e. reader-worker method, reference use only, use-each-time, and emergency response ☐	a. Operators are trained in procedure use requirements and management oversight reinforces the expectations.		
	b. Directives and management policy contain provisions for operators to report deficient procedures and initiate changes or revisions to correct them instead of continuing on. During emergency conditions, operators may take necessary action to place the facility in a safe condition, and to protect equipment, personnel, and public safety without first initiating a procedure change.		

Technical Procedures, Attachment 2 Paragraph 2.p			
1 Requirements, Attachment 2 ¶ 2.p	2 Detailed Attributes		3 Doc Citation / Justification
	c. Directives define applicable procedure use methods and specify when to use them. Options include reader-worker, reference, fill out steps as a checklist, and others.		
	d. Directives include provisions for use of procedures for emergency response. Normally, immediate actions are committed to memory and may be executed without reference to the procedure. When conditions permit, operators use the procedure to check completion of the immediate actions and continue with follow-up actions.		

Operator Aids, Attachment 2 Paragraph 2.q			
1 Requirements, Attachment 2 ¶ 2.q	2 Detailed Attributes		3 Doc Citation / Justification
2.q. The operator must establish and implement operations practices to provide accurate, current, and approved operator aids, addressing the following elements: ☐			
2.q.(1) Technical evaluation and management approval of operator aids ☐	a. Directives contain a process for developing, approving, and controlling operator aids.		
	b. Operators, maintenance staff, and other facility staff are trained on the operator aids process.		
	c. Operator aids are approved by operations management prior to posting. Approving authorities determine the accuracy and necessity of operator aids.		
	d. Directives and management practice do not allow operator aids to alter procedures, but instead initiate procedure revisions or changes if necessary.		
2.q.(2) Operator aids serve as conveniences, not operational requirements. ☐	a. Directives and training provide that operator aids serve as a convenient reminder or quick reference source for information, not a substitute for procedures.		
2.q.(3) Operator aids do not obscure equipment, ☐	a Directives call for posting operator aids close to the point of use in a manner that does not obscure indications or controls.		

Operator Aids, Attachment 2 Paragraph 2.q			
1 Requirements, Attachment 2 ¶ 2.q	2 Detailed Attributes		3 Doc Citation / Justification
	b. Directives call for operator aids to be sturdy, and securely mounted or stowed, and waterproof where necessary.		
2.q.(4) Administrative control of installed operator aids ☐	a. Directives controlling operator aids include provisions for maintaining a master list and copy of all approved operator aids in the control area or other appropriate area. The listing includes: - Unique identification numbers for each operator aid. - Listing of source documents for operator aid content, including revision status or notation that there are no source documents for the rare aids that are not developed from other sources. - Date of approval, revision, and posting location for operator aids		
	b. Directives controlling operator aids include provisions to update operator aids when their source material is updated.		
2.q.(5) Periodic review for adequacy and correctness ☐	a. Verify the accuracy, necessity, and condition of posted operator aids.		
	b. Verify only approved operator aids are posted.		
	c. Verify agreement between the master list and actual postings; remove or replace operator aids and update the master list as needed.		
	d. Verify operator aids reflect the latest revisions of source material.		

Component Labeling, Attachment 2 Paragraph 2.r			
1 Requirements, Attachment 2 ¶ 2.r	2 Detailed Attributes		3 Doc Citation / Justification
2.r. The operator must establish and implement operations practices for clear, accurate equipment labeling, addressing the following elements: ☐			
2.r.(1) Components that require a label ☐	a. Directives contain provisions for component labeling, including identification of components and standardized label format and colors. Labeled components include:		
	1. Valves		
	2. Major equipment		
	3. Switches		
	4. Circuit breakers		
	5. Fuse panels or locations		
	6. Instruments and gauges		
	7. Busses and motor control centers		
	8. Cabinets, including, where appropriate, listing major components inside		
	9. Room doors		
	10. Emergency equipment		
	11. Fire protection systems		
	12. Piping		
	13.Any named SSC, item, or operator control		

Component Labeling, Attachment 2 Paragraph 2.r			
1 Requirements, Attachment 2 ¶ 2.r	2 Detailed Attributes		3 Doc Citation / Justification
2.r.(2) Label information that uniquely identifies components and is consistent with regulations, standards, and facility documents ☐	a. Directives for component labeling contain provisions for label information to match facility documentation, including design and safety basis documents, procedures, lineup sheets, and other documents that refer to components.		
	b. Label nomenclature, abbreviations, and identification codes are standardized and included in operator training.		
	c. Labeled components have unique identification numbers.		
	d. Color codes are consistent and unambiguous.		
	e. Piping labels indicate the fluid and normal flow direction.		
	f. Piping is color coded per OSHA/ANSI standards and piping for hazardous and explosive materials is uniquely identified.		
2.r.(3) Durable and securely attached labels that do not interfere with controls or equipment ☐	a. Labels, adhesives, and fasteners are made of durable materials compatible with the material to which they are attached.		
	b. Labels are securely attached.		
	c. Labels are oriented for easy reading and located as close as practical to the labeled item.		
	d. Labels do not interfere with equipment operations or indicators.		

Component Labeling, Attachment 2 Paragraph 2.r			
1 Requirements, Attachment 2 ¶ 2.r	2 Detailed Attributes		3 Doc Citation / Justification
2.r.(4) Administrative control of labels, including a process for promptly identifying and replacing lost or damaged labels, preventing unauthorized or incorrect labels, and control of temporary labels ☐	a. Directives prohibit informal labels and provide a process for replacing labels.		
	b. Directives provide for deliberate inspections for missing or damaged labels, such as post-maintenance checks, operator tours, lineup sheets, or other appropriate means.		
	c. Directives include a process to document lost, damaged, or incorrect labels and procure replacements.		
	d. Directives include provisions for temporary replacement labels, including: documentation of senior operations supervisor approval, verification of proper placement, and documenting temporary labels in the facility.		
	e. Temporary labels have the same information content as permanent labels.		