Conduct of Operations Manual
APS User Experimental Facilities Operations Group (EFOG)

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Conduct of Operations Manual
APS User Experimental Facilities Operations Group (EFOG)

1. INTRODUCTION

1.1. Purpose

A Conduct of Operations Program is implemented to support mission success and promote safety and environmental protection with a goal to minimize the likelihood and consequences of technical and organizational system failures.

This manual provides a comprehensive overview of the operations program for the User experimental facilities. It is intended as a reference for anyone trying to understand the program with links to the more detailed process that implement the program.

The operations program is the local APS implementation of DOE, Argonne, and APS requirements and standards.

1.2. Scope

The content of the Conduct of Operations Manual is based on the framework of topics set out in the DOE Order O422.1 and tailored to an accelerator facility. Chapters align with the “special requirements” identified in O422.1, and the content of the chapters is guided by breakdown of the defined elements of these special requirements.

To facilitate ease of use and to avoid maintaining redundant documents, this manual provides a descriptive framework for operations program with references and links to the detailed implementing processes.

This manual is limited to the beamline support operations program handled by the Experimental Facilities Operations Group (EFOG).

Not in the SCOPE of this manual, except for administrative actions associated with or incidental services provided by EFOG, are beamline and user activities; accelerator systems R&D; work planning procedures of APS technical groups; and plant facilities work.

1.3. Maintenance of the Manual

This manual is prepared under the direction of EFOG Group Leader and is maintained in the APS electronic records system ICMS (a persistent URL is available to the latest revision). It is reviewed on an annual basis with workflows managed by the APS Policy and Procedure Administrator. Feedback can be directed to the APS Operations Directorate.

2. ORGANIZATION AND ADMINISTRATION

The Photon Science Directorate (PSC) is one of the programmatic directorates of Argonne National Laboratory. The Laboratory provides business and facility services common to programmatic organizations (human resources (HR), plant facilities maintenance; environment, safety, and health (ESH) support and oversight; desktop information technology (IT) support; procurement; shipping and receiving; financial services; Health Physics services; etc.)

- Argonne Organization Chart

PSC is made up of the Advanced Photon Source (APS) and the APS-Upgrade Project (APS-U).

- APS Mission Statement
- PSC Leadership Team

The APS is organized into an Office of the Director, three Divisions, and APS-U:

- APS Organization Chart and chart detailed with staff

The missions of the APS Divisions and the Groups that make up the Divisions and APS-U:

- APS Engineering Support Division (AES)
  - AES Mission
  - AES Groups and Organization Chart
  - EFOG is one of the groups in AES
- Accelerator Systems Division (ASD)
  - ASD Mission
  - ASD Groups and Organization Chart
- X-ray Science Division (XSD)
  - XSD Mission
  - XSD Groups and Organization Chart

- APS-Upgrade (APS-U)
  - APS-U Organization Chart

APS/PSC Cross-Divisional Standing Committees include:

- Operations Directorate (OPS Directorate) charter and member list. The Ops Directorate collectively coordinates operating decisions that affect the facility as a whole).

EFOG Mission Statement

The Experiment Floor Operations Group (EFOG) provides facility ESH oversight for all user experiment safety and day-to-day beamline activities. EFOG also plays an integral role in radiation safety at the APS. The EFOG Floor Coordinators (FCs) are deployed around the experiment hall, providing shift coverage and support to users and beamline operations personnel to help ensure their activities meet ESH standards.

- Experiment Floor Operations Group staff

EFOG Roles and Responsibilities

Floor Coordinators (FCs): FCs represent the APS, providing oversight of User (both Argonne personnel and non-Argonne personnel) activities and assisting in keeping users safe and beamline operations in conformance with applicable safety standards.

- Safety Oversight: The EFOG is charged with ensuring both safe work practice and a safe work environment are maintained on the experiment floor. Floor Coordinators review work proposals and requests, work directly with contractors scheduled by beamline staff, and monitor work in progress. Floor Coordinators are key in the configuration management of radiation safety shielding systems, including:
  - Change Control for Radiation Safety Shielding,
  - Management of Configuration Control Work Permits and
  - Labelling of radiation safety systems (see section 19).
- Operation Oversight: The EFOG also has a role in maintaining daily operations. Floor Coordinators monitor and interact with ACIS, PSS, FEEPS, and BLEPS interlock systems to diagnose problems, plan repairs, and minimize beamline and facility downtime.
- Experimental Floor Liaison: The EFOG serves as the point of contact for users, work groups, and the Main Control Room (MCR). The Floor Coordinators are knowledgeable of APS and Argonne requirements and resources and gather, organize, distill, and transmit information, and finally put people and resources together to facilitate work on the experiment hall floor.

EFOG Leader/User Safety Officer: Is responsible for:

- Developing and implementing a safety program for APS Users
- Managing the EFOG Group
- Implementing and providing oversight of the User experiment safety program, in conjunction with the Experiment Safety Review Board and administrative oversight provided by FCs:
  - APS Experiment Safety Reviews

Argonne and the APS are committed to providing safe and healthy working conditions for the prevention of work-related injury and ill health. See the Argonne Safety and Health Policy (LMS-POL-1).

Methods for the analysis of hazards and implementation of hazard controls in the work planning and execution process

The APS Work Planning and Control Policy (APS_1432773) establishes the requirements for work planning and control (WPC) processes to:

- Ensure a safe working environment, protecting workers and the public
- Ensure hazards associated with the work are mitigated or eliminated
- Identify clear roles and responsibilities of those involved in the planning and execution of the work
- Identify the impact of the work on the facility and the work force
- Support highly reliable facility operations
- Optimize the use of effort and other resources to support the mission of the APS
- Provide a consistent framework to develop new or improve existing work practices

Facility Technical Task (not experiments or conventional construction) work is planned using the Argonne AWARE application. See the APS Work Planning and Control Policy and Argonne Work Planning and Control Manual for complete requirements.

Methods for approving, posting, maintaining, and controlling access to electronic operations documents (procedures, drawings, schedules, maintenance actions, etc.)

The Managing APS Documents Policy (APS_1273342) establishes that documents required for:

- Maintaining a safe work environment;
- Maintaining reliable and efficient operations; and
- Recording the business and R&D activities of the APS

are maintained in an APS-approved repository.

Administrative and R&D Documents are typically: 1) kept in the APS Integrated Content Management System (ICMS); 2) can be regenerated from the APS business database; or 3) paper copies of some beamline permits and forms may be filed in FC offices. Engineering documents may be kept in ICMS or other approved, specialized electronic document systems. Repositories for select EFOG records:

- Shift logs - APS business software system (see section 12 for more information)
- Experiment Safety Assessment Forms (ESAFs) - APS business software system
- Configuration Control Work Permits (CCWPs) - ICMS
- Copies of health physics (HP) routine radiation surveys – paper copies kept in FC files

3. SHIFT ROUTINES AND OPERATING PRACTICES

The EFOG Group provides facility ESH oversight for all user experiment safety and day-to-day beamline activities. The EFOG Floor Coordinators are deployed around the experiment hall, providing shift coverage, and support to users and beamline operations personnel to help ensure their activities meet ESH standards.

Typical shift schedule during User Operations:

- Weekday Coverage
  - Shift 1: 2200 to 0800 - FC on-call, contact the MCR
  - Shift 2: 0800 to 1600 – FC
  - Shift 3: 1400 to 2200 – FC
- Weekend Coverage
  - Shift 1: 0000 to 0800 – FC on-call, contact the MCR
  - Shift 2: 0800 to 1800 – FC
  - Shift 3: 1800 to 0800 – FC on-call, contact the MCR

Shift Exchange during weekday coverage from Shift 2 to Shift 3 occurs at 1500

Posted online:

- Floor Coordinator On-Shift Schedule, applicable during user operations
- Floor Coordinator Shutdown Shift Schedule, applicable during APS shutdown periods

While on-shift, Floor Coordinators must be available to:

- Review, post, and assist users with questions about the Experimental Safety Assessment Form packet.
- Investigate messages generated from the various safety protection systems on the experiment floor. If an issue is found, or cause of the

message is not known, the responding Floor Coordinator will contact the appropriate work group to troubleshoot or repair the system.
- Review, post, and in some cases instigate Configuration Control Work Permits for all RSS work on the experiment floor and front ends. It is also the responsibility of the Floor Coordinators to establish a radiation safe working state before work begins.
- Respond to and records any reported events on the floor.

The on-call Floor Coordinator should remain available by phone for the duration of the shift.

Floor Coordinators not on-shift are expected to be on-site to provide support to their local beamlines and manage assigned projects.

4. CONTROL AREA ACTIVITIES

Floor Coordinators offices are located in each LOM, typically in the central pentagon, with direct access to the experimental hall. Each office is equipped with a shared computer, which can be used by any other Floor Coordinator, and a personal computer. Additionally, each office houses safety signage, locks/chains for securing hutches housing hazardous materials, forms utilized by the Floor Coordinators, a toolbox with materials for removing and restoring configuration control, and a secure lockbox with local area keys. Floor Coordinator offices are keyed with the same lock to be accessible to all other Floor Coordinators, as well as the MCR Operators via a key securely stored in the MCR.

Each computer in a Floor Coordinator office has access to the MEDM-based EPICS control, which is utilized by Floor Coordinators to monitor and manipulate various systems and equipment in the storage ring front end and beamlines. Only authorized users/accounts may be granted edit privileges to this system.

5. COMMUNICATION

Contacting the EFOG/ Floor Coordinator On-Duty

The EFOG can be reached by emailing to: UES@aps.anl.gov.

The on-shift floor coordinator can be reached by:
- Pager: 2-0101 and leaving a call back number
  - From an Argonne extension: 2-0101
  - Other phones: 630-252-0101
  - Cell phone : 630-863-0808 (alternate 630-863-0829)
  - Submitting a request via the Floor Coordinator Request webpage.

During User Operations a Floor Coordinator is:

- Available on-site:
  - Monday-Friday: 8 a.m. - 10 p.m.
  - Weekends: 8 a.m. - 6 p.m.
- On-call at other times and may be contacted through the APS Main Control Room.

During APS maintenance periods, a Floor Coordinator is:

- On-site Monday-Friday 8 a.m.- 4 p.m.
- On-call at other times and may be contacted through the APS Main Control Room.

EFOG electronic communications

The EFOG maintains an electronic log of events that occur on the APS experiment floor, available for public viewing on the FC Shift Log Public page

Additional records and notifications posted on-line on the EFO home page:

- EFOG Group Meeting minutes
- Standing Orders
- Beamline Administrative Restrictions

Communications Systems for Emergency Operations

Communication systems have been implemented to ensure that all facility occupants are warned of hazards and threats and are promptly alerted to facility emergencies. When personnel are working in areas where the public address system or emergency signals cannot be heard, alternative methods for alerting these persons shall be utilized.

911

The principal mechanism to be used by individuals to report an emergency incident is to dial 911 using an Argonne telephone or to call 630-252-1911 from a cellular phone. All employees and resident visitors are trained to call 911 in any emergency. If in doubt if you should call 911

Laboratory-Wide Alert System

Argonne maintains a site-wide notification system to provide time-urgent warnings (e.g., fire alarms, tornado warnings, and emergency alerts). The Argonne Office of Emergency Management (OEM) provides oversight of the capabilities of the Laboratory's public address system and the outdoor warning system. The Infrastructure Services (IS) organization is responsible for maintaining these systems. Periodically, but at least annually, OEM arranges for testing of the site's

general notification and warning systems. Uses of the systems are detailed in the Argonne Comprehensive Emergency Management Plan (CEMP) and related OEM procedures. References:

- Emergency Management Planning (OEM): LMS-POL-4
- Operating and maintaining the Argonne Notification and Warning Systems policy: LMS-POL-29

All Argonne employees and resident visitors are trained to recognize the emergency audio-signals used by Argonne (e.g., fire, tornado, and hazardous materials releases) and those used by APS to announce emergency situations, as well as the proper actions to be taken. Training is administered and managed using the Laboratory's Training Management System (TMS).

The Argonne Director of Communications and Public Affairs Division (CPA) oversees non-emergency use of these systems.

Site-wide e-mail notices include Argonne Newsroom general Campus Updates, sent for non-emergency announcements, and OEM Argonne Alert System notices.

APS Public Address Systems for Normal Operations

The APS maintains local public address that is integrated into the Argonne site system. The Building Manager coordinates operational and maintenance requirements for the building’s notification and warning systems and capabilities. The building manager also serves as a point of contact for activities that may affect building notification and warning system operations. The APS Facility managers may direct actions to confirm the availability of a functional notification and warning system.

The APS public address system use is controlled to maintain its effectiveness and prevent it becoming too commonplace.

APS General Announcements emails are sent for APS site-wide non-emergency notifications.

6. ON-SHIFT TRAINING

The APS has implemented a rigorous program for Floor Coordinator training detailed in:

- FC Training Modules

The training program is delivered through:

- Classes
- Required Reading - see section 15
- On the Job Training (OJT)

For OJT, a Floor Coordinator shall be qualified as determined by the EFO Group Leader to administer training to a trainee. OJT trainees are supervised by qualified personnel ensuring that unqualified personnel do not make mistakes that could adversely affect safety or operations. The instructor monitors the trainee closely and remains in a position to intervene or assume control. Training topics, activities, and applicable procedures are identified in the training modules. Any pre-requisite training as determined by the job hazard questionnaire (JHQ) must be completed before OJT of the activity can proceed. Completion of training will be recorded as noted in the specific training material.

7. INVESTIGATION OF ABNORMAL EVENTS, CONDITIONS, & TRENDS

All significant aspects of an abnormal event are to be investigated and resolved. This review process requires that abnormal events satisfying defined criteria be promptly reported to APS management. APS management must promptly investigate in accordance with guidelines identified LMS-PROC-188 (Section 3.2.4 (Lab Procedure Accelerator Safety)). Following collection and evaluation of data, line management must develop and implement a plan to prevent recurrence of the event or, alternatively, to prevent undesirable consequences that might result from or otherwise be associated with the abnormal event if it were to recur.

If the event indicates a potentially significant increase in the consequence or probability from the hazards analyzed in the Safety Assessment Document, the process described in APS_1185831 (Unreviewed Safety Issue Determination) shall be followed.

An occurrence is an event or condition that adversely affects, or may adversely affect, Laboratory personnel, the public, property, or the environment and is determined to be reportable as defined in LMS-PROC-157, Incident Notification. In addition, “near miss” situations shall be reported for review if it is suspected that such a review might uncover circumstances that could lead to a recurrence with potentially serious consequences.

Events requiring investigation are defined in LMS-MNL-5, Performance improvement.

As is appropriate to their assigned duties, all personnel have the responsibility to remain attentive to operational conditions or events indicative of hazards to:

- The safety or well-being of persons working at or visiting the APS;
- The general environment;
- The APS facility and associated equipment; and
- The reliable operation of the facility.

Individuals who find themselves engaged in an unsafe activity or observe unsafe working conditions are empowered and obligated to stop any activity that they deem to have placed them or others in immediate danger. It is also an obligation of anyone stopping work to bring such conditions immediately to the attention of the Division Director or line supervisors of the relevant organization.

Division or department management must ensure that work is not restarted until appropriate hazard control measures are in place.

8. NOTIFICATIONS

Individuals that observe conditions or events that can adversely impact APS operations, ESH, or security should report them.

Stop Work

- Per Argonne Safety & Health Policy (Argonne LMS-POL-1), everyone at Argonne is empowered and obligated to stop any activity they deem to present an imminent danger. The APS Work Planning and Control Policy (APS_1432773) also set the expectation workers stop or pause work due to deviations from an approved work scope or unexpected or unsafe events.
- After the potentially unsafe situation is secured, the person issuing the stop work shall immediately notify the AES Division Director or more senior line management. (Work may restart per Argonne LMS-POL-1.)
- Stop work issued by EFOG personnel shall be noted in the shift log.

911 - any emergency incidents on site

- When an emergency incident occurs, safely stabilize the situation to the extent possible (e.g., pause or stop work) and take one of the following actions
  - Call:
    - the 911 hotline from an Argonne landline
      or
    - 630-252-1911 from a cell phone on site
- Notify your manager , or more senior line manager, as soon as possible that you placed the 911 call.

- Any 911 calls related to experimental floor activities shall be noted in the shift log.

Accidents and Injuries

- When an injury or accident occurs, once the situation is secured, notify your supervisor and an ESH Coordinator as soon as practical.
- The supervisor will conduct an investigation, and the ESH Coordinator and the ALD ESH Program Manager will be responsible for follow-on notifications, if any, to Argonne and/or DOE.

9. CONTROL OF EQUIPMENT AND SYSTEM STATUS

Configuration Management of Radiation Safety Shielding

Floor Coordinators play an essential role in the configuration management of radiation safety shielding (RSS):

- FCs maintain inventories and signage of RSS components through:
  - Beamline Component Database
  - RSS Interface Documents (beamline specific, housed in ICMS)
  - Configuration Control tags using guidance and templates found on EFO webpage

- FCs support of RSS Configuration Management includes:
  - Review of work proposed to take place in the Front Ends or on the Experiment Floor to determine if work will affect RSS components
  - Coordination and oversight of all RSS work in the Front Ends and on Experimental Floor
  - Establishing a radiation safe state prior to RSS work beginning (described in the Enabling and Taking Beamlines Off-line section)

- FCs manage permits for RSS change control:
  - Determined by RSS Policy-Change Control for Radiation Safety Shielding (APS_1685081)
  - Primary Permit: Configuration Control Work Permit (APS_1192930)
  - The FC Reference page contains specific CCWP sub-processes, e.g., Configuration Control Work Permit Procedure for Opening and Closing Labyrinths and Mini-hutches (APS_1205731).
  - FCs will post a UES Type C Radiation form and organize a survey with Health Physics if appropriate for return to operations
  - FCs will investigate and reset PSS and FEEPS trips/faults to restore beam permit according to Personnel Safety System (PSS) Trip and Fault Reset Procedure (APS_1273833) and Front-End Equipment Protection System (FE-EPS) Reset Procedure (APS_1273831)

Beamline Operations Administrative Controls

FC are responsible for the management of administrative controls placed on the operating envelope of beamlines. The administrative controls can be identified during the design review process, during routine surveys, or *in situ* as a response to an adverse event.

Types of Administrative Controls Used:

- Administrative Restrictions (AR) to prevent beamlines from operating in specific ways or under specific conditions as described in Procedure for Administrative Restriction Forms on APS Beamlines (APS_1273829)
- Beamline Mode Change Procedures, summarized on the FC Resource webpage

APS Enable and Taking Beamlines Global Off-line

Floor Coordinators are tasked with creating a radiation safe state by placing beamlines Globally Offline and/or removing APS Enable:

- during RSS/CCWP work
- during maintenance periods
- after an incident or as part of troubleshooting an issue
- as a result of an administrative restriction
- if a condition described in the Beamline Pre-Run Procedure (APS_1280000) is not met

Relevant Procedures:

- Use of the APS Enable Key (APS_1251334)
- Procedure for the Use of Beamline Global Online Keys (APS_1186603)

10. LOCKOUTS AND TAGOUTS

Lockout and Tagout (LOTO) is a practice to establish positive control over hazardous energy sources to protect personnel from injury and to protect equipment from damage while work is being done.

Workers must use LOTO when working on or near equipment that could cause injury to people if the equipment unexpectedly energizes, starts up, or releases stored energy. Hazardous energy is any form of energy that can cause personal injury including electrical, mechanical, pressure or vacuum, hydraulic and pneumatic. No matter what the source, mitigating hazards by isolating hazardous energy and using LOTO is part of Integrated Safety Management.

There is a flow-down of LOTO requirements from national codes and standards to Argonne Lab-wide requirements, which are implemented in APS procedures.

Mandatory National Codes and Standards

- 10 CFR 851, *Worker Safety and Health Program (*which establishes the following referenced codes and standards)
- Title 29 CFR 1910, Occupational Safety and Health Standards
- Title 29 CFR 1926, Safety and Health Regulations for Construction

And for electrical safety:

- NFPA 70, National Electrical Code (NEC)
- NFPA 70E, Standard for Electrical Safety in the Workplace
- ESH-385 Switching operations for non-qualified electrical worker (QEW)

Argonne Hazardous Energy Program

To prevent injury to personnel or damage to property that may result from hazardous energy and to implement the national codes and standards, the Laboratory has established a hazardous energy program. The program is described in: Hazardous Energy Program Manual (LMS-MNL-4)

This Manual sets minimum standards that must be met by the local APS processes.

To control the ubiquitous laboratory electrical hazards, to protect personnel, Argonne has established: 1) a Qualified Electrical Worker Program and 2) minimum requirements for identifying and controlling electrical hazards and Laboratory-wide site-specific electrical safe work practices that meet regulatory requirements and match the types of hazards found on site as detailed in:

- Electrical Safety Work Controls, Chapter 6 of the Argonne Electrical Safety Manual

This Manual also sets minimum standards that must be met by the local APS processes.

Floor Coordinators performing LOTO must have the appropriate ANL training for performing the type of LOTO being applied.

Floor Coordinator LOTO Procedure

- Procedure for Performing Circuit Lockout/Tagout of 110/208V Technical Panels (APS_1270643)

If a LOTO lock is applied by a Floor Coordinator, the key may be stored in one of the Floor Coordinator lock boxes.

Floor Coordinators also act as LOTO custodians for LOTO stations around the APS.

11. INDEPENDENT VERIFICATION

The Floor Coordinator, as designated on a Configuration Control Work Permit, provides independent oversight on RSS work as described in: Change Control for Radiation Safety Shielding (APS_1685081). This includes verification of proper approvals and signoffs, establishing and restoring a safe working state, independently monitoring RSS work, and determining and facilitates any required Type C radiation surveys. Additional information about the Floor Coordinator role in CCWP and Type C Surveys can be found in: Posting a Beamline or Front-End Configuration Control Work Permit (APS_1414320) and EFOG Type C Survey Information Form.

Specifically, for welding on hutches, the Floor Coordinators will determine if a welding is allowable based on the requested location, via the form: APS Experimental Hutch Welding Location Request Form (APS_2185611). Additional information can be found in: Managing Welding Performed on Experimental Enclosures (APS_1258901).

During maintenance shut-down periods, Floor Coordinators conduct a variety of walkthroughs to prepare for the start of a new user run. These include QEW electrical walkthroughs, a Configuration Controlled Components List walkthrough, and an Administrative Restriction walkthrough. Further detail can be found in: Beamline Pre-Run Preparation (APS_1280000).

Floor Coordinators conduct the final review and authorization for all user experiments at the APS to ensure accuracy of experiment and to ensure users are aware of all restrictions, hazards, and reviewer comments. The process is described in: Instructions for Posting of Experiment Authorization Form/Experiment Hazard Control Plan (APS_1179853).

Floor Coordinators provide oversight for contractor visits for beamlines. This includes verifying scope of work, verifying contractor has completed required training, and completion of a tool inspection.

12. LOGKEEPING

EFOG logbooks capture thorough, accurate, and timely recording of User Floor Operations information for performance analysis, trend detection, and to reconstruct important events.

FC Shift Log

FC shift log maintained in APS business database:

- FC Shift Log searches:
  - Latest Shift Logs - 24 hrs
  - Latest Shift Logs - 7 days
  - Latest Shift Logs - All
  - Shift Log Search
  - Shift Log ESAF Table

Shift log will record the FC making the entry, time, and date, and:

- If entry for posting an Experiment Authorization form, the ESAF number and note special hazards or
- Narrative of events.

Information regarding activities shall be recorded promptly throughout the shift in order to ensure the accuracy of the entry. The time of each event shall be indicated by means of a uniform clock notation. Delaying the recording of activities or events often leads to incomplete or inaccurate entries.

Once entered, the text of a shift log entry cannot be edited. Appending the original log is appropriate for corrections or additions to the original entry.

Beamline Downtime Reports

In the event that a beamline cannot operate due to an issue not related to the storage ring, Floor Coordinators will create a Beamline Downtime Report. This report will recount the cause, solution, and length of time the beamline was unable to operate.

Form and Permits

FCs shall maintain records of forms and permits they complete, including:

- CCWPs - entry into ICMS and filed in the local Floor Coordinator's office
- Completed Type C surveys - filed in the local Floor Coordinator's office
- Administrative Restrictions - entry into ICMS
- Other forms or permits - as required by DOE, Argonne, or APS requirements

FC shift logs and downtime are maintained in online databases and will be retained for the life of the facility.

13. TURNOVER AND ASSUMPTION OF RESPONSIBILITIES

Floor Coordinator to Floor Coordinator Turnover

During shift turnover between Floor Coordinators, a summary of the events of the shift should be shared. This includes:

- Operational status and issues
- User issues
- Events that occurred on the floor during the shift
- Notable/hazardous experiments in progress, including location and nature of the experiment. This should note any Administrative Restrictions in use due to the experiment.
- Any open or continuing issues or repairs

The Floor Coordinator assuming the shift should also review the FC Shift Log and the MCR logbook before fully assuming the shift.

After assuming the shift, the Floor Coordinator will call the MCR to inform them of who is on-shift and will log the shift assumption in the FC Shift Log.

Floor Coordinator to MCR Turnover

During user operations, the shift turnover to the MCR occurs when the on-shift Floor Coordinator leaves site at the end of Shift 3 (22:00). During this turnover, the Floor Coordinator should inform the MCR of:

- Operational status and issues
- Notable/hazardous experiments in progress, including location and nature of the experiment. This should note any Administrative Restrictions in use due to the experiment.
- Any open or continuing issues or repairs
- The name and contact information of the on-call Floor Coordinator

On-Call Responsibilities

During user operations, the on-call Floor Coordinator will be contacted by the MCR.

During APS maintenance periods, the on-call Floor Coordinator will retain one of the shift phones.

14. CONTROL OF INTERRELATED PROCESSES

MCR Back-Up

The Main Control provides some backup off-hours support for the EFOG:

- MCR Instructions

Plant Facility Services

Argonne's Infrastructure Services Directorate (IS) is responsible for such a process in providing and maintaining the building and utility infrastructure that house and support the APS. IS maintains a dedicated engineering group to support APS electrical and mechanical facilities. APS maintains responsibility for technical (accelerator and experimental) systems.

FCs are the designated APS points of contact for IS for IS-managed work that may impact beamline operations. FCs will coordinate IS work with beamline personnel.

The IS/APS Site Operations Group Leader is the designated IS point of contact. The ASO Group Leader is matrixed to the PSC/AES Division and is physically located in APS facilities.

A memorandum of understanding (MOU) has been jointly prepared by PSC and IS that defines the responsibilities for infrastructure to be provided to the APS by IS:

- Memorandum of Understanding Between The Photon Sciences Directorate (PSC) And The Infrastructure Services (IS) Directorate For the Advanced Photon Source (APS) Complex (APS_2030428).

15. REQUIRED READING

Required Reading for Floor Coordinators Includes:

- Floor Coordinator Training Modules (wiki)
- Required procedures (as noted) found on the EFO Resource Page

Floor Coordinators are also expected to complete any training required by APS, Argonne, or DOE. Argonne training requirements for employees are identified via a Job Hazard Questionnaire and are tracked by the Argonne Training Management System (TMS). Some TMS training may consist of required reading with materials provided online through TMS or through instructor lead courses.

16. TIMELY INSTRUCTIONS/ORDERS

Standing orders used by Floor Coordinators are housed in the Standing Orders page of the EFOG webpage.

Floor Coordinators communicate long-term direction to the MCR Operators for off-hours via the EFOG Instructions for Operators page on the EFOG homepage.

Short-term instruction for off-hours is communicated via daily turnover notes to the MCR. This information can include the over-night on-call Floor Coordinator, notice of hazardous experiments in progress, action needed by the MCR in response to these hazardous experiments, and other information about current floor operation.

Floor Coordinators also utilize Administrative Restrictions on beamlines to prohibit operation under specific conditions until acceptable criteria are met. These can be used to cover a variety of situations, such as beamlines in the process of shielding verification, beamlines who have to completed annual radiation surveys, operating conditions due to shielding deficiencies, or use of certain hazardous materials in user experiments. The Administrative Restrictions are physically posted at the appropriate beamline end cabinet, and a record of posting is recorded in the Floor Coordinator shift log.

17. OPERATING PROCEDURES

Operations procedures provide specific directions for operating accelerator systems and equipment during normal and postulated abnormal and emergency conditions. They help ensure that the facility is safely operated and within its design bases.

APS Facility Procedures

The APS process for the development and maintenance of facility procedures, including MCR operating procedures, is detailed in:

- Managing APS Facility Procedures (APS_1001409)

Facility procedures are maintained in ICMS (Managing APS Documents Policy, APS_1273342) and use ICMS workflow for review and approvals. Required minimum approvals are identified in the policy. New procedures are submitted to an APS-designated Procedure Administrator (PA). The PA works with the author and facilitates the formatting, workflow, periodic reviews, and addressing feedback (feedback link). The template used for APS procedures is available through ICMS (APS_1191216). Once approved, a procedure is released in ICMS, and a

persistent URL provides the link to the latest revision. Personnel should verify that all printed copies are current before using them.

EFOG Procedures

EFOG operations procedures:

- Should be sufficiently detailed such that they can be executed without direct supervision.
- The sequence of procedural steps shall conform to the normal or expected operational sequence.
- Shall maintain operations within the “safety envelope” defined by the Safety Assessment Document (SAD) (APS_1188832). If there is the potential that an activity will or may have exceeded the safety envelope, the Unreviewed Safety Issue Determination (APS_1185831) process is to be followed.
- Warnings, notes, and cautions shall precede the step to which they apply, shall be easily identifiable, and shall not contain action statements.
- Procedures shall be technically and administratively accurate (i.e., the instructions and information should be correct; referenced documents should be correctly identified; and necessary instructions shall be present to guide the user when transferring between procedures).
- Individual signoffs shall be provided for critical steps.
- Limits and/or tolerances for operating parameters shall be specified and shall be consistent with the readable accuracy of instrumentation.
- Acceptance criteria for surveillance or test procedures shall be easily discerned, including tolerances and units.

Emergencies

Procedures are prepared for anticipated facility conditions. Personnel may take whatever corrective actions are necessary during emergencies to place the equipment in a safe condition, and to protect equipment, personnel, and public safety without first initiating a procedure change. Employees shall be capable of performing the immediate action steps of emergency procedures without reference to the procedure. The emergency procedure shall be reviewed after the actions are performed, verifying that all required actions have been taken.

Post-Incident Procedure Reviews

Applicable procedures shall be reviewed after an unusual incident (such as an accident, significant human error, or equipment malfunction).

18. FLOOR COORDINATOR AIDS

For many activities it is useful to use aids and reference materials to assist in the operation of instruments or facilities, to call attention to key steps, or to identify critical control points or values. Floor Coordinator aids and reference materials serve as a convenient reminder or quick reference source for information, not as operational requirements and not as a substitute for procedures.

Useful information can be found of the EFOG webpage.

FC aids shall not bypass the normal APS procedure review and approval process (Managing APS Facility Procedures, APS_1001409). Floor Coordinator aids that are inconsistent with or have the effect of altering facility procedures will not be approved. Instead, as appropriate, procedures should be revised per APS procedures.

19. COMPONENT LABELING

Radiation Safety Systems (RSS)

RSS prevent exposure of personnel to unacceptable levels of ionizing radiation. For the purposes of this policy, RSS include:

1) Shielding – the hardware that stops, for safety purposes, the propagation of radiation (e.g., lead, tungsten, copper, steel, or concrete absorbers in shutters, stops, apertures, collimators, transport, and enclosures);
2) Hardware that positions the shielding – supports and controllers through actuators (e.g., support tables, clamps, actuators, pneumatic systems, and control boxes);
3) Personnel safety interlocks (ACIS and PSS), from Programmable Logic Controllers (PLCs) to monitored radiation safety devices (e.g., shielded door/shutter/stop position switches; interlock control cabinets, enclosures and wiring; emergency stop (crash) buttons; radiation monitors interfaces; particle beam current monitors and associated wiring, etc.;
4) Shielding covers, excluding any other equipment mounted on an RSS, where the presence or absence of the hardware does not impact the radiation protection provided.
5) Equipment required to protect an RSS component, the absence of which could compromise an RSS (e.g., a mask required to protect a safety shutter) is part of the RSS.

All RSS at the APS shall be labeled and subject to controls that ensure the configuration of the system is known (refer to section 9), documented and that all subsequent changes are controlled and tracked.

RSS are identified as part of design reviews and included in RSS inventories:
APS Design Reviews (APS_000031)

- RSS Component Classification
- Machine Component Database
- Beamline Component Database
- For each beamline RSS are listed on a:
  - Component Reference Table (maintained by Floor Coordinators and approved by the PSC Design Review Committee)
  - Configuration Control Component List

RSS shall be clearly identified (typically red tagged) to alert employees that authorization is required to work on the system. APS employees that do hands-on (i.e., not just office type work) are trained on RSS configuration controls.

RSS tags are generated and maintained by APS Floor Coordinators.

- Instructions for Making RSS Tags
- RSS Tag Template

RSS tags are durable and securely attached. On a component-by-component basis the tags are placed to be visible and so as not to interfere with controls or equipment.

Any work on RSS requires a Configuration Control Work Permit (see Chapter 8):

- Change Control for Radiation Safety Shielding (APS_1685081)

The Floor Coordinator group is responsible for reviewing and posting Configuration Control Work Permits, as well as establishing a radiation safe working state prior to the start of work. At the conclusion of the work, Floor Coordinators are responsible for confirming work is complete and reestablishing an operational state.

After a shutdown or reconfiguration, a Floor Coordinator will do a walk-down inspection to confirm that the as-install configuration of tagged RSS is consistent with facility records.

GLOSSARY

ACCELERATOR ENCLOSURE
Any one of the areas that contains accelerator components through which accelerated particles pass.

ACCELERATOR SYSTEMS DIVISION (ASD)
The APS division responsible for the systems required for the creation and acceleration of charged particle beams at the APS, including the linac, particle accumulator ring, booster/synchrotron, storage ring, and low-energy test line. The ASD also is responsible for the operation of the particle beam, the development and operation x-ray radiation sources, and development of the next generation synchrotron radiation sources.

ACCIDENT
An undesired event that results in injury, illness, damage to equipment, or insult to the environment.

ADMINISTRATIVE CONTROLS
Broadly defined as any written policies, procedures, standards, or limits set by APS Management that must be strictly adhered to for reasons of safety or equipment protection. An Administrative Control for a power supply, for example, might include a prohibition against operating the power supply above a certain voltage and/or current because of possible damage to other equipment even though the power supply itself is capable of such operation.

ALD-PSC ESH/QA PROGRAM MANAGER
An individual designated by position description as responsible for coordinating the development and implementation of the APS Environment, Safety, and Health (ESH) and Quality Assurance (QA) program. The ALD ESH/QA Program Manager provides independent oversight on behalf of the DIR-APS in the areas of ESH and QA.

APS ENGINEERING SUPPORT DIVISION (AES)
The AES Division provides mechanical engineering, controls engineering, information technology, and database management support to the Accelerator Systems and X-ray Science Divisions. AES also manages the user ESH program and the APS radiation program, and the APS building and conventional facilities.

APS-MANAGED BEAMLINE SYSTEMS
Any beamline component/system and ancillary utilities that are deemed essential to radiation protection whose design, installation, and maintenance is performed and or reviewed by approved APS personnel.

ASSOCIATE DIVISION DIRECTOR FOR X-RAY SCIENCE DIVISION - XSD
An individual responsible for the operation of XSD beamlines and the quality and productivity of the research conducted on those beamlines.

AUTHORIZED ACCESS
Access to an accelerator enclosure by an authorized person without MCR intervention.

AUTHORIZED EMPLOYEE
An employee who has approval from the supervisor and has been trained to lock out energy sources in accordance with Argonne and APS procedures in order to service or maintain machines or equipment.

BEAMLINE PERSONNEL
Any person associated with or performing experiments on a beamline. This includes CAT/CDT members, APS personnel associated with APS-operated beamlines, general users, and partner users.

CAT DIRECTOR
An individual designated as having overall responsibility for the management of a CAT. CAT Directors are responsible for the following:

- Serving as the CAT's primary point of contact with APS management.
- Ensuring that all work carried out in the CAT's sector(s) at the APS is CAT as well as the APS-approved CAT management Plan and the APS Users Policies and Procedures.
- Maintaining CAT-owned equipment.
- Ensuring that all research and support operations performed by users at the CAT beamlines are consistent with the APS-approved CAT Safety Plan and comply with the safety and operational guidelines provided orally or in writing by the APS, including those elements of the Conduct of Operations Manual that apply in accordance with the graded approach.

The Director of the X-Ray Science Division (XSD) has these responsibilities for all APS operated beamlines.

CHIEFS OF OPERATIONS (CO)
The Chiefs of Operations are staff members whose responsibilities are focused on one or more portions of the accelerator complex (e.g., linac, control system). Among other duties, they are responsible for Floor Coordinator training and certification, assisting on-shift personnel in troubleshooting problems, and scheduling work on accelerator components. The responsibilities of the COs include but are not limited to the following:

- Act as a liaison between the MCR Group and the technical groups.
- Be on-call to assist the Floor Coordinators, Machine Managers, and MCR Group leader in solving operational problems as they arise.

- Assist in the development of systems, accelerator studies, software, procedures, and policies related to his/her area of responsibility.
- Assist in tracking reliability and analyzing faults to determine causes and remediation.
- Act as training and qualifications officers in EFOG Group in his/her area of expertise.

COLLABORATIVE ACCESS TEAM (CAT)
A Partner User group organized to develop and operate beamlines in a designated APS sector or sectors.

COLLABORATIVE DEVELOPMENT TEAM (CDT)
An external partner group that drives the development of a beamline that will be ultimately operated by the APS.

CDT DIRECTOR
Has the same roles and responsibilities as a CAT Director for CDT beamlines.

COMPUTERIZED LOGS
Logs that contain data in a format that can be used by both computers and APS personnel to reconstruct or restore operational states. Examples are Save/Compare/Restore files and downtime logs.

CONCERN
Matter of interest that may involve an event or condition with an adverse impact on safety, health, quality assurance, or the environment.

CONFIGURATION CONTROL WORK PERMIT
A CCWP is generated by the APS Work Request System for work on radiation safety systems in the accelerator, front ends, and beamlines. The CCWP is the administrative control to allow a device to be removed from service and safely returned to service. The accelerator, front end, or beamline cannot be enabled for operation until the conditions of the permit are satisfied. The criteria for return to service are defined in the APS Policy on Design, Installation, and Maintenance of Radiation Safety Systems.

CRITICAL COMPONENT SYSTEM MANAGER (CCSM)
The CCSM oversees work on radiation safety systems in the accelerator, front ends, and beamlines. The CCSM ensures that a responsible engineer is assigned to perform the work, that approved procedures are in place, and that the equipment is returned to service correctly.

DATA LOGGERS
Programs running on the APS controls system computers that record, at a prescribed frequency, the operational state of the APS facility.

DIVISION DIRECTOR
An individual designated by position description as having overall responsibility for an APS division. Division Directors have the line responsibility for carrying out the program established by the Operations Directorate. They translate the decisions of the Operations Directorate into detailed programs and schedules for their technical groups. Division Directors are responsible for providing the manpower and facilities to initiate and carry out the design, development, construction, and operation of the accelerator and beamlines. The Division Directors provide ongoing programs of maintenance and improvements to facility components to improve efficiency, increase operating reliability, and add facility capabilities.

DIVISION ESH COORDINATOR
An individual, appointed by and reporting to a Division Director, who develops and implements that Division's ESH programs.

DIVISION QUALITY ASSURANCE REPRESENTATIVE
An individual, appointed by and reporting to a Division Director, who assists in the development and implementation of that Division's QA/QC programs.

EXPERIMENTAL FACILITIES OPERATIONS GROUP - AES
EFOG has the responsibility of providing safety coverage on the experiment floor, overseeing user beamline readiness, operations, and safety. The coverage is provided by Floor Coordinators either being present or on-call. For times that the Floor Coordinators are on-call, AES Floor Coordinators will provide the floor coverage. To accomplish this task, the group has trained operations coordinators and safety personnel. In addition to the Floor Coordinators the safety personnel include the APS Biosafety Officer and matrixed Health Physics personnel. The individuals are described elsewhere in the Glossary.

EXPERIMENTAL FACILITIES OPERATIONS GROUP LEADER
The EFOG Group Leader is authorized by the AES Division Director to make any necessary day-to-day decisions involving minor changes to user operation parameters as established by the Operations Directorate. Changes that may directly affect the user program will be discussed with the AES Deputy Division Director. The EFOG Leader also serves as the APS User Safety Officer.

FLOOR COORDINATORS (FCs)
Individuals responsible for monitoring the safe operations of the user beamlines. The Floor Coordinators provide the first level of oversight for user compliance with APS policies, procedures, and safety and operational guidelines. At least one Floor Coordinator is on duty (present or on-call) at all times during User Operations periods.

INCIDENT
An event resulting in personal injury/illness, spill or release to the environment, loss or spill of radiological material, radiation exposure or contamination, chemical or physical agent exposure that may have potential health effects, fire or explosion, near miss, regulatory noncompliance, property damage, vehicle mishap, loss of assets, or an event or condition that adversely affects or may adversely affect DOE or contractor personnel, the public, property, the environment, or DOE mission.

INDEPENDENT VERIFICATION
Independent verification shall locate and identify the component and determine both its required state for safe operation and its actual state. The independent verification shall not change the component state unless state changes are specified in the validation procedure. All steps involved in verification shall be performed independently to avoid a common failure mode.

KIRK-KEY
Common name for a key used in conjunction with a system of key- capture units. These units capture a key while a mechanical action is in one condition and release it when the mechanical action is changed. Other such units capture several keys while releasing a “master” key, thus ensuring that the captured keys cannot be used elsewhere. These units and their unique keys are used to build a system that enforces an electrical and/or mechanical procedure.

LOCKOUT
The application of a lock and a tag identification on an energy-isolating device in accordance with an established procedure.

MACHINE INTERVENTION
The term used to describe time scheduled during user operations for accelerator-related activity. The primary use of this time is accelerator studies, although if accelerator components need repair or maintenance, this work will be scheduled to be performed during machine intervention time.

MACHINE MANAGER
An individual designated as having responsibility for the performance of one of the APS accelerators: linac, PAR, booster, storage ring, and the linac extension area (LEA). These individuals define and maintain performance parameters and must be involved in any design changes that affect performance parameters.

MAIN CONTROL ROOM GROUP - ASD
The Main Control Room Group has the responsibility of providing around-the-clock coverage during periods of accelerator operation, overseeing both accelerator operations and maintenance activities. To accomplish this task, the Group includes but is not limited to crews of qualified individuals and ACOs (with additional trainees) and several staff members. These individuals are in this glossary. The group is also responsible for developing high-level procedures and software for safe, reliable, and responsive operation of APS accelerators.

MAIN CONTROL GROUP LEADER
The MCR Group Leader is authorized by the ASD Division Director to make any necessary day-to-day decisions involving minor changes to the schedule and beam parameters previously approved by the Operations Directorate. The meaning of "minor" in this context will be established by discussions with the Operations Directorate and recorded in written policies by ASD management. Identification of the need for a minor change and subsequent actions may be delegated by the MCR Group Leader to the MCR Crew Chief and Chiefs of Operations through written policies and instructions. Significant changes to schedule or beam parameters require consultation of the MCR Group Leader, Chief of Operations, or Crew Chief with the ASD Division Director or his designee.

NARRATIVE LOGS
Logs in which APS personnel enter information that describes the events of their shifts, and pass on information to subsequent shifts and other APS personnel.

NEAR MISS
A situation where an incident was avoided by only a single barrier or when all of the conditions necessary to cause an incident existed (i.e., when all barriers were compromised).

OCCURRENCE
As defined in DOE M 232.1-1A, Occurrence Reporting and Processing of Operations Information, Appendix A: An event or condition that adversely affects or may adversely affect DOE or contractor personnel, the public, property, the environment, or DOE mission. Events or conditions meeting the criteria threshold for Unusual and Off-Normal occurrences are defined in the Argonne ESH Manual Chapter 1-8, Occurrence Reporting. Occurrences are reportable to DOE via the ORPS reporting system.

ON-SHIFT TRAINING (OST)
That portion of a Floor Coordinator qualification program where the trainee receives training within the job environment and with as much hands-on experience as possible.

OPERATING ENVELOPE
A set of physical and administrative conditions that define the bounding conditions to ensure that operations are held well within the safety envelope. Operating envelopes are set by machine managers with concurrence from the Argonne Radiation Safety Officer.

OPERATIONS DIRECTORATE
An advisory group chartered by the Director of the Advanced Photon Source (DIR-APS) that includes the DIR-APS, the Deputy ALD for Accelerators, Deputy ALD for X-ray Science, APS Division Directors, the APS ESH/QA Oversight Manager, a representative from the Partner Users Council, a representative from the APS Users Organization Steering Committee, and other appropriate personnel. The Operations Directorate gives input on operational issues that affect the facility as a whole.
They will review:

- Long- and short-term schedules proposed by ASD, including scheduled maintenance and facility improvement periods.
- Global operating parameters, such as energy, maximum circulating beam current, and fill patterns
- Requests for accelerator enhancements
- Operational statistics prior to publication

All minutes and actions taken by the Operations Directorate are recorded on the web. Important submitted material is also recorded on the Operations Directorate web page.

OPERATIONS PERSONNEL
Members of the ASD Main Control Room Group authorized to conduct hands-on operations of the APS accelerator systems.

ORDER
A written communication, posted on the APS intranet, that contains information prepared by management to relay instructions to AES Floor Coordinators. It is expected that AES Floor Coordinators know and follow all orders.

PROCEDURE CHANGE
An immediate change to a procedure, whether for permanent or one- time use, which does not involve reissuing of the procedure.

PROCEDURE REVISION
A reissued edition of a procedure.

RESIDENT BEAMLINE PERSONNEL
Beamline personnel who are onsite at the APS collectively for three of the twelve months in a calendar year.

SAFETY ASSESSMENT DOCUMENT
The document containing the results of the safety analysis of an accelerator facility pertinent to understanding the risks associated with its operation.

SAFETY ENVELOPE
A set of physical and administrative conditions that define the bounding conditions for safe operations at an accelerator facility as approved by DOE.

SECTOR
A subunit of the APS consisting of the Experiment Hall space allocated to an insertion device beamline and the preceding bending magnet beamline, as well as that portion of the storage ring that includes these two radiation sources.

STANDING ORDER
An order accessed from the AES Floor Coordinator Group that generally falls into one of two categories: 1) an instructional order that is likely to be permanent and is of sufficient brevity that a procedure is not appropriate; 2) an administrative restriction on a beamline that prevents operation for an extended duration of time. For example, describing allowable situations for MCR Operators to perform some Floor Coordinator tasks can result in a Standing Order. Another example is an administrative restriction that limits the operating gap of a beamline due to shielding deficiencies.

SYSTEM/RESPONSIBLE ENGINEERS
Individuals designated by position description or assignment as responsible for improving and ensuring the proper maintenance and repair of a specific technical system within the APS. The System/ Responsible Engineer is a member of one of the technical groups of the APS divisions. A System/Responsible Engineer may be responsible for an entire system, such as storage ring rf or synchrotron vacuum, or for a subsystem thereof, such as storage ring rf modulators or synchrotron vacuum pumps. The System/Responsible Engineer shall ensure that a technical contact is reachable 24 hours a day during operational periods.

TECHNICAL GROUPS
The groups responsible for the maintenance, repair, and improvement of all APS equipment. Administratively, each technical group is part of an APS division. In most cases, these groups are organized along lines of technical expertise; for example, the Power Systems Group is responsible for all magnet power supplies. In general, all System Engineers are members of these groups. The Technical Group Leaders, working with the System Engineers, are responsible for setting up appropriate maintenance schedules for the equipment under their jurisdiction.

TIMELY ORDER
An order provided by the AES Floor Coordinators that is considered short term, typically in place from one day to one run.. For example, AES Floor Coordinators providing

the MCR a list of hazardous experiments running overnight would be considered a timely order.

USER
An individual authorized to conduct research operations at an APS beamline. A user may be an employee of the APS, of an Argonne division outside of the APS, or from another institution. General users receive authorization to conduct research operations at the APS through the APS General User system. Partner Users are individuals or groups whose work involves a greater degree of collaboration with the APS than is generally expected of General Users. Users who are members of a Collaborative Access Team (CAT) are a class of Partner User as are users who are part of a Collaborative Development Team (CDT). Some Partner Users are authorized to conduct research operations at APS operated beamlines based on Partner User proposals submitted through the APS general user system. All Partner User groups may be composed of resident and non-resident users. Resident users are non-APS users who spend a significant part of the year at the APS and are in general responsible for the operations of non-APS beamlines, instruments, or experiments.

WORK REQUEST
An online form that is used to communicate the status of work. It is initiated when the work is first defined, and subsequently used to track work through the approval, execution, and final check-out phases. It also includes a variety of safety checks.

X-RAY SCIENCE DIVISION (XSD)
The APS division that manages x-ray science programs conducted under the XSD Associate Division Director develops and operates radiation sources, builds experimental station instrumentation for APS users and next-generation synchrotron radiation sources, and develops x-ray optics to support beamline research. Performs the APS directed x-ray science research and development and manages the operation of the APS beamlines.

DOE O422.1 DEFINITIONS

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, workstation, or experiment controls (e.g., switches, knobs, buttons) are located. (DOE-STD-1042-93, Ch 1)

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)

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)

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.

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).

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-1063-2017)

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)

Interrelated Processes. Those processes or activities that can affect operations but are under the control of persons other than the affected Floor Coordinators, such as shared support systems or special testing.

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.

Floor Coordinator 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)

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

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 - DOE O422.1 CONDUCT OF OPS REQUIREMENTS

a. Organization and Administration. (DOE-STD-1032-92 (CH-1), Guide to Good Practices for Operations Organization and Administration
The Floor Coordinator 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,
(4) Implementation of Department of Energy Oversight Policy, current version;
(5) management and worker accountability for the safe performance of work;
(6) management training, qualification, succession, and, when appropriate, certification;
(7) methods for the analysis of hazards and implementation of hazard controls in the work planning and execution process; and
(8) 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 Floor Coordinator must establish and implement operations practices to ensure that shift Floor Coordinators 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 Floor Coordinators 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 Floor Coordinator performance of duties.

c. Control Area Activities. (DOE-STD-1042-93 (CH-1), Guide to Good Practices for Control Area Activities)
The Floor Coordinator 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 Floor Coordinator 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 Floor Coordinators 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 Floor Coordinator must establish and implement operations practices that control on-shift training of facility Floor Coordinators, 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 Floor Coordinator 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.

g. Floor Coordinators 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.
Notifications. (DOE-STD-1045-93 (CH-1), Guide to Good Practices for Notifications and Investigation of Abnormal Events)
The Floor Coordinator 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.
Floor Coordinators 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 Floor Coordinator 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 Floor Coordinator 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 Floor Coordinator 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;

j. Independent Verification. (DOE-STD-1036-93 (CH-1), Guide to Good Practices Independent Verification. (DOE-STD-1036-93 (CH-1),
   The Floor Coordinator 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 Floor Coordinator 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 Floor Coordinator must establish and implement operations practices for thorough, accurate transfer of information and responsibilities at shift or Floor Coordinator relief to ensure continued safe operation, addressing the following elements:
definitions for all key positions requiring a formal turnover process;
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
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 Floor Coordinator 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 Floor Coordinators, such as shared support systems or special testing);
(2) Floor Coordinator 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 Floor Coordinators 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 Floor Coordinator must establish and implement operations practices for an effective required reading program to keep Floor Coordinators 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 Floor Coordinators)
The Floor Coordinator must establish and implement operations practices for timely written direction and guidance from management to Floor Coordinators, 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 Floor Coordinator 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. Floor Coordinator Aids. (DOE-STD-1043-93 (CH-1), Guide to Good Practices for Floor Coordinator Aid Postings)

The Floor Coordinator must establish and implement operations practices to provide accurate, current, and approved Floor Coordinator aids, addressing the following elements:
(1) technical evaluation and management approval of Floor Coordinator aids;
(2) Floor Coordinator aids serve as conveniences, not operational requirements;
(3) Floor Coordinator 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 Floor Coordinator 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.