

Advanced Photon Source Conduct of Operations Manual

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TABLE OF CONTENTS

ACRONYMS.....	xiii
FOREWORD.....	1
AVAILABILITY AND MAINTENANCE OF THIS MANUAL..	2
INTRODUCTION	3

APS ORGANIZATION AND ADMINISTRATION

CHAPTER

1

1.0	PURPOSE	5
2.0	SCOPE.....	6
2.1	Participative Input.....	7
2.2	Standards	7
3.0	DEFINITIONS	7
4.0	RESPONSIBILITIES	15
5.0	PROCEDURE.....	15
5.1	Operations Policies	15
5.2	Resources	16
5.3	Monitoring of Operating Performance.....	16
5.3.1	Abnormal Events.....	16
5.3.2	Facility Inspection Program	16
5.3.3	Self Assessments	18
5.3.4	ESH and QA Functions	18
5.3.5	Operations Oversight and Independent Review	19
5.3.6	Operating Performance Goals	19
5.3.7	Performance Indicators	19

5.4	Accountability	19
5.5	Management Training.....	20
5.6	Planning for Safety and Environmental Protection ..	20
5.6.1	Integrated Safety Management.....	20
5.6.2	Environmental Protection	21
5.6.3	User Safety Plans.....	21
5.7	Fitness for Duty	22
6.0	REFERENCES.....	22

CHAPTER**2****SHIFT ROUTINES AND OPERATING PRACTICES**

1.0	PURPOSE	23
2.0	SCOPE	23
3.0	DEFINITIONS	24
4.0	RESPONSIBILITIES.....	24
4.1	Crew Chief	24
4.2	MCR Operators	25
4.3	Floor Coordinators.....	26
4.4	System/Responsible Engineers	26
4.5	Beamline Personnel	26
5.0	PROCEDURE	27
5.1	Status Practices.....	27
5.2	Safety Practices.....	27
5.3	Inspection Tours.....	27
5.4	Personnel Protection Commensurate with As Low As Reasonably Achievable (ALARA) Guidelines....	28
5.5	Response to Indications	29
5.6	Resetting Protective Devices	29
5.7	Key Control.....	30
5.8	Changes to Operating Parameters.....	30
5.9	Temporary Modification Control	30
5.10	Authority to Operate Equipment	31
5.11	Procedure Compliance	32
5.12	Fitness/Alertness/Attention to Duty.....	32
5.13	Overtime Guidelines for MCR Shift Workers	32
5.14	Housekeeping.....	33

6.0 REFERENCES 33

MAIN CONTROL ROOM ACTIVITIES

**CHAPTER
3**

1.0 PURPOSE 35
 2.0 SCOPE 35
 3.0 DEFINITIONS 35
 4.0 RESPONSIBILITIES 36
 4.1 Operations and Analysis Group Leader 36
 4.2 Crew Chiefs and Operators 36
 5.0 PROCEDURE 36
 5.1 Control Room Access 36
 5.2 Professional Behavior 36
 5.3 Alarm Status 36
 5.4 Monitoring the Main Control Screens 37
 5.5 Operation of Control Area Equipment 37
 6.0 REFERENCES 37

COMMUNICATIONS

**CHAPTER
4**

1.0 PURPOSE 39
 2.0 SCOPE 39
 3.0 DEFINITIONS 40
 4.0 RESPONSIBILITIES 40
 4.1 All Personnel 40
 4.2 Crew Chiefs 40
 5.0 PROCEDURE 40
 5.1 Emergency Communications Systems 40
 5.2 Public Address System 41
 5.3 Contacting Personnel 41
 5.4 Portable Communication Devices 42
 5.5 Oral Instruction 42
 5.5.1 Operating Directions 42
 5.5.2 General Attributes of Good Communication 43
 5.6 Communication Devices 44
 5.7 Personal Pagers 44

5.8 Testing Communication Links 44
6.0 REFERENCES 44

CHAPTER CONTROL OF ON-SHIFT TRAINING

5

1.0 PURPOSE 45
2.0 SCOPE 45
2.1 APS Employees, Visitors, Users 45
2.2 MCR Operations Training 46
3.0 DEFINITIONS 46
4.0 RESPONSIBILITIES 46
4.1 Division Directors 46
4.2 ASD Operations and Analysis Group Leaders 47
4.3 ASD Chiefs of Operations 47
4.4 Group Leaders 47
4.5 Employees 47
5.0 PROCEDURE 47
5.1 Adherence to Training Programs 47
5.2 MCR On-Shift Instruction 47
5.3 MCR Qualified Operator Supervision and Control
of Trainees 48
5.4 MCR Qualification Program Approval 48
5.5 MCR/UES Training Documentation 48
5.6 MCR Suspension of Training 48
5.7 Maximum Number of Trainees 48
5.8 Elements of MCR On-Shift Training (OST) 49
5.9 Administrative Policies for Implementation
of MCR On-Shift Training (OST) 49
5.10 Review of JHQs 50
6.0 REFERENCES 50

CHAPTER INVESTIGATION OF ABNORMAL EVENTS

6

1.0 PURPOSE 51
2.0 SCOPE 52
2.1 Summary of Required Actions 52

2.2 Events Covered by Requirements of the Chapter. . . . 52

3.0 DEFINITIONS 52

4.0 RESPONSIBILITIES 53

4.1 Events Requiring Investigation 53

4.2 Investigation and Corrective Action Responsibility . 53

4.2.1 Occurrence Reporting 53

4.3 All Personnel 53

4.4 Supervisors 54

4.5 Division Directors 54

4.6 Division ESH Coordinators 54

4.7 Associate Laboratory Director 55

4.8 ALD ESH/QA Program Manager 55

5.0 PROCEDURE 55

6.0 REFERENCES 55

NOTIFICATIONS

CHAPTER

1.0 PURPOSE 57

2.0 SCOPE 57

3.0 DEFINITIONS 57

4.0 RESPONSIBILITIES 58

4.1 Individuals 58

4.2 Supervisors 58

4.3 Division ESH Coordinators 58

4.4 ALD ESH/QA Program Manager 58

5.0 PROCEDURE 59

5.1 General 59

5.2 Notification Procedures and Responsibility 60

5.3 Names and Phone Numbers 60

5.4 Documentation 60

6.0 REFERENCES 60

7

MANAGEMENT OF EQUIPMENT AND SYSTEM STATUS

CHAPTER

1.0 PURPOSE 61

8

2.0	SCOPE	61
3.0	DEFINITIONS	62
4.0	RESPONSIBILITIES.	63
4.1	Division Directors	63
4.2	Technical Group Leaders	64
4.3	Machine Managers.	64
4.4	Chiefs of Operation (COs)	64
4.5	Crew Chiefs and Floor Coordinators (FCs)	65
4.6	System/Responsible Engineer.	65
5.0	PROCEDURE	65
5.1	Work Planning	65
5.2	Work Approval	66
5.2.1	Work Request Authorization	67
5.3	Completion of Work	67
5.4	Equipment Deficiency Identification and Documentation.	68
5.5	Status Change Authorization and Reporting	69
5.6	Distribution and Control of Equipment and System Documents	69
6.0	REFERENCES.	69

CHAPTER LOCKOUTS AND TAGOUTS**9**

1.0	PURPOSE	71
2.0	SCOPE	71
3.0	DEFINITION	71
4.0	RESPONSIBILITIES.	72
4.1	All Employees.	72
4.2	Users, Contractors, and Service Personnel.	73
5.0	PROCEDURE	73
5.1	Lockout/Tagout: Chapter 7-1 of the ANL ESH Manual.	73
5.2	Subcontractors	73
5.3	Group Lockouts	73
5.4	Accelerator Enclosure Equipment Lockout/Tagout	73
5.5	Building 420 RF Equipment Lockout/Tagout.	74

5.6 Conduit Cutting Policy..... 74
 6.0 REFERENCES 74

INDEPENDENT VERIFICATION

CHAPTER

10

1.0 PURPOSE 75
 2.0 SCOPE 75
 3.0 DEFINITIONS 76
 4.0 RESPONSIBILITIES 76
 4.1 System/Responsible Engineers..... 76
 4.2 Technical Group Leaders 76
 4.3 CCSM
 4.4 APS Personnel 76
 4.5 Independent Verifiers..... 77
 5.0 PROCEDURE..... 77
 5.1 Components Requiring Independent Verification... 77
 5.2 Occasions Requiring Independent Verification 77
 5.3 Verification Techniques 78
 5.3.1 Independence 78
 5.3.2 Guidelines for Performing Independent
 Verification 79
 5.3.3 Independent Verification of Lockout/Tagout 79
 6.0 REFERENCES 79

CHAPTER

11

LOGKEEPING

1.0 PURPOSE 81
 2.0 SCOPE 81
 3.0 DEFINITIONS 82
 4.0 RESPONSIBILITIES 82
 4.1 Technical Group Leaders 82
 4.2 APS Personnel 83
 5.0 PROCEDURE..... 83
 5.1 Data Loggers 83
 5.2 Computerized Logs..... 83
 5.3 Narrative Logs 83

5.3.1	MCR Narrative Log	83
5.3.2	UES Narrative Log	84
5.3.3	Information to be Recorded	85
5.3.4	Log Review	86
5.3.5	Permanent Storage of MCR Logs	86
6.0	REFERENCES	87

CHAPTER

12

OPERATIONS TURNOVER

1.0	PURPOSE	89
2.0	SCOPE	89
3.0	DEFINITIONS	89
4.0	RESPONSIBILITIES	89
5.0	PROCEDURE	90
6.0	REFERENCES	91

CHAPTER

13

OPERATIONS ASPECTS OF FACILITY CHEMISTRY AND UNIQUE PROCESSES

1.0	PURPOSE	93
2.0	SCOPE	93
3.0	DEFINITIONS	93
4.0	RESPONSIBILITIES	94
4.1	Operator Responsibilities	94
4.2	Operator Knowledge	94
4.3	AES Conventional Facilities Group	94
5.0	PROCEDURE	94
6.0	REFERENCES	95

CHAPTER

14

REQUIRED READING

1.0	PURPOSE	97
2.0	SCOPE	97
3.0	DEFINITIONS	97
4.0	RESPONSIBILITIES	98

5.0 PROCEDURE 98
 5.1 APS Required Reading 98
 5.2 ASD Operations and Analysis Group Required
 Reading 98
 6.0 REFERENCES 98

CHAPTER
15

ORDERS TO OPERATORS

1.0 PURPOSE 99
 2.0 SCOPE 99
 3.0 DEFINITIONS 99
 4.0 RESPONSIBILITIES 100
 5.0 PROCEDURE 100
 6.0 REFERENCES 101

CHAPTER
16

OPERATIONS PROCEDURES

1.0 PURPOSE 103
 2.0 SCOPE 103
 3.0 DEFINITIONS 103
 4.0 RESPONSIBILITIES 104
 5.0 PROCEDURE 104
 5.1 Procedure Development 104
 5.2 Procedure Content 105
 5.3 Procedure Changes and Revisions 107
 5.4 Procedure Approval 108
 5.5 Procedure Review 108
 5.5.1 New Procedures 108
 5.5.2 Periodic Reviews 108
 5.5.3 Post-Incident Reviews 109
 5.6 Procedure Availability 109
 5.7 Procedure Use 109
 6.0 REFERENCES 110

CHAPTER

17

OPERATOR AID POSTINGS

1.0	PURPOSE	111
2.0	SCOPE	111
3.0	DEFINITIONS	111
4.0	RESPONSIBILITIES	112
4.1	Operations and Analysis Group Leader	112
4.2	Crew Chiefs	112
5.0	PROCEDURE	112
5.1	Operator Aid Guidelines in the Main Control Room	112
5.2	Use of Operator Aids	113
6.0	REFERENCES	113

CHAPTER

18

EQUIPMENT, CABLING, AND PIPING LABELING

1.0	PURPOSE	115
2.0	SCOPE	115
3.0	DEFINITIONS	116
4.0	RESPONSIBILITIES	116
4.1	Division Directors	116
4.2	Technical Group Leaders	117
4.3	All Personnel	117
5.0	PROCEDURE	117
5.1	General	117
5.2	Labels	117
5.3	Installation and Verification	118
6.0	REFERENCES	118

GLOSSARY	119
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ACRONYMS

ACIS	Access Control Interlock System
ACO	Assistant Chief of Operations
ADDXOR	Associate Division Director for X-ray Operations and Research
ALARA	As Low As Reasonably Achievable
ALD-SUF	Associate Laboratory Director for Scientific User Facilities
ANL	Argonne National Laboratory
ANSI	American National Standards Institute
AES	APS Engineering Support Division
APS	Advanced Photon Source
ASD	Accelerator Systems Division
CAT	Collaborative Access Team
CCSM	Critical Component System Manager

CCWP	Configuration Control Work Permit
CDT	Collaborative Development Team
CFG	Conventional Facilities Group
CO	Chief of Operations
DD/DH	Division Director/Department Head
DIR-APS	Director of the Advanced Photon Source
DOE	U.S. Department of Energy
ESH	Environment, Safety, and Health
FC	Floor Coordinator
JHQ	ANL Job Hazard Questionnaire
LEUTL	Low-Energy Undulator Test Line
LOTO	Lockout/Tagout
MCR	Main Control Room
NEC	National Electrical Code
NEPA	National Environmental Policy Act
ORPS	Occurrence Reporting and Processing System
OSHA	Occupational Safety and Health Administration
OST	On-Shift Training

PFS	Plant Facilities and Services
PSS	Personnel Safety System
QA	Quality Assurance
QA/QC	Quality Assurance/Quality Control
RM&D	Repair, Maintenance, and Development
SAD	Safety Assessment Document
TMS	ANL Training Management System
UES	User ESH Support
WRS	Work Request System
XSD	X-ray Science Division
XOR	X-ray Operations and Research

FOREWORD

The purpose of this manual is to establish standards for Advanced Photon Source (APS) operations that comply in a uniform and consistent way with the requirements of Department of Energy (DOE) Order 5480.19, Chg. 2, “Conduct of Operations Requirements for DOE Facilities.” The manual was developed by the APS Conduct of Operations Committee, which includes designated representatives from all major organizational elements of the APS.

The manual implements the eighteen chapters of DOE O 5480.19 in sequence and supplements the requirements of the Order with Argonne National Laboratory (ANL) procedures and other “best industry practices.” In terms of format, style, and objectives, much of the manual was initially patterned on, or excerpted from, the corresponding document produced by the Westinghouse Government Operations Business Unit. Revision 1, dated November 1998, incorporated policies and procedures established as a result of APS operating experience. Revisions 2 and 3, dated April 2001 and May 2006, respectively, incorporated changes necessitated by the reorganization of APS.

The scope of this manual encompasses the accelerators, storage ring, front ends, and all accelerator-related activities. Included are configuration control processes and devices, personnel safety interlock systems, and all processes and devices that are related to the control of radiation from the accelerators into occupiable areas.

AVAILABILITY AND MAINTENANCE OF THIS MANUAL

This manual is archived in the APS Integrated Content Management System (ICMS). This system will allow all APS personnel to access the document electronically, and to use search tools to locate sections of interest as well as hypertext tools to navigate rapidly through this document and to other related on-line documents.

Recommendations to change this manual must be submitted to the APS Operations Directorate for review and to APS management for approval. After approval, the revised manual must be submitted to the DOE Chicago site office.

This document supersedes Rev. 2 of the APS Conduct of Operations Manual, report APS-3.1.1.1.0, dated April 2001.

INTRODUCTION

DOE O 5480.19, Chg. 2, “Conduct of Operations Requirements for DOE Facilities,” is a set of standards that establishes an overall philosophy for achieving excellence in the operation of DOE facilities. The principles and philosophy of the Order apply not only to APS “operations,” APS R&D, and APS administration, but to many facets of ANL's other day-to-day activities, such as maintenance, engineering, environmental science, radiation protection, waste handling, quality assurance, etc. The tools provided by DOE O 5480.19, Chg. 2, and the complementary DOE Orders 433.1A (Maintenance Management Program for DOE Nuclear Facilities) and 420.2A (Safety of Accelerator Facilities), taken together, provide the framework for a well-operated facility committed to excellence.

The goal of the APS Conduct of Operations Manual is to provide each APS employee with management’s guidelines and policies for conducting operations, and to encourage employees to improve safety and other aspects of operations. The formality and discipline resulting from the implementation of the elements of this manual will enhance the safety, reliability, and efficiency of our operations and make possible higher quality research. On a day-to-day basis, evidence of success will include accountability, striving for excellence, and technical inquisitiveness at all levels.

Many of the tools provided in this manual, such as those in Chapter 1, Operations Organization and Administration, apply to all aspects of APS facility operations. Certain elements of the manual may apply to custodial, purchasing, clerical, and human resources activities. Other ANL site organizations (maintenance, radiation protection, waste han-

ding, etc.) have their own Conduct of Operations Manuals, which will also follow the standards of DOE O 5480.19, Chg. 2. Within APS organizations, a graded approach is to be followed in determining which of the chapters or elements of chapters are applicable to any activity or unit. Each of the eighteen chapters shall be reviewed by Division Directors to establish applicability to each organizational unit and activity, and implemented in accordance with this graded approach. This means that the elements of the chapter are applied to each activity at a level of detail that is commensurate with the operational importance of the activity and its potential environmental, safety, and/or health impact. For example, very detailed and extensive training on the topic of Lockouts and Tagouts (Chapter 9) would be required for an operator or maintenance technician. In contrast, general safety orientation training would be sufficient for a file clerk or purchasing agent.

APS ORGANIZATION AND ADMINISTRATION

1.0 PURPOSE

The mission of the Advanced Photon Source (APS) is to deliver world-class science and technology by operating an outstanding synchrotron radiation research facility accessible to a broad spectrum of researchers. The APS's goals are to:

- operate a highly reliable third-generation synchrotron x-ray radiation source;
- foster a productive environment for conducting research;
- enhance the capabilities available to users of the APS facility;
- assure the safety of the facility users and staff and the environment;
- maintain an organization that provides a rewarding environment that fosters professional growth; and
- optimize the scientific and technological contribution to the Department of Energy and society from research carried out at the APS.

In operating the APS, highest priority will be given to assuring the health and safety of employees, users, and visitors, as well as to protecting the environment. Access to the APS, built and operated

2.0 SCOPE

for the United States Department of Energy, Office of Basic Energy Sciences, is open to all qualified synchrotron radiation users.

In keeping with this mission, operations activities at the APS shall be organized and administered in a manner that ensures a high level of performance with respect to safety, protection of the environment, and efficient and productive operation of the facility. APS policies shall embody the philosophy of excellence under which the facility is operated and shall establish clear lines of responsibility for operating under normal conditions and responding to off-normal conditions. Effective implementation and control of operating activities will require adherence to the following principles:

- Management establishes high operating standards, with input from personnel at all levels, and communicates these standards effectively.
- Sufficient resources are provided for operations, maintenance, and testing.
- Approved procedures are followed.
- Personnel are well qualified, well trained, and held accountable for their performance.
- Management is involved in regular workplace monitoring and performance assessments.
- Personnel are encouraged to bring safety-related problems and proposed solutions to the attention of management.
- Personnel see themselves as part of a team.

2.0 SCOPE

This chapter establishes the responsibilities, APS administrative guidelines, and requirements necessary for daily conduct of facility operations.

2.1 Participative Input

Free and open communication among personnel at all levels shall be encouraged. Both employees and users of the APS are encouraged to bring industrial, radiation, or environmental safety concerns to the attention of management. Participative input to performance goals, standards, and methods is also encouraged and expected. Input is normally given to the immediate supervisor, but it may be given to a higher level of management if appropriate.

2.2 Standards

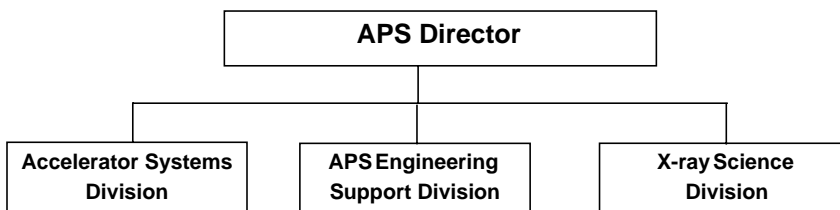
Standards for certain elements of APS operational excellence are contained in this manual. Additional standards may be developed on a situation-specific basis. Standards for APS operations shall define operating objectives, establish expected performance levels, and clearly define responsibility. Standards for operating activities shall be integrated into APS procedures and programs. Operating standards shall also be communicated to operations personnel and users through training programs and by supervisory monitoring and guidance of APS operations activities.

Operating reports, performance indicators, and goals shall be used to evaluate adherence to operating standards. All personnel shall be held accountable for their performance through supervisory counseling, performance appraisals and, when necessary, corrective action. Remedial training shall be provided when applicable.

3.0 DEFINITIONS

The following definitions are selected for their applicability to individuals or organizational entities most involved in and affected by the contents of this manual. A current APS organization chart is available online.

APS Organization Chart



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.

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 ALD. They translate the decisions of

the ALD 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.

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 of x-ray radiation sources, and development of the next generation synchrotron radiation sources.

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

OPERATIONS AND ANALYSIS GROUP LEADER - The Operations and Analysis 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 O&A Group Leader to the MCR Crew Chief and Chiefs of Operations through written policies and instructions. Significant changes to the schedule or beam parameters require consultation of the

3.0 DEFINITIONS

O&A Group Leader, Chief of Operations, or Crew Chief with the ASD Division Director or his designee.

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 operator 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 O&A Group and the technical groups.
- Be on-call to assist the Operators, Machine Managers, and O&A 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 the O&A Group in his/her area of expertise.

ASSISTANT CHIEF OF OPERATIONS (ACO) - A senior operator who is qualified on all APS accelerators and given significant responsibility in training other operators.

CREW CHIEF - The operator qualified on all APS accelerators who is in charge of the MCR during a shift. The Crew Chief is often, but not always, an ACO. While on shift, the Crew Chief is the designated supervisor of the other operators.

OPERATOR - An individual who is either qualified or becoming qualified to operate all APS accelerators. This individual need not be a dedicated accelerator operator. For example, COs and Machine Managers, when suitably qualified, may perform as operators when circumstances

require it.

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

USER ESH SUPPORT GROUP-AES: The User ESH Support Group 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, MCR Operators 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 below.

USER ESH SUPPORT (UES) GROUP GROUP LEADER: The User ESH Support 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 User ESH Support Group 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.

X-RAY SCIENCE DIVISION (XSD): The APS division that manages x-ray science programs conducted under the XSD Associate Di-

3.0 DEFINITIONS

vision Director for X-ray Operations and Research (XOR), 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.

Other Definitions

ALD-SUF 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.

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.

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

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/Responsible Engineers are members of these groups. The Technical Group Leaders, working with the System/Responsible Engineers, are responsible for setting up appropriate maintenance schedules for the equipment under their jurisdiction.

OPERATIONS PERSONNEL: Members of the ASD Operations and Analysis Group authorized to conduct hands-on operations of the APS accelerator systems.

USER: An individual authorized to conduct research operations at an APS beamline. A user may be an employee of the APS, of an ANL 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.

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

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

3.0 DEFINITIONS

management.

- Ensuring that all work carried out in the CAT's sector(s) at the APS is performed in accordance with the scientific and technical goals of the
- 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 X-Ray Operations and Research (XOR) within XSD has these responsibilities for all APS operated beamlines.

Collaborative Development Team (CDT): An external partner group that drives the development of a beamline that will be ultimately operated by the APS.

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

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.

ASSOCIATE DIVISION DIRECTOR FOR X-RAY OPERATIONS AND RESEARCH (ADDXOR) - XSD: An individual responsible for the operation of XOR beamlines and the quality and productivity of the research conducted on those beamlines.

X-RAY OPERATIONS AND RESEARCH: The XSD department that performs the APS directed x-ray science research and development and manages the operation of the APS beamlines.

4.0 RESPONSIBILITIES

All personnel are responsible for compliance with the procedures described in this chapter.

Managers and supervisors shall ensure that all personnel under their direction are trained to follow the procedures described in this chapter.

Responsibilities of specific positions are described in Section 3.0.

Responsibilities for APS technical systems are listed in the APS Responsibilities and Interfaces for APS Technical Systems document located on the APS intranet.

5.0 PROCEDURE

5.1 Operations Policies

Policies and procedures shall specify requirements that are to be applied to the operation of the APS. They shall specify goals and the means to achieve those goals, and they shall provide for the controls necessary to ensure implementation. Responsibilities for implementing these policies, including the responsibility of shift personnel, shall be clearly defined. Personnel shall clearly understand their authority, responsibility, accountability, and interfaces with support groups.

It is the policy of all APS organizations that the primary consideration in the operation of all facilities is the safety of the general public, site personnel, the environment, and plant equipment. All personnel who identify hazardous or potentially damaging conditions are to take the safe course of action. Personnel safety and health shall be integrated into all aspects of the APS facility, and facility operations should be of secondary importance after facility and personnel safety.

It is the policy of ANL and APS that:

- Personnel shall ensure their own safety and that of their fellow employees, users, and the general public through the proper operation and frequent monitoring of their

equipment and facilities.

- APS employees, users, visitors, contractors and all personnel who observe, or 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 line management of the relevant organization.
- Operations, maintenance and other activities shall be conducted in an orderly and professional manner in accordance with this manual.
- Personnel shall follow written procedures in a “thinking compliance” manner. This means that procedures are followed as written; if they cannot be followed as written, or the individual believes they are wrong, that individual will stop work and seek the advice of a supervisor immediately. A graded approach refers to the scope of application and detail of procedure content, not whether deviations from a procedure are allowed. Procedures are covered in Chapter 16 of this manual.
- Management’s role is to set an example for subordinates in the above, to encourage subordinates to make problems known, and to provide feedback to facilitate resolution of those problems.
- The organizations covered by this manual will perform self assessments relating to operational standards as appropriate.

5.2 Resources

Resources (both materials and personnel) shall be sufficient to accomplish assigned tasks without requiring excessive overtime by the operations staff. These resources shall include technical personnel needed to support the operations. A long-range staffing plan that anticipates personnel losses shall be developed and implemented.

Organization charts defining the operational line of authority, and position descriptions defining the duties and responsibilities of each management and supervisory position identified by the organization charts, shall be maintained and readily available.

Standing committees, boards, and directorates shall be chartered and used as a resource by the appropriate level of ANL or APS management. A file of current charters and member listings will be maintained in the Associate Laboratory Director's Office.

5.3 Monitoring of Performance

5.3.1 Abnormal Events

Abnormal events that occur during operation shall be documented and evaluated in accordance with Chapter 6, "Investigation of Abnormal Events." Based on assessments of these events, corrective actions shall be taken to improve facility operations. Copies of investigative reports shall be forwarded to the responsible Division Director for approval.

5.3.2 Facility Inspection Program

The purpose of the facility inspection program is to ensure that the physical condition of the facility, industrial safety practices, cleanliness and housekeeping, and radiological and hazard protection practices meet management's standards. The program also gives management an opportunity to demonstrate its interest in personnel activities in a manner that will positively affect morale, motivation, and general work attitudes. The program provides positive feedback to individuals or groups through recognition of their efforts.

Inspections of all areas should be made with the objective of improving operations. Discussions with operating staff concerning component and system performance, reviews of operator logs for followup action, and reviews of event reports give management insight into facility operations. The supervisor should know what to expect when an area is inspected. The expectation is excellence; compliance is the minimum acceptable standard.

5.0 PROCEDURE

The facility inspection program will include the following elements:

- Each area of the APS facility will be inspected by line management on a regular basis.
- Information on the inspection observations will be collected and evaluated by the appropriate Division Office.
- The UES floor coordinators will archive the beamline inspection reports.
- Corrective actions and responsibilities will be assigned for all deficiencies identified.

5.3.3 Self Assessments

Inspections, audits, reviews, investigations, and self-assessments are a part of the internal assessment process that addresses the effectiveness of an operating program. Line managers and supervisors are expected to routinely evaluate the performance of their personnel and activities. Identified deficiencies shall be corrected and documented where appropriate. APS management maintains a strong commitment to safety and quality in all activities associated with operation of the facility. This commitment to both safety and quality assurance follows through the line organization to all APS personnel.

5.3.4 ESH and QA Functions

ESH and QA are the responsibility of all APS personnel. Managers are accountable for ensuring that his/her subordinates understand their respective ES&H and QA responsibilities and are properly equipped and qualified to fulfill these responsibilities. The DIR-APS and Division Directors have appointed individuals to coordinate and oversee the implementation of the QA/QC and ESH activities of their respective organizations.

5.3.5 Operations Oversight and Independent Review

Programmatic operations appraisals should be independently conducted and/or verified to ensure that environment, safety, and health issues are being considered, and operations are being con-

ducted in accordance with established operational criteria. The ALD-SUF office maintains a list of committees that perform these appraisals.

5.3.6 Operating Performance Goals

Goals related to overall facility operations shall be established by the Operations Directorate. These goals shall be used as management tools for involving groups and individuals in improving operating performance and measuring effectiveness.

Goals shall be measurable, realistic, and challenging. Each Division Director, with input from appropriate personnel, will implement a plan to meet these goals. Progress toward completing these plans shall be monitored periodically. If results show a significant variance from the desired progress in achieving goals, management shall review the plans to ensure that they are realistic and adequate and are being executed. Actual machine performance shall be measured relative to operating goals on a regular basis.

5.3.7 Performance Indicators

Performance indicators for strategic parameters, such as lost-time accidents and APS operating parameters, should be developed and given visibility appropriate to the APS mission. The experience and lessons learned from using and developing performance indicators should be shared with all APS personnel.

5.4 Accountability

Personnel and their supervisors shall be held accountable for operating performance, including safety. Personnel involved in significant or frequent violation of operating practices shall be counseled, retrained, or disciplined, as appropriate. Performance appraisals and promotions for supervisors shall include an assessment of both operating performance and the individual's handling of administrative, personnel, and technical issues.

5.5 Management Training

Formalized supervisory and management training shall be incorporated into training programs. First-line and first-time supervisors are to be given training to enhance interpersonal and administrative skills. A key function of management is to train, teach, coach, and develop personnel. In addition, training for technical, non-technical, and operations supervisors should include the following subjects on a graded basis appropriate to their duties:

- The Conduct of Operations (using the contents of this manual)
- Job-Specific Procedures and Expectations (including applicable safety and emergency response training)

Training shall be documented using appropriate qualification standards. The APS facility shall establish and budget for continuing training to maintain and enhance the proficiency of the operations personnel who perform functions associated with safety-related structures, systems, and components.

5.6 Planning for Safety and Environmental Protection

5.6.1 Integrated Safety Management

Pre-work safety planning should address the following five functions with a degree of rigor appropriate to the type of work activity and the hazards involved:

- Define the Scope of Work — Work objectives are defined, tasks are identified and prioritized, and resources are allocated.
- Do Hazards Analysis — Hazards associated with the work are identified, analyzed, and categorized.
- Develop and Implement Hazard Controls — Applicable standards and requirements are identified and agreed upon, controls to prevent/mitigate hazards are identified, the safety envelope is established, and controls are implemented.
- Perform Work — Readiness is confirmed and work is

performed safely. Work is monitored periodically to ensure that it is being performed safely.

- Provide Feedback and Continuous Improvement — Feedback information on the adequacy of the hazard analysis and controls is provided by individuals performing the work. Opportunities for improving the work planning process are then identified and included in subsequent work planning activities.

5.6.2 Environmental Protection

In accordance with the National Environmental Policy Act (NEPA), all new work must be reviewed for possible effects on the environment. An APS operating goal is to minimize the discharge of pollutants to the environment. Deliberate action will be taken to eliminate discharges of any toxic, hazardous, noxious or offensive materials. Until adequate review, consideration, and planning have been done to ensure that proposed activities will have no effect on the environment or that everything feasible will be done to minimize unavoidable effects on the environment, approval for work to proceed will not be granted.

The pre-work planning steps defined in Section 5.6, Planning for Safety, also apply to environmental considerations.

5.6.3 User Safety Plans

Each prospective CAT/CDT shall submit a written management plan, which includes a safety plan, to APS management, and approval of this plan by APS shall be a prerequisite for the assignment of a sector(s) to the CAT/CDT. All CAT/CDT members and other users shall conduct their on-site activities in accordance with these plans, in accordance with ongoing guidance provided by appropriate APS and ANL documentation and personnel, and in accordance with the ANL ESH Manual. In addition, each individual user shall receive appropriate orientation and safety training as a prerequisite for obtaining authorization to perform work at the APS. Further safety-related responsibilities of CAT/CDT members are described in the APS User Policies and Procedures Manual, the CAT/CDT

6.0 REFERENCES

Management Plans, and the APS Beamline Design and Construction Requirements document.

5.7 Fitness for Duty

Personnel shall present and maintain themselves in a condition fit for duty. No employee shall be permitted to assume his or her duties and responsibilities if it is obvious that the person is not alert, coherent, or capable of performing the requirements of the position.

Persons who observe behavior that indicates an individual is unfit for duty have the immediate responsibility to confidentially advise a manager of such behavior. Also, if there is concern for the safety of the individual or any employee or if the condition of the individual poses a risk to any equipment or facility, the observer shall call 911 immediately and report a fitness for duty concern. Management shall evaluate the person and make the final determination of the fitness of the person to assume his or her responsibilities.

It is the ongoing responsibility of management to evaluate the fitness for duty of personnel. The line manager's judgment in this regard is final. As quickly as safe operation permits, the manager will document the circumstances leading to the removal of a person from the assigned activities and notify upper management. The manager may remove a person from assigned duties while this evaluation takes place.

No person shall be required to work if he or she feels that doing so could jeopardize the safe operation of equipment, other personnel, or the general public.

6.0 REFERENCES

DOE O 5480.19, Chg. 2, Conduct of Operations Requirements for DOE Facilities

DOE Policy P 450.4, Safety Management System Policy

SHIFT ROUTINES AND OPERATING PRACTICES

1.0 PURPOSE

This chapter provides standards for professional conduct that should be followed by personnel so that their performance meets the expectations of DOE and APS management. Guidelines are given for some important aspects of routine shift activities and shift-operation practices that apply to all operations personnel.

2.0 SCOPE

Professional conduct and good shift-operation practices require appropriate attention to facility conditions. Effective equipment monitoring is necessary to detect abnormal conditions or adverse trends so that appropriate action can be taken before an equipment malfunction occurs. Notifying supervisors promptly of unusual or unexpected situations helps to ensure that proper attention is given to off-normal and/or changing conditions. Equipment status and the system for conferring authority to operate equipment shall be understood by all personnel to ensure activities can be controlled and coordinated. Personnel shall follow proper industrial safety, radiological protection (if applicable) and quality assurance practices. These items are key elements that shall be included in an effective shift-operation program. A desire to conduct assigned tasks expeditiously shall not interfere with good shift-operation practices.

3.0 DEFINITIONS

3.0 DEFINITIONS

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 ANL Radiation Safety Officer.

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.

4.0 RESPONSIBILITIES

It is the responsibility of all APS personnel to safely operate the APS facility through adherence to operating procedures, technical specifications, operational safety requirements, and sound operating practices in general. The authority for operations shall be transferred at shift-change through formal turnover to a qualified relief. Specific responsibilities of the major on-shift positions are given below.

4.1 Crew Chief

The crew chief shall maintain authority and responsibility for all accelerator operations, and shall transfer this responsibility only through formal turnover to a qualified relief. If an abnormal condition or the need for a special test arises, facility personnel should be aware that the responsibility and authority for decisions on operating conditions, system alignments, or equipment manipulations rest fully with the responsible crew chief. The crew chief shall not permit any individual to bypass or overrule his or her operational judgment without bringing the matter to the attention of higher line authority.

During user operations the MCR crew chief will respond to the Floor Coordinators with respect to requests to accommodate user needs.

During accelerator studies the responsible machine physicist has the authority to request operational changes; however, the crew chief maintains the responsibility to see that the machines are operated within their respective operating envelopes.

The crew chief will defer to the Operations and Analysis Group Leader or his designee under the following conditions:

- If there is a request to operate the accelerator in some other mode than what has been reviewed by the Operations Directorate.
- If downtime exceeds a defined limit (presently three hours).

The crew chief always has emergency shutdown responsibilities, even before higher management, if available, is consulted.

The crew chiefs are responsible for good conduct and discipline on their shifts. This includes evaluation of personnel fitness for duty and any actions required to ensure the safety of personnel and equipment under their cognizance.

4.2 MCR Operators

MCR operators are responsible and accountable for all operations conducted on their shifts and for the status of all systems, components, and records within a defined work area. Operators are responsible for adhering to operating procedures and technical specifications, operating within the operating and safety envelopes, maintaining safe conditions within the boundaries of their work areas, and operating in a manner that complements overall facility operation.

Operators are expected to report to work alert and prepared to carry out the full range of expected duties. If, because of sudden illness or some other reason, an operator becomes unable to perform assigned duties, he or she is expected to request a relief from the crew chief.

4.0 RESPONSIBILITIES

4.3 Floor Coordinators

The Floor Coordinators have the responsibility for operations on the experiment floor, including the operation of beamline equipment that is the responsibility of the APS. They perform the initial trouble analysis and notify the appropriate responsible individuals for repair or replacement of faulty components. They are also responsible for monitoring user operations and provide necessary safety support and guidance to the users. The FCs maintain the records of beamline shielding, critical components, and other safety-related configurations and disable the beamlines whenever configuration changes are made. The FCs are responsible for enabling the beamlines only after confirming that the appropriate documentation has been provided by the responsible engineer as described in configuration control procedures. At least one FC is on duty (present or on-call) during each shift that is scheduled for user operations.

4.4 System/Responsible Engineers

System/Responsible Engineers are responsible for improving, and insuring the proper maintenance and repair of, their system. They should receive notifications of trouble with their assigned system and should follow up all such notifications. If appropriate, they may request the opportunity to effect repairs via the Work Request system (Chapter 8), or they may initiate changes to operational procedures by use of written orders. The System/Responsible Engineers shall ensure that regular inspection tours of their assigned systems are conducted to ensure proper operation. This inspection should include the monitoring of any computerized logs of equipment status and operating parameters pertaining to their systems.

4.5 Beamline Personnel

Beamline personnel are responsible for writing preliminary and final design reports; interacting with the APS Beamline Safety and Design Review Steering Committee (BSDRSC) to ensure beamline policies and procedures are adhered to and are consistent with appropriate ANL ES&H policies and procedures; and reviewing any

changes to the beamline with the Beamline Configuration Readiness Review Team and providing the team with adequate documentation.

5.0 PROCEDURE

5.1 Status Practices

The System/Responsible Engineer for a given system or piece of equipment shall be promptly notified of all status changes, abnormalities, or difficulties encountered with the operation of that system or piece of equipment. OAG and UES personnel will be responsible for this notification per prearranged, system-specific and fault-specific lists and protocols.

Similarly, the System/Responsible Engineer shall notify the appropriate OAG and UES personnel of any system or equipment problems that might impact operations. As appropriate for the scope and severity of a problem, the System/Responsible Engineer shall also escalate response or attention to a problem through his/her line management or through line management in other groups and divisions.

5.2 Safety Practices

Personnel shall comply with all prescribed safety precautions and regulations. Any operation that is in violation of a safety rule shall be stopped and reported immediately to management.

5.3 Inspection Tours

System/Responsible Engineers shall ensure that regular inspection tours of their designated areas of responsibility are conducted and that appropriate equipment inspections are made at times or at intervals specified by their Technical Group Leaders. Inspection tours shall be of sufficient detail to ensure that the status of equipment is known.

During tours, equipment shall be inspected to ensure that it is operating properly or, in the case of standby equipment, that it is fully operable.

An example of a regularly conducted inspection tour is a tour that is conducted after a maintenance period and before the accelerator enclosure is secured. System/Responsible Engineers or their designees are required to inspect their related equipment within the enclosure to verify that their systems are ready. Tour inspection documentation in this case is defined by the System/Responsible Engineer, and is for his/her use. Once the tour is complete, the System/Responsible Engineer or his/her designee signs a checklist located in the MCR indicating that his/her system is ready.

5.4 Personnel Protection Commensurate with As Low As Reasonably Achievable (ALARA) Guidelines

Personnel shall be appropriately qualified to follow good personnel protection practices that will, to the extent possible, (1) ensure ALARA exposure (as defined in 10 CFR 835, Occupational Radiation Protection) to ionizing radiation and (2) apply ALARA principles (as defined in DOE O 440.1A, Worker Protection Management for DOE Federal and Contractor Employees) to chemicals, electromagnetic fields, toxic materials, and other personnel hazards as applicable. In particular, personnel shall:

- Become familiar with and adhere to the appropriate configuration control policies for radiation shielding.
- Adhere to all posted personnel protection requirements and observe proper practices and precautions while in controlled areas.
- Correctly utilize appropriate monitoring instruments when required.
- Be aware of their own exposure levels and take appropriate action to minimize exposures.
- Be knowledgeable of the proper use of radiation work permits, safe work permits, or inhalation limits, where applicable.
- Promptly report protection deficiencies and hazards to

supervisors and/or appropriate radiation protection personnel (in addition to taking appropriate immediate actions to reduce or correct the hazards).

- Inform appropriate radiation protection personnel before performing activities that have a potential to significantly change conditions in the facility.

Division management shall periodically review exposure trends of division personnel. Emphasis should be placed on determining the adverse factors that contribute to personnel exposures and minimizing those factors to keep exposures as low as reasonably achievable.

5.5 Response to Indications

Personnel shall believe instrument readings and treat them as accurate unless proven otherwise. Ignoring an unusual reading because of the belief that an instrument is faulty can cause abnormal conditions to be undetected. Personnel shall check other indicators and conditions, if possible, when unexpected readings are observed. Prompt action shall be taken to investigate the cause of abnormal or unexpected indications so that prompt corrective action can occur. When malfunctioning or inaccurate instruments are discovered, the instruments shall be appropriately identified to prevent subsequent confusion. Instrument and control personnel should be notified to effect repairs. In situations of doubt, personnel shall give facility, personnel, and environmental safety a higher priority than uninterrupted facility operation.

5.6 Resetting Protective Devices

When protective devices (such as circuit breakers or fuses) trip, an attempt shall be made to understand the cause of the trip before the device is reset. Normally, before action is taken, an operator shall ensure that no abnormal condition exists that would preclude resetting. However, because the consequences of inappropriately resetting protective devices vary considerably, good judgment and specific guidance are necessary in this area. APS management shall provide procedures, as appropriate, so that the resetting of tripped protective devices is properly addressed. Facility trips and un-

planned forced shutdowns may require a thorough investigation in accordance with the guidance of Chapter 6.

5.7 Key Control

To facilitate control over keys that are used in day-to-day operations and not permanently assigned to individuals, there shall be key accountability logs in place to record what keys are being used by which individuals. Keys shall be labeled and assigned to labeled spaces to expedite location of keys.

Kirk-Key systems are used to mechanically and electrically interlock the access to certain areas and equipment with related APS system operation. The use and control of these keys are covered by operation and access-control procedures. By virtue of their usage, these keys are either captured in mechanical summation assemblies, captured in electrical breaker mechanisms, or are in transit between these points.

5.8 Changes to Operating Parameters

Changes to major operating parameters such as circulating beam energy and maximum current shall be reviewed by the Operations Directorate. If changes to operating parameters require the operating envelope to be exceeded, the machine manager must be consulted.

5.9 Temporary Modification Control

Temporary modifications are to be used sparingly and only when necessary. A graded approach shall be used for authorizing the use of temporary modifications. Simple temporary modifications may only require the authorization of a CO, crew chief, Technical Group Leader, or System/Responsible Engineer. Complex modifications or a modification to a safety system or operating mode may require the approval of an appropriate Division Director. In all cases, authorization for temporary modifications, especially those that may affect safety, accelerator operations, or beam availability, is a line management responsibility. Written procedures may be used to document temporary modifications. Accelerator-related tempo-

rary modifications or temporary configuration changes are noted in the MCR on-line log and are maintained from shift to shift until these situations have been resolved.

5.10 Authority to Operate Equipment

Skill and training requirements for operating APS equipment cover a broad range, and a graded approach must be applied to authorization for operation of such equipment. For example, although operation of a personal computer requires considerable training, the consequences of mishandling the equipment would have little if any effect on overall APS operations. On the other hand, mishandling of an APS operations control computer could result in serious consequences to the experimental program and potential damage to accelerator components. The authorization requirements for operating equipment are graded on the basis of the potential consequences of improper operation of such equipment. Management shall ensure that only trained and authorized personnel operate equipment.

In general, control room personnel shall be aware of all activities that have a potential for affecting machine operation. See Chapter 8, Section 5.1.3.

The overall operation of the facility shall be governed by approved policies and procedures. All accelerator operations shall be directed by the crew chief or, in the case of machine research, by the designated physicist in charge. Nonroutine operation of equipment should not be undertaken without the specific approval of the responsible crew chief, systems engineer, or machine manager.

During emergencies, the MCR shall immediately take whatever actions are required to ensure personnel, facility, and environmental safety, without obtaining prior authorization; however, the appropriate manager or supervisor shall be promptly informed of these actions. The MCR shall be constantly aware that safety takes priority over uninterrupted facility operation.

During non-operational periods, that is, when the APS is not being operated for research or machine studies, the operational responsibility for all systems reverts to the various technical groups. During these periods, the technical groups can, with due consideration for

5.0 PROCEDURE

safety procedures, operate their respective systems for maintenance, checkout, or upgrade purposes. Portions of the APS may be in an operational status while others are not. For example, the storage ring could be filled and under control of the crew chief while the linac is in a non-operational, maintenance state and under the control of technical groups.

5.11 Procedure Compliance

All operations shall be performed in strict compliance with approved procedures. If during an emergency there are no procedures covering the situation, operators shall take the actions necessary to place the facility in a safe condition and to protect the public, APS personnel, the environment, and facility equipment. Subsequent to such an event, an evaluation shall be made as part of the abnormal-event investigation process to ascertain the need for a procedure.

5.12 Fitness/Alertness/Attention to Duty

Activities at the APS should be performed in a businesslike manner. All personnel shall adhere to the Fitness For Duty requirement of Chapter 1. Personnel also have the individual responsibility to be alert throughout their shift assignment, and to be attentive to the work they perform to ensure that it is accomplished competently.

5.13 Overtime Guidelines for MCR Shift Workers

Adequate shift coverage must be maintained without excessive use of overtime. Use of overtime to cover vacations should be avoided. However, in the event that unforeseen problems (such as emergency shutdowns, extended outages, technical problems, or weather-related occurrences) require substantial amounts of overtime to be used, the following guidelines apply:

- The scheduling of personnel for overtime will be limited if fatigue or lack of rest may impair operator performance.
- A person shall not be permitted to work more than 16 consecutive hours, excluding shift turnover time.

- A person shall not be permitted to work more than 32 cumulative hours in any 48-hour period, excluding shift turnover time. The ASD division office shall be informed of any instance of an individual working more than 24 hours in a 48-hour period.
- A person shall not be permitted to work more than 88 hours in a 7-day period, excluding shift turnover time. The ASD division office shall be informed of any instance of an individual working more than 72 hours in a 7-day period.
- Overtime will be approved for specific cases, and shall be approved for the entire shift crew. Events that will be considered for overtime are extended shutdown periods, brief training sessions that occur before or after scheduled shifts, and weather related occurrences.

Any deviation from the overtime requirements shall be authorized in advance, on a case-by-case basis, by the Operations and Analysis Group Leader or designee in accordance with established procedures and with documentation of the basis for granting the deviation. Individual overtime shall be reviewed monthly by the Division Director or designee to assure that excessive hours have not been worked.

5.14 Housekeeping

The responsibility for good housekeeping rests with all APS personnel. A job shall not be considered complete until the housekeeping is completed. Any situations involving disregard for housekeeping policies shall be promptly reported to the appropriate line manager.

6.0 REFERENCES

DOE O 5480.19, Chg. 2, Conduct of Operations Requirements for DOE Facilities

10 CFR 835, Occupational Radiation Protection

**DOE O 440.1A, Worker Protection Management for DOE Federal
and Contractor Employees**

MAIN CONTROL ROOM ACTIVITIES

1.0 PURPOSE

The purpose of this chapter is to define the policy for Main Control Room (MCR) activities. MCR activities should be conducted in a manner that achieves safe and reliable facility operations. This chapter addresses the important elements of MCR activities that are necessary to support safe and efficient facility operation.

2.0 SCOPE

The MCR is the most critical facility operating base and the coordination point for important facility activities. Therefore, activities in the MCR must be businesslike, and a professional atmosphere conducive to safe and efficient operation must be maintained. In addition, MCR operators shall not be overburdened with administrative responsibilities, and the Crew Chief may limit MCR access so that operators will not be distracted from properly monitoring facility parameters.

3.0 DEFINITIONS

None

4.0 RESPONSIBILITIES

4.0 RESPONSIBILITIES**4.1 Operations and Analysis Group Leader**

The Operations and Analysis Group Leader is responsible for providing the necessary tools within the MCR in support of facility operation, and for establishing and maintaining high standards for control room conduct.

4.2 Crew Chiefs and Operators

Crew chiefs and operators have the responsibility and authority to uphold the standards of conduct defined in this manual. The crew chief has the authority to restrict access or remove personnel from the MCR during routine and/or emergency operations as required, to meet this responsibility.

5.0 PROCEDURE**5.1 Control Room Access**

Control room access shall be limited to persons conducting official business. Entry shall be controlled by the responsible crew chief or designee.

5.2 Professional Behavior

The crew chief will enforce professional behavior.

5.3 Alarm Status

The status of control board or local panel alarms shall be readily available to operations personnel.

Appropriate actions shall be taken to monitor equipment parameters for abnormal conditions that would be masked by malfunctioning alarms.

5.4 Monitoring the Main Control Screens

Operators shall be alert and attentive to control systems display indications and alarms. Control systems display indications shall be monitored frequently, and prompt action taken to determine the cause of and to correct abnormalities. Emphasis shall be placed on closely monitoring and trending to detect problem situations early. Operator response to alarms shall be timely, and actions shall be taken to address and correct the alarm causes. All reasonable actions shall be taken to clear conditions causing an alarm. Care will be taken when disabling alarms (for instance, when taking hardware off line) to ensure that the alarms are re-enabled when the hardware is put back on-line.

5.5 Operation of Control Area Equipment

The ASD Operations and Analysis Group Qualification Procedure is used to determine when an individual is qualified to operate equipment. When trainees operate this equipment, they shall be supervised and controlled by an operator who is qualified, and who normally would perform the operations.

No operators shall attempt any operational activity they do not feel qualified to perform.

6.0 REFERENCES

DOE O 5480.19, Chg. 2, Conduct of Operations Requirements for DOE Facilities

APS Procedure #1110-00068, ASD Operator Qualification Procedure

COMMUNICATIONS

1.0 PURPOSE

The purpose of this chapter is to establish a methodology for effective, reliable, and accurate transmission of operations-related information within the facility through oral and other audible means.

2.0 SCOPE

Since accurate communications are essential for the safe and efficient operation of facilities, guidance in the use of the various forms of audible communication is necessary. These communications must be controlled to ensure that they do not detract from normal operations and are available in an emergency.

Audible communications are used to transmit operating, administrative, and emergency information within the facility. Face-to-face speech, telephone and radio transmissions, public address announcements, and special sounds (horns and bells) are examples of audible communications. Appropriate mechanisms are needed to ensure the accurate transmission and receipt of oral instructions. Examples include repeating back instructions and using standardized terminology.

The APS facility uses warning lights, horns, and the public address system to alert personnel to abnormal or emergency conditions and to announce changes in the operating mode of its accelerators and storage ring. These communications must be controlled to ensure

3.0 DEFINITIONS

that they do not detract from normal operations and are available and recognized in an emergency.

3.0 DEFINITIONS

None

4.0 RESPONSIBILITIES

4.1 All Personnel

All personnel are responsible for the following:

- Conducting verbal communications involved in facility operations in accordance with the procedures given below.
- Reporting defective communication equipment in accordance with stated procedures.

4.2 Crew Chiefs

The crew chiefs are responsible for the following:

- Ensuring that the requirements and instructions of the operations-related communications procedures are implemented.
- Ensuring that all operations-related communications are conducted in a professional manner.

5.0 PROCEDURE

5.1 Emergency Communications Systems

Methods shall be 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. Flashing lights, personal pagers that vibrate and can be felt, and persons

dedicated to notifications are examples of alternative methods that might be effective.

All employees and resident visitors shall be trained to recognize the emergency audio-signals used by ANL (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. Laboratory-wide standards for audio-signal alarms are described in the ANL ESH Manuals, and a quick reference is provided on the back cover of the ANL telephone directory.

The principal mechanism to be used by individuals to report an emergency situation is to dial 911 using an ANL telephone. Procedures shall be employed by ANL and APS to ensure that all employees and visitors are aware of this system and telephones are clearly marked as to the use of the 911 emergency number. Information on use of the Dial 911 System appears on the back cover of the ANL telephone directory.

Emergency communications systems shall be periodically tested to ensure that they are functional. Control areas shall have the capability of overriding other users of the APS public address system for emergency announcements.

5.2 Public Address System

The use of the APS facility public address system shall be administratively controlled to ensure that it retains its effectiveness in contacting facility occupants. Excessive use of the public address system for paging of personnel and unnecessary announcements shall be avoided because excessive use can reduce the impact of important announcements and can be distracting. Facility telephones and other point-to-point communications channels shall be used in lieu of the public address system whenever practical.

5.3 Contacting Personnel

Methods are in place to ensure that control areas can quickly contact all personnel. To avoid confusion, a distinction shall be made between routine and emergency notifications. Examples cited in Section 5.1, Emergency Communications Systems, for communica-

tion in high-noise areas may be effective in accomplishing this function.

Visual emergency and hazard communication, generally in the form of postings and warning lights, are incorporated in the APS facility to inform personnel of local hazards and protective measures for normal and abnormal operating conditions. Information relating to requirements for safety related postings and warning lights can be found in the ANL ESH Manual.

5.4 Portable Communication Devices

Portable communication devices such as two-way radios and cell phones are an effective means of providing mobile point-to-point communications and are available through Technical Group Leaders for this purpose. Portable communication device usage shall be controlled in areas where electronic interference with facility equipment may result. Areas where portable communication is prohibited shall be posted.

5.5 Oral Instruction

Oral instructions shall be clear and concise. Instructions involving the operation of equipment shall be repeated by the listener to the extent necessary for the speaker to ensure that the instructions have been correctly understood.

5.5.1 Operating Directions

Operating directions are orally assigned actions involving the operation of a component or system. They are normally limited to short, straightforward directions. Matters not meeting this criterion should be presented and acknowledged in writing. Operating directions may be given directly by telephone, by use of the public address/page system, or by communication devices.

If an employee is given a directive to perform an action, and the operator cannot or believes he or she cannot follow the directive, then the employee is obligated to communicate those concerns to the originator of the directive.

The following are normally applicable to oral directions:

- Instructions shall be given using clear, concise expressions and terminology.
- Directions shall be explicit, understandable, and unambiguous.

In the MCR the completion of crew chiefs-ordered actions shall be reported to the appropriate crew chief. This communication shall be acknowledged by the crew chief.

Activities outside the MCR with the potential to affect operations, such as on-line maintenance and surveillance, should be fully coordinated with MCR activities. Communications with or notification of the operator at the controls should be established and maintained throughout such activities.

Some verbal instructions may need to be supplemented with written guidance to ensure that important information is not forgotten.

When practicable, the person giving the direction should observe displays and note any confirming information (valve position lights, pressure, level voltage, current, flow, etc.).

5.5.2 General Attributes of Good Communication

- Ensure that all participants know each other's identities.
- Use clear, precise terminology. Do not use slang terms. Avoid words that sound alike (e.g., avoid the use of “increase” and “decrease”; instead, use “raise” and “lower”). Use commonly agreed upon terms.
- To identify a piece of equipment, use both its descriptive name and its number.
- Repeat back messages, either paraphrased or verbatim.
- Speak distinctly and deliberately.
- Acknowledge all communications.
- In an oral instruction, do not include multiple actions that could be confused or misunderstood. Either write down the instructions or give several short directions in sequence.

6.0 REFERENCES

5.6 Portable Communication Devices

Sender and receiver identification shall be included in each message. Portable communication devices shall be tested prior to conducting a procedure that requires portable communication, and whenever operability is in doubt. Portable communication equipment used in normal operations may be used in an emergency to communicate with mobile units.

5.7 Personal Pagers

Personal pagers or other suitable means shall be provided to personnel working in areas where the facility paging system cannot be heard.

5.8 Testing Communication Links

ANL emergency phones shall be tested periodically to ensure that they are operable.

6.0 REFERENCES

DOE O 5480.19, Chg. 2, Conduct of Operations Requirements for DOE Facilities

ANL Telephone Directory

CONTROL OF ON-SHIFT TRAINING

1.0 PURPOSE

Every employee shall be trained to perform work in a safe manner so as not to put themselves, other employees, the facility, or the environment at risk. To ensure this, APS shall have a formalized, documented training program that is in compliance with those policies and procedures proscribed by ANL and DOE.

Work performed by personnel in training shall be carefully supervised and controlled to avoid mistakes by unqualified personnel and to use trainees' time effectively. This chapter establishes guidelines for conducting an on-shift training program in a manner such that the trainee satisfactorily completes all of the required training objectives and receives maximum learning benefit from hands-on experience while their duties are maintained in a safe manner.

2.0 SCOPE

2.1 APS Employees, Visitors, Users

Training of APS employees, Resident Beamline Personnel, and Users shall be in compliance with those policies and procedures proscribed by ANL and DOE. Training requirements for APS employees and Resident Beamline Personnel will be identified via a JHQ and will be tracked by the ANL TMS system.

Training for Users will be specific to the hazards associated with the areas where they will work and the hazards to which they may be

3.0 DEFINITIONS

exposed. This training could include hazard-specific orientation by APS or Resident Beamline Personnel or participation in formal TMS courses.

2.2 MCR Operations Training

On-shift training is normally controlled by operations organization personnel because the operation of equipment is usually involved. Operations-administered controls are appropriate for the following aspects of training activities:

- On-shift training shall adhere to established training programs so that instructional uniformity will be maintained.
- On-shift instructors/evaluators shall be qualified for the activities they perform to ensure both correct operation and quality training.
- Trainees shall be supervised by qualified personnel so that unqualified personnel do not make mistakes that could affect safety.
- Policies that direct how trainees may be used to support operations work activities shall be developed. These policies shall ensure that personnel in training are effectively and appropriately used and that they are aware of all operating limits and hazards.
- On-shift training shall be appropriately documented.

3.0 DEFINITIONS

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

4.0 RESPONSIBILITIES

4.1 Division Directors

Division Directors shall approve on-shift training programs.

4.2 ASD Operations and Analysis Group Leaders

The ASD Operations and Analysis Group Leaders shall facilitate implementation and involvement of Operations and Analysis Group personnel in proper on-shift training.

4.3 ASD Chiefs of Operations

The ASD Chiefs of Operation have the responsibility for writing the training material for the systems for which they are responsible.

4.4 Group Leaders

Group Leaders shall verify that all employees are properly trained, are current in their training requirements, and that each employee's JHQ correctly reflects their scope of work.

4.5 Employees

Employees are responsible for performing only those tasks that they are properly trained to accomplish. Work assigned outside of an employee's scope of training should be promptly reported to their line management. No employee shall perform a task that puts themselves or another person in danger or harm's way.

5.0 PROCEDURE

5.1 Adherence to Training Programs

On-shift training shall be conducted in accordance with training protocols that specifically identify items the trainee must accomplish (MCR training requirements and JHQs).

5.2 MCR On-Shift Instruction

On-shift training for MCR personnel may be conducted by qualified scientists, engineers, COs, crew chiefs, and qualified operators.

5.3 MCR Qualified Operator Supervision and Control of Trainees

Whenever trainees operate equipment, a qualified operator serving as an on-shift instructor shall observe the trainee in order to ensure the trainee does not make an error that could adversely impact the facility. On-shift instructors shall not become complacent with respect to trainees. The instructor shall always monitor the trainee closely and remain in a position to intervene or assume control, if necessary.

5.4 MCR Qualification Program Approval

The qualification programs shall be approved by the ASD Division Director, and changes to the programs shall be managed by that Division.

5.5 MCR/UES Training Documentation

Completion of the operator qualification program requirements shall be formally documented. On-shift training and system check-out, classroom requirements, and written exam results shall be documented and included in the operator's training file.

5.6 MCR Suspension of Training

Operation of equipment by trainees shall be immediately suspended during unanticipated or abnormal events, accident conditions, or whenever the operations personnel or on-shift instructor believes suspension is necessary to ensure safe and reliable facility operation. During abnormal or accident conditions, trainees shall provide assistance at the discretion of the qualified operator.

5.7 Maximum Number of Trainees

The maximum number of trainees allowed to simultaneously participate in any particular training session shall be limited so as to ensure training effectiveness and avoid adverse effects on the facility. An upper limit on the trainee-to-instructor ratio will ensure that the trainee is provided with the most effective instruction and

will ensure that the instructor is not distracted by having too many trainees at once.

5.8 Elements of MCR On-Shift Training (OST)

Effective OST involves four elements:

- The objectives of OST (what the trainee is expected to know/perform when training is completed) must be known to the trainer/evaluator and the trainee.
- The standards for successful completion of OST (skill and knowledge performance criteria) must also be known by the trainer/evaluator and the trainee.
- The trainer/evaluator must have the knowledge and ability to teach/evaluate the trainee in accordance with the training objectives and standards.
- The training and competency of the trainees must be documented as factors in the qualification process, to provide feedback to the training system and to meet training record requirements.

Once appropriate objectives and standards are established, training on each task or grouping of like tasks is conducted in two distinct steps: the trainee is taught, and the trainee is evaluated. The teaching step may be accomplished by trainee self-study, observation, discussion, simulation, and/or performance under the supervision of a qualified job incumbent or trainer. The evaluation step is typically a “checkout” in which the trainee performs or simulates a task under the scrutiny of an evaluator and/or discusses the task if necessary. Both the teaching and evaluation steps are essential to effective OST programs. The results of these steps are then documented to satisfy training record requirements and to provide input to the formal qualification process as appropriate.

5.9 Administrative Policies for Implementation of MCR On-Shift Training (OST)

In order to enhance the effectiveness of OST, controls should be established governing trainee prerequisites, trainer/evaluator quali-

6.0 REFERENCES

fications, and program coordination. Such controls may be established through administrative policies or procedures.

The determination of program content, establishment of performance standards, and implementation of the program are enhanced significantly by the participation of line managers and supervisors. It is essential that they become involved and provide resources and technical input, as well as administrative guidance on the qualification process and its relation to the work assignment.

5.10 Review of JHQs

Each employee's JHQ shall be reviewed annually by the employee and their supervisor. JHQs shall be updated whenever there are changes in an employee's scope of work, and new training requirements shall be established when applicable.

6.0 REFERENCES

DOE O 5480.19, Chg. 2, Conduct of Operations Requirements for DOE Facilities

APS Procedure #1110-00068, Operator Qualification Procedure

INVESTIGATION OF ABNORMAL EVENTS

1.0 PURPOSE

This chapter provides APS-specific guidance regarding the investigation of abnormal events with serious or potentially serious impact to assure they are promptly and thoroughly investigated and that an appropriate response is made to significant findings. Thorough investigation of such events means that:

- The impact of the event has been assessed;
- The impact of the event in a worst-case scenario has been assessed;
- A determination has been made regarding required reporting to DOE and other authorities;
- The root cause(s) of the event have been determined; and
- Corrective actions capable of preventing recurrence of the event have been identified.

Appropriate response means that, where feasible, steps are taken to prevent recurrence of the event or a similar event that might be accompanied by adverse impact.

2.0 SCOPE

2.0 SCOPE

2.1 Summary of Required Actions

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 conduct an investigation in accordance with guidelines identified in the appropriate ANL ESH Manual chapters. 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.

2.2 Events Covered by Requirements of the Chapter

For the purpose of this chapter, 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 DOE Order 232.1A, Occurrence Reporting and Processing of Operations Information. 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.

3.0 DEFINITIONS

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

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.

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 Manual 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 ANL ESH Manual Chapter 1-8, Occurrence Reporting. Occurrences are reportable to DOE via the ORPS reporting system.

4.0 RESPONSIBILITIES

4.1 Events Requiring Investigation

Events requiring investigation are defined in the ANL ESH Manual, Chapter 1-8, Occurrence Reporting.

4.2 Investigation and Corrective Action Responsibility

The ANL ESH Manual, Chapter 1-7, identifies the persons responsible for investigating safety incidents and taking corrective action.

4.2.1 Occurrence Reporting

All situations and conditions that may be considered abnormal shall be brought to the attention of Division Management. Supervisors who make initial determinations that an event is to be managed as abnormal must immediately determine if the event is subject to the requirements of DOE O 232.1A.

4.3 All Personnel

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

4.0 RESPONSIBILITIES

- 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.

4.4 Supervisors

Supervisors are responsible for initial evaluation of abnormal events and “near misses” reported to them. When a reported event is determined to be subject to this chapter, the supervisor has the responsibility for initiating, planning, directing, and coordinating the resulting investigation and for ensuring that corrective actions are planned and implemented in a timely manner.

4.5 Division Directors

Division Directors have overall responsibility for managing the investigation of abnormal events that affect those portions of the facility for which they have responsibility. Division Directors may delegate investigative tasks to other personnel as they determine appropriate. In addition, they may delegate responsibility for review of findings and implementation of corrective actions.

4.6 Division ESH Coordinators

The ESH Coordinator for the affected division has the responsibility to provide technical support and guidance to the investigation coordinator and to maintain investigation records relating to ESH

deficiency findings. Moreover, the ESH Coordinators should monitor division activities to verify that they are conducted in accordance with this chapter.

4.7 Associate Laboratory Director

The Associate Laboratory Director has overall responsibility for management of the investigation of abnormal events that affect or might affect more than one division. The Associate Laboratory Director may delegate investigative tasks to other personnel as deemed appropriate, and may delegate responsibility for review of findings and implementation of corrective actions.

4.8 ALD ESH/QA Program Manager

The APS ALD ESH/QA Program Manager is responsible for independently appraising operations at the APS and verifying that they are conducted in accordance with this manual. In particular, the ALD ESH/QA Program Manager has the responsibility for ensuring that investigations conducted under this chapter are thorough and reliable. If the ALD ESH/QA Program Manager notes deficiencies, he or she shall bring them to the attention of APS management and shall propose corrective actions.

The ALD ESH/QA Program Manager functions as the APS ORPS contact person, as described in Chapter 7.

5.0 PROCEDURE

Refer to ANL ESH Manual Chapter 1-7, Incident Reporting and Analysis and Chapter 1-8, Occurrence Reporting.

Contact the appropriate Division ESH Coordinator or the APS ESH/QA Manager for guidance.

6.0 REFERENCES

DOE O 5480.19, Chg. 2, Conduct of Operations Requirements for DOE Facilities

6.0 REFERENCES

DOE O 232.1A, Occurrence Reporting and Processing of Operations Information

DOE Manual M 232.1-1A, Occurrence Reporting and Processing of Operations Information, Appendix A

ANL ESH Manual Chapter 1-7, Incident Reporting and Analysis

NOTIFICATIONS

1.0 PURPOSE

This chapter describes the requirements, responsibilities and procedures for timely notification of ANL and DOE of events, conditions, or concerns that have safety, health, quality assurance, security, or environmental impacts. Notification requirements that apply under prescribed conditions have been established by ANL, DOE, OSHA, and other regulatory agencies.

2.0 SCOPE

This chapter provides guidelines to ensure uniformity and thoroughness of notifications to meet ANL and DOE requirements. For occurrences that require notification, it is essential that information be gathered and transferred in a systematic and controlled manner to avoid duplication and confusion.

3.0 DEFINITIONS

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

4.0 RESPONSIBILITIES

4.0 RESPONSIBILITIES

4.1 Individuals

Individuals who observe conditions or events, or who have concerns, are responsible for reporting them. The reporting requirements will vary based on the situation, and this chapter summarizes those situations. When corrective action cannot be accomplished on the spot, reporting requirements should include advising individuals with supervisory responsibilities for affected individuals or for areas where occurrences are identified.

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 DD/DH 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.

4.2 Supervisors

Supervisors shall ensure that the appropriate Division ESH Coordinator and representatives of other organizational units that may be impacted are made aware of any adverse situation.

4.3 Division ESH Coordinators

Division ESH Coordinators have been trained to develop the initial or draft reports on incidents and occurrences, and can assist those individuals with reporting responsibilities in collecting required information.

4.4 ALD ESH/QA Program Manager

The ALD ESH/QA Program Manager is the designated point of contact for the transmittal of incident, accident, and Occurrence Reporting and Processing System (ORPS) reports to ANL, which formally transmits them to DOE.

5.0 PROCEDURE

5.1 General

Employees and supervisors 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.

- Concerns, conditions, and events should be reported to the responsible supervisor and ESH Coordinator as soon as possible with a recommendation of possible solutions.
- Accidents shall be reported to the responsible supervisor and ESH Coordinator as soon as practical. Once the situation is secured, the supervisor is responsible for conducting and filing an accident investigation report. The procedure and reporting requirements are detailed in the ANL ESH Manual.
- Emergency situations or adverse conditions or events require that personnel shall take immediate actions to ensure their own safety and shall warn other employees who may be affected. Thereafter, the event should be reported as soon as possible. If the immediate supervisor is not available, personnel shall find the next senior individual available or (if the facility is operational) the appropriate supervisor.

If any situation calls for an immediate response by trained emergency personnel, personnel shall call 911 and then notify the responsible supervisor. If possible, remain near the phone from which the 911 call was placed and report to the Area Emergency Supervisor or ANL emergency response personnel when they respond. Detailed guidance for handling emergency conditions is found in the ANL Comprehensive Emergency Management Plan.

Variances to established ANL emergency response procedures shall be documented and publicized to all potentially affected individuals.

6.0 REFERENCES

5.2 Notification Procedures and Responsibility

The occurrences that are reportable are defined in the ANL ESH Manual Chapter 1-8, Occurrence Reporting. This chapter addresses requirements of DOE O 232.1A, Occurrence Reporting and Processing of Operations Information, and DOE O 151.1A, Comprehensive Emergency Management System.

5.3 Names and Phone Numbers

The names and phone numbers of APS personnel can be obtained through the MCR or from the APS intranet (see Chapter 8, Section 3.0).

5.4 Documentation

Records of occurrences and accidents shall be retained by Division ESH Coordinators and ANL ESH. All notifications shall be documented and a formal record of notifications maintained by the ALD ESH/QA Program Manager.

6.0 REFERENCES

ANL ESH Manual Chapter 1-7, Accident Investigation Incident Reporting and Analysis

ANL ESH Manual Chapter 1-8, Occurrence Reporting

ANL Comprehensive Emergency Management Plan

DOE O 5480.19, Chg. 2, Conduct of Operations Requirements for DOE Facilities

DOE O 232.1A, Occurrence Reporting and Processing of Operations Information

DOE O 151.1A, Comprehensive Emergency Management System

MANAGEMENT OF EQUIPMENT AND SYSTEM STATUS

1.0 PURPOSE

This chapter provides direction for planning work so that the status of equipment and systems is properly managed. Status management is necessary to ensure that facility configuration is maintained in accordance with operational schedules and procedural requirements, and to ensure that operating shift personnel know the status of facility equipment and systems.

Status management includes the planning and execution of work done during both long maintenance periods and during the shorter machine intervention periods that occur during operational runs (see section 2.0 below). It also includes instructions for control of equipment, locking of components, verification of technical specification compliance prior to facility operating-mode changes, authorization prior to removing or restoring equipment to service, and identification and documentation of equipment deficiencies.

2.0 SCOPE

The APS operates year round on a schedule developed by ASD and reviewed by the Operations Directorate. For example, the current schedule consists of runs, typically 11 to 12 weeks in duration, separated by long (5- to 6-week) shutdowns that are used for extensive maintenance, repairs and machine development. During the runs, a block of time is set aside each week to effect shorter urgent repairs (referred to as machine intervention) and perform machine studies.

3.0 DEFINITIONS

During runs, aside from the machine intervention times, any hardware failure that causes machine downtime will need to be repaired. There are also situations during runs when work may be taking place on systems not impacting machine operation.

This chapter addresses how work is planned, authorized and carried out, and how equipment is returned to service in all of the above situations and applies to all individuals involved in the operation, maintenance, or development of APS accelerators, front-end systems, or APS managed beamline systems. (Where possible, similar administrative tools are used to manage all work.)

It is imperative that work on equipment and systems in the APS facility be properly managed. Personnel must be aware of how equipment and systems are expected to function for operational purposes. Additionally, as work is performed on accelerator and beamline equipment it is necessary to ensure that design bases and operational limits are not compromised.

APS is required to establish administrative control programs to handle configuration changes resulting from maintenance, modifications, and testing activities. Typically, changes in equipment and system configuration are to be communicated from shift to shift through the shift turnover process or through an equivalent method of controlling status. During operational periods, equipment status computer displays, particularly the Save/Compare/Restore program, are used as aids in maintaining configuration control of equipment status.

3.0 DEFINITIONS

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.

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.

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.

CONFIGURATION CONTROL WORK PERMIT (CCWP): 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. Presently one individual is assigned as CCSM for beamlines and front ends, and a second individual assigned as CCSM for the accelerator. 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.

INTRANET: An APS-wide implementation of Internet and World Wide Web technology used for internal (i.e., APS) communications.

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.

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

WORK REQUEST: An online form that is used to communicate the status of work. It is initiated when the work is first defined, and

4.0 RESPONSIBILITIES

subsequently used to track work through the approval, execution, and final check-out phases. It also includes a variety of safety checks.

4.0 RESPONSIBILITIES

4.1 Division Directors

Division Directors shall ensure participation in pre-shutdown planning sessions by personnel responsible for defining group maintenance requirements and schedules to enhance communication of maintenance plans and possible conflicts. Division Directors shall evaluate the work being planned during maintenance periods to ensure that divisional priorities are being addressed.

4.2 Technical Group Leaders

Technical Group Leaders are responsible for seeing that Work Requests are submitted for work being planned by their group. They shall evaluate Work Requests to see that group resources are available to complete the work in the scheduled time. Technical Group Leaders shall provide updated call-in lists to ensure that adequate and appropriate technical expertise is available during run periods.

4.3 Machine Managers

Machine Managers ensure that work being done does not affect accelerator design parameters or operating envelopes. If the work being done does modify design parameters or operating envelopes, the machine manager evaluates the changes if approved and incorporates them into the appropriate documentation.

4.4 Chiefs of Operation (COs)

Each of the accelerators has assigned to it a CO who is responsible for approving work during maintenance periods. The CO assists in developing the schedule and looking for potential conflicts. If proposed work affects machine design parameters, the CO will bring it to the attention of the appropriate machine manager.

During user runs the CO will provide guidance to the ACO in identifying the cause of problems so that the correct group can be contacted.

4.5 Crew Chiefs and CCSM

The crew chiefs authorize the beginning of work based on the status of the Work Request (e.g., approved or not approved) and the status of the machine. The Critical Component System Manager (CCSM) authorizes the beginning of work on user beamlines for work requiring Configuration Control Work Permits.

4.6 System/Responsible Engineer

The System/Responsible Engineer or his/her designee will submit Work Requests. It is their responsibility to see that the Work Request is properly filled out, and that the work takes place as defined. The System/Responsible Engineer or his/her designee will obtain crew chief authorization to begin work and notify the crew chief when the work is completed.

5.0 PROCEDURE

5.1 Work Planning

New or upgraded systems or components for accelerators, front ends, and beamlines cannot be installed until the system or component has been approved as required by the APS Policy on Design Review.

The primary tool for scheduling and defining work related to the APS accelerators, front end systems, and APS managed beamline systems is the Work Request System (WRS). An additional tool, the Configuration Control Work Permit is also required for work on radiation safety systems. This tool is triggered by the WRS and managed by the CCSM.

Planning for maintenance periods begins many weeks (in some cases, months) in advance. The planning process includes intragroup meetings and weekly meetings expressly for this purpose that in-

clude members from all groups. The primary tool for scheduling and defining work is the Work Request. When a group has decided that a job should be done, a Work Request, denoting the specific maintenance period in which the proposed work would be done, is submitted. The authorized approver for the affected machine will approve or disapprove the Work Request. In doing so the authorized approver is not determining the priorities of the facility. Rather, the role of the authorized approver is to ensure work is well coordinated and that the specific request is not in conflict with other work. When conflicts are discovered they are raised to the appropriate level (i.e., System/Responsible Engineer up to Division Directors) for resolution. The Work Requests then form the basis of the Maintenance period master schedule, which is made available on the intranet.

To plan work to be done during machine intervention periods a request is submitted to the ASD OAG group leader (or designee) to use machine intervention time for work (rather than accelerator studies). If time is made available for the requested work, a Work Request is filled out, and the steps described in subsequent sections of this chapter are followed.

Work that takes place during runs falls into two broad categories. One is work that is associated with machine development. New components are often installed or modified during operation with little, but finite, risk to the operation of the machine. In these cases the Work Request must be approved by the responsible authorized approver. These individuals are encouraged to defer the decision to upper management if there is a question regarding the priority or risk level of the work. The work is then authorized by the crew chief. The second category of work is that which is needed to repair the accelerator. In this case it is likely the accelerator is down, awaiting these repairs. However, a Work Request must be filled out and approved/authorized by the crew chief before the work may begin.

5.2 Work Approval

Work Requests are approved by means of a graded approach to verify that the work has priority and does not conflict with other work or operational needs. A number of safety checks are per-

formed in filling out the Work Request, and these are taken into consideration when approving the request (e.g., permit for working on energized systems? change to procedure required because of work?). The person who has approved the Work Request modifies the status to “Approved.” When approving work to be done during a user run, the approver shall assess overall priorities and the risk to operation, and advise the person carrying out the work on special precautions that may need to be taken. The Work Request System produces a Configuration Control Work Permit (CCWP) when work on radiation systems is requested. Approval requirements for the CCWP are specified in the Policy on Design, Installation, and Maintenance of Radiation Safety Systems. Work cannot proceed on radiation safety systems without an approved CCWP.

5.2.1 Work Request Authorization

Although a Work Request may have been approved, the individual performing accelerator work must receive MCR crew chief authorization before beginning the work. For APS-managed beamline component work, the individual performing the work must receive Floor Coordinator authorization before beginning work. This authorization serves several purposes: to ensure that conditions are consistent with the work beginning; to inform anyone who needs to know of the work beginning; and to update the Work Request to the status of “Work in Progress.” Additionally, the MCR crew chief or FC may verify that those performing the work have their training up-to-date.

Documentation of the status of the Work Request shall be made available on the intranet.

5.3 Completion of Work

Equipment shall be tested following maintenance or modification to demonstrate that it is capable of performing its intended function. Normally such testing is performed by or under the supervision of the System/Responsible Engineer for that equipment.

Testing of equipment following maintenance shall include testing of all functions that may have been affected by the maintenance.

5.0 PROCEDURE

Post-maintenance testing of equipment shall verify that the maintenance performed corrected the original problem and no new problems were introduced. Testing shall be stopped, and the situation re-evaluated, if it becomes apparent that the original problem has not been corrected or new problems have been introduced.

Checks shall be performed after extended shutdowns, maintenance, or as defined by other procedures such as the appropriate calibration procedures and timetables. Normally the System/Responsible Engineer responsible for the particular equipment performs such checks and reports to the MCR and/or the Floor Coordinator on the readiness of the system. The open Work Request is then closed to indicate that the job is done and that the appropriate checks have been made. There are times when the post-maintenance testing cannot be done at the time the work is done (e.g., when waiting for the enclosure to be secured so the equipment can be turned on). In these cases the Work Request will remain open until the testing has been performed.

Start-up checklists are used in appropriate situations such as pre-closure tunnel inspections and safety system validations. The Save/Compare/Restore capabilities of the controls system are used to verify proper configuration control, during both startups and operation.

The need for a complete check of equipment and systems should be based on the level of control that has been maintained over the status of the components. Typical situations that may require equipment and systems to be reviewed include startup from cold shutdown, major outages, and major changes. Following maintenance or other shutdown situations, any system controlled by the Access Control Interlock System (ACIS) or the Personnel Safety System (PSS) that has work done on its interlock subsystems shall be tested to ensure that ACIS/PSS is still able to perform its shutdown tasks. Following all validations of ACIS/PSS systems, those systems controlled by the ACIS/PSS just validated shall be functionally tested according to the appropriate ACIS/PSS procedures to ensure that ACIS/PSS is still able to perform its shutdown tasks.

5.4 Equipment Deficiency Identification and Documentation

Equipment deficiencies shall be recorded by personnel and reported to System/Responsible Engineers for correction. The Repair, Maintenance, and Development (RM&D) system is used for this purpose.

5.5 Status Change Authorization and Reporting

Since the crew chief is typically the senior accelerator operations person on shift, the crew chief is tasked with maintaining an overview of the accelerator operations according to the envelope established by the Operations Directorate. The on-duty floor coordinator has the responsibility to insure that the experimental operations are being performed within APS policies and procedures, and according to the operating envelope established by the Operations Directorate. Minor variations to routine operating parameters within the approved operating envelope are discussed, as appropriate, between the crew chief and FC, and if determined to be significant or unresolvable, are referred to higher levels.

Typically, changes in status of safety-related equipment and systems shall not be authorized while the APS is in the operating mode. In the case of beamlines, such changes shall not be authorized while the specific beamline is in operation.

5.6 Distribution and Control of Equipment and System Documents

A system shall be established to ensure that personnel receive and utilize the latest revisions of engineering drawings and specifications. Personnel shall be made aware of all changes to these documents.

The document distribution shall include all operations-related activities such as procedures review groups, maintenance groups, facility safety analysis groups, and testing groups.

6.0 REFERENCES

DOE O 5480.19, Chg. 2, Conduct of Operations Requirements for DOE Facilities

ANL ESH Manual Chapter 7-1, Control of Hazardous Energy -
Lockout/Tagout

ANL APS Quality Assurance Program Plan, 1.1.1.11-00007, Rev. 2

APS Document #1-01304 Policy on Design, Installation, and Main-
tenance of Radiation Safety Systems

APS Document # X.3.1.1 APS Design Review Procedure

LOCKOUTS AND TAGOUTS

1.0 PURPOSE

Lockout and Tagout 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.

2.0 SCOPE

Chapter 7-1 of the ANL ESH Manual defines Argonne National Laboratory's minimum performance requirements for Lockout/Tagout. These requirements are based on 29 CFR 1910.147, "The Control of Hazardous Energy (Lockout/Tagout)"; DOE O 5480.19, Chg. 2, "Conduct of Operations Requirements for DOE Facilities"; and ANL determination of good management practices.

At Argonne National Laboratory a tag alone shall not be considered sufficient to provide control of an energy source. Where it is not mechanically possible to lock an energy source, some positive control should be in place to prevent an unplanned energization until the system can be reengineered to be able to provide that positive control.

3.0 DEFINITIONS

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

4.0 RESPONSIBILITIES

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 insuring 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.

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 ANL and APS procedures in order to service or maintain machines or equipment.

Further descriptive definitions are provided in the ANL ESH Manual Chapter 7-1, Lockout/Tagout.

4.0 RESPONSIBILITIES

4.1 All Employees

At the APS it is required that employees who apply a lockout device verify its presence initially, and with regularity, e.g., daily, while work is being performed. All employees must individually apply their own locks on systems on which they will be working. They may not rely on another individual’s locks. If an employee causes a lock to fall off or observes a lock that has fallen off a breaker, that person is responsible for assuring that the breaker is secured until the original applier of the lock is able to replace the lock. No employee shall attempt to start, energize, or use machinery or equipment that is locked or tagged out of service, nor shall any employee attempt to defeat a lock or remove a tag without authorization from line management. Before turning a circuit on or off, an employee should be aware of the impact of such an action.

4.2 Users, Contractors, and Service Personnel

Users, contractors, and service personnel shall comply with ANL and APS Lockout/Tagout procedures while performing work at the APS. It is the responsibility of individuals initiating such work to ensure that the individuals performing that work are aware of and understand the ANL Lockout/Tagout procedures.

5.0 PROCEDURE

5.1 Lockout/Tagout: Chapter 7-1 of the ANL ESH Manual

The ANL ESH Manual Chapter 7-1, Lockout/Tagout, provides specific details of ANL Lockout/Tagout practices.

5.2 Subcontractors

Whenever subcontractor personnel are to be engaged in activities covered by the scope of the Lockout/Tagout program, the system shall first be locked by a knowledgeable ANL or APS employee, and then overlocked by the subcontractor employees who will be working on the system.

5.3 Group Lockouts

When servicing or maintenance is performed by a crew, craft, department, or other group, they should use a procedure that will provide for the same level of safety provided by the personal lockout or tagout device.

5.4 Accelerator Enclosure Equipment Lockout/Tagout

All power supplies powering equipment in an APS accelerator enclosure that require lockout/tagout to permit safe working conditions in the enclosures have been identified. Power supplies for the magnets within the accelerator enclosures are provided with a Kirk-Key system. Prior to Authorized Access into any of the enclosures, the keys for this system are removed, thus inhibiting electrical power. The Kirk-Keys are brought to the MCR where they are

6.0 REFERENCES

captured by additional key interlock systems. One key is obtained for any one enclosure. This key, needed to release the keys to power equipment, is placed in a lock box. Each person working in the tunnel is required to overlock this lock box. He or she is also individually responsible for verifying that power is not present. Work on other systems within the accelerator enclosures may require additional lockout/tagout.

5.5 Building 420 RF Equipment Lockout/Tagout

When the booster or Zone F enclosures are brought to an ACIS state of Controlled Access or lesser, the associated 420 rf systems require lockout/tagout to ensure that no rf can be brought into these enclosures during the access. This lockout/tagout is performed by utilizing a Kirk-Key system that is located in Building 420. This Kirk-key system is similar to that used for power equipment.

Lockout/tagout will be performed in the Building 420 area, with the keys to be captured and maintained at either the 420 LOTO board or the MCR. All of those working within the Booster or Zone F enclosures must overlock at either location prior to the access.

5.6 Conduit Cutting Policy

As an extra precaution to supplement lockout/tagout, normal APS practice is to remove wire from conduits before the conduit is cut.

6.0 REFERENCES

DOE O 5480.19, Chg. 2, Conduct of Operations Requirements for DOE Facilities

ANL ESH Manual Chapter 7-1, Control of Hazardous Energy - Lockout/Tagout

INDEPENDENT VERIFICATION

1.0 PURPOSE

This chapter identifies the considerations for including independent verification in procedures that are considered critical to the safety of the operation or maintenance of APS systems. Independent verification provides a high degree of reliability in ensuring the correct facility operation and the correct position of components such as valves, switches, and circuit breakers, particularly in cases in which such components would create a health or safety hazard or result in equipment damage.

2.0 SCOPE

Independent verification should be performed in those cases where a reasonable potential exists for human error or where the consequence of error is great in terms of personnel injury or equipment damage. The application of the independent verification program is dependent upon the safety and operational considerations of each system at the facility.

Because the possibility of some errors may be remote and the effects of some errors may not be significant for safe and reliable operation, not all procedures require independent verification. Designating systems or components that require independent verification and defining when independent verification is required will ensure that independent verification is consistently applied. The application-

3.0 DEFINITIONS

criteria should ensure that independent verification is performed in all cases where a reasonable potential for human error exists.

3.0 DEFINITIONS

INDEPENDENT VERIFICATION: The act of checking that a given operation conforms to established operational criteria, e.g. a shutter's position and the shutter's limit switches are operating within proper limits, or a power supply interrupt circuit controls the supply as specified.

4.0 RESPONSIBILITIES

4.1 System/Responsible Engineers

System/Responsible Engineers shall:

- Develop independent verification procedures for the systems under their purview, where needed.
- Develop the required documentation.

4.2 Technical Group Leaders

Technical Group Leaders shall:

- Ensure that only qualified personnel perform independent verifications.
- Determine the corrective actions to be taken when discrepancies are discovered.
- Obtain approval from the responsible Division Director to authorize deviations from normal verification practices.

4.3 CCSM

The critical component system manager (CCSM) oversees work on radiation safety systems in the accelerator, front ends, and beamlines. Presently one individual is assigned as CCSM for beamlines and front ends, and a second individual assigned as CCSM for the

accelerator. 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.

4.4 APS Personnel

APS personnel shall adhere to the requirements of this procedure.

4.5 Independent Verifiers

Independent verifiers shall locate and identify the component and determine both its required state for safe operation and its actual state. The independent verifier 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.

5.0 PROCEDURE

5.1 Components Requiring Independent Verification

Division Directors shall ensure that components or process systems requiring verification are identified. In most cases these will be components or processes that are critical to ensuring safe operation. These components or processes shall be identified explicitly in facility procedures or other official documents in order to ensure consistent application by involved personnel.

Incorrect programming, positioning, placement, connections, or alignment of certain components that are not safety related can also lead to facility shutdowns, challenges to safety-related equipment, or other undesirable effects on facility safety. Therefore, independent verification should not be limited to safety-related system components.

5.2 Occasions Requiring Independent Verification

Subsystems or components should be considered candidates for independent verification if one or more of the following situations is involved:

- A test, configuration, or modification that has potential for injury or damage.
- A test, configuration, or modification of a component or system described in the APS Policy on Design, Installation, and Maintenance of Radiation Safety Systems.
- A particularly expensive subsystem is being tested or configured and the potential for damage is present in the case that errors are made.
- A subsystem of major importance to APS operations is being tested or configured and the potential for damage is present in the case that errors are made.
- An elaborate test or configuration is being executed for the first time.

It should be noted that when two or more of the above situations are involved, the need for independent verification is more than warranted.

5.3 Verification Techniques

The Division Directors or designees shall approve the method of independent verification for each component and the procedure (including component listing, method of verification, and documentation requirements) for each independent verification. Personnel shall be trained in the appropriate techniques for verifying the positions of all facility components. In addition, a reference document should be provided explaining what is to be done when verifying a procedure or component position. Because of the large variety of components, it is not feasible to provide specific instructions for verification of all individual component positions without system-specific knowledge.

5.3.1 Independence

- Independent verification shall be conducted in a manner such that each check constitutes a local identification of the component or process and a determination of both its required and actual positions or responses.

- To be independent, the integrity of the checks must be maintained by minimizing interaction between the personnel operating the components and those performing the independent verifications.

5.3.2 Guidelines for Performing Independent Verification

Independent verifications should be conducted in a manner such that each check constitutes an actual identification of the component or process and determination of both its required and actual positions or responses. There must be no doubt as to the determination of the actual position or response of a component or process.

Determining the actual position (e.g., open, shut, throttled, test position, or racked out) of the component is based upon examination of drawings, design, experience, training, and if needed, vendor information for the specific devices encountered.

If a discrepancy is discovered while independently verifying a condition, the individual discovering the discrepancy shall clearly indicate the discrepancy on the procedure or check sheet, leaving the relevant step or item unsigned, and shall then notify the MCR.

5.3.3 Independent Verification of Lockout/Tagout

If a lockout/tagout or removal of a lockout/tagout requires independent verification, the person assigned to perform independent verification shall review the lockout/tagout to ensure that he or she is qualified to do so, and shall then perform the following steps:

- Verify each detail of lockout/tagout by personal observation of the document and equipment and tags/locks.
- When required, return the documents to their normal locations.
- Immediately notify the MCR if a discrepancy is observed between the required and actual positions of a component as designated on a document.

6.0 REFERENCES

DOE O 5480.19, Chg. 2, Conduct of Operations Requirements for DOE Facilities

APS Document # 1-01304, Policy on Design, Installation, and Maintenance of Radiation Safety Systems

LOGKEEPING

1.0 PURPOSE

This chapter provides direction for establishing and maintaining operating logs in order to fully record the data necessary to provide an accurate history of facility operations. This chapter describes the operating logs utilized by the APS facility and provides guidelines to ensure they are properly maintained.

2.0 SCOPE

This chapter applies to operating logs that are maintained to provide an accurate history of facility operations and to reconstruct important events. Logs include those that are maintained by the controls system computers (i.e., data loggers); logs that reside in computer databases for use by computers and personnel to analyze events; and narrative logs, both electronic and handwritten. Data loggers are used to monitor facility parameters including operational modes, alarm status, etc. From the data loggers many events can be reconstructed. Other logs that are kept in computer databases include the downtime log, which contains the duration and reasons for equipment failures. Narrative logs contain text provided by operations personnel to elaborate on, and extend, the information that has been logged by computers.

Events recorded in narrative logs should be recorded in a timely fashion in order to ensure the accuracy of the entry. Entries shall include documentation of actions taken, activities completed, trans-

3.0 DEFINITIONS

fer of information among operators, and data necessary for event reconstruction. Logs kept for off-line R&D and testing of individual pieces of equipment when not immediately associated with APS operations are to be maintained in accordance with good laboratory log-keeping practices. Procedures to be followed are at the discretion of the appropriate Technical Group Leaders.

This chapter applies to operating data associated with normal operation, testing, and unusual activities. Data in the logs will be available to appropriate personnel in order to perform the following activities in an effective manner: equipment and facility performance evaluation or analysis; operational performance evaluation or analysis; safety analysis; accountability; reporting requirements; and transfer of information from shift to shift.

3.0 DEFINITIONS

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

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.

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.

4.0 RESPONSIBILITIES

4.1 Technical Group Leaders

The Technical Group Leaders shall ensure that logs and records covering operations in his or her area of responsibility are properly established, maintained, and used.

4.2 APS Personnel

APS personnel shall ensure that data and information are properly recorded in appropriate logs.

5.0 PROCEDURE

5.1 Data Loggers

Technical Group Leaders or designees will establish the list of control system parameters to be logged. Procedures will be established to ensure that data logger programs are running at all times. The duration over which data logger data is saved is determined by a graded approach. Beam current, operational modes, and other important operational parameters will be permanently saved. Other parameters such as power supply currents or water temperatures will be “winnowed” over time or discarded when a specified age is reached.

5.2 Computerized Logs

APS personnel required to use computerized logs will be trained in the use of the appropriate computerized log.

5.3 Narrative Logs

5.3.1 MCR Narrative Log

A narrative log shall be maintained by the Main Control Room (MCR). The MCR log shall be maintained by entering text into a computer file during the course of the shift. The electronic log is automatically translated to an 'on-line format' every few minutes and made available on the intranet. Certain entries may be required in the bound log as specified by the Operations and Analysis Group Leader. An example is a safety related sign-off.

The MCR narrative log will require at a minimum the following controls:

- Each log file shall be clearly identified.

- Each log file shall be chronologically ordered.
- The beginning and ending time period covered by each log file shall be identified.
- Entries made during the shift shall be clear and chronological.

Before a shift is completed, the Crew Chief shall review his/her log for readability, completeness, and accuracy. Modifications to the electronic log after the end of the shift will only be done if information is later determined to be inaccurate or misleading. This will only be done with the approval of the Operations and Analysis Group Leader. Any changes to the bound log will be done using good logkeeping practices (no erasures or white-outs).

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.

Entries made in all shift operating logs must be easily read and understood. All handwritten entries shall be made using indelible ink (ball point or other nonwater-base).

5.3.2 UES Narrative Log

The UES narrative log shall be maintained by entering text into a computer file during the course of a shift. Information regarding activities shall be recorded promptly throughout the shift in order to ensure the accuracy of the entry.

The UES narrative log will require at a minimum the following controls:

- Each log file shall be clearly identified
- Each log entry shall include the initials of the person making the entry
- Each log entry shall be chronologically ordered unless directly event driven

5.3.3 Information to be Recorded

The Technical Group Leader should provide written guidance to define thoroughly the type and scope of entries for each log and the format for making entries. This is done, in part, via a template used when opening the file to begin the logkeeping.

Example templates indicating the type of information required follow:

MCR Log information types	UES Narrative Log information types
1.0 General: Shift Personnel Type of Shift Shift Objective	1.0 Shift Personnel
2.0 Initial Machine Status: Linac LEUTL PAR Booster Storage Ring	2.0 Shift Events
3.0 Shift Events	3.0 Approximate Downtime for Specific Beamline and Reasons
4.0 Approximate Downtime and Reasons	4.0 Summary of Experiments
5.0 Shift Summary	5.0 Shift-to-Shift Orders
6.0 Daily Orders	6.0 Floor Coordinator Aids
7.0 Operator Aids	

The “Shift Events” section will contain:

- Facility mode or condition changes.
- Abnormal facility configurations.
- Status changes to safety-related and other major facility or area equipment.
- Occurrence of any reportable events.

5.0 PROCEDURE

- Initiation and completion of surveillance tests.
- Pertinent changes to Operational Safety Requirements and/or Technical Specifications.
- Security incidents.
- Out-of-specification operation or results.
- Related engineering, maintenance, and/or related activities from other departments.
- Any other information deemed necessary by the supervisor.

To aid in event reconstruction, as much significant information as possible should be logged during emergencies and abnormal or unexpected events. However, logkeeping should not take precedence over controlling and monitoring the facility.

Items 6 (Daily Orders) and 7 (Operator Aids) are discussed in Chapters 15 and 17.

The contents of this section are passed from shift to shift by copying the previous shift's text from its log. Chiefs of Operation and the Operations and Analysis Group Leader are responsible for removing expired items or documenting long-term items in other ways.

5.3.4 Log Review

The oncoming crew chief, operators, and FCs shall review, as a minimum, the two previous shifts of the operational logs under their cognizance.

The CO, crew chief, System Managers, and Technical Group Leaders, or their designees, shall review logs under their cognizance when appropriate. These reviews shall ensure that entries are accurate and adequate.

5.3.5 Permanent Storage of MCR Logs

The electronic copies of narrative logs will remain on line for the life of the facility. Backup copies of electronic logs will be made on a timely basis in accordance with good computer backup policy. Bound logs will be available when needed.

6.0 REFERENCES

DOE O 5480.19, Chg. 2, Conduct of Operations Requirements for
DOE Facilities

OPERATIONS TURNOVER

1.0 PURPOSE

This chapter establishes the instructions to be followed during shift turnover to ensure that all operators and Floor Coordinators receive the information required to adequately carry out their shift responsibilities.

2.0 SCOPE

This chapter describes the controls necessary for conducting an orderly and accurate transfer of information regarding a facility's overall status at shift turnover. Shift turnover is a critical part of the APS operation. Personnel should not assume operational duties unless they are physically and mentally fit to do so and until they have a high degree of confidence that an appropriate information transfer has taken place.

3.0 DEFINITIONS

None

4.0 RESPONSIBILITIES

Shift personnel shall conduct shift turnovers in a professional manner. The offgoing Crew Chief shall prepare for relief by completing

5.0 PROCEDURE

the logbook including the shift summary. He/she will review the logbooks of the previous shift and his/her shift. If it has been more than 16 hours since the oncoming crew was on shift, the offgoing Crew Chief should be prepared to review critical operational information that has developed since the oncoming crew was last on shift.

Each crew shall have at least one person who is qualified to assume the shift position. If arrival of relief is delayed by weather conditions or other unusual circumstances, the operator on shift shall remain on duty until appropriate alternatives are arranged.

No person shall assume a shift position unless physically and mentally fit to competently discharge the responsibilities of the shift position.

The offgoing Floor Coordinator shall advise the incoming Floor Coordinator or the crew chief of critical operational information that has developed during the previous shift and advise of shift-to-shift details. If arrival of relief is delayed by weather conditions or other unusual circumstances, the Floor Coordinator on shift shall remain on duty until appropriate alternatives are arranged.

5.0 PROCEDURE

The offgoing crew chief will conduct a shift briefing with the oncoming crew at an area away from the workstations. The offgoing crew members shall retain their responsibilities during the briefing. The offgoing crew chief shall discuss the events of the previous shift and his/her shift. If it has been more than 16 hours since the oncoming crew was last on shift, critical operational information that has developed since the last time the oncoming crew was on shift will be noted. The briefing shall consist primarily of reviewing the contents of the on-line log including the shift summary and the sections entitled "Daily Orders" and "Operator Aids."

The offgoing FC/crew chief shall be responsible for briefing the oncoming FC/crew chief on the status of the beamlines and the current status of the configuration control logs. The off going FC/crew chief will also review the current RM&D logs affecting beamlines and Work Requests with the oncoming FC/crew chief.

All members of the Operations and Analysis Group not on shift (i.e., back-up crews, Chiefs of Operation) are encouraged to attend shift briefings, as their schedule permits.

6.0 REFERENCES

DOE O 5480.19, Chg. 2, Conduct of Operations Requirements for DOE Facilities

OPERATIONS ASPECTS OF FACILITY CHEMISTRY AND UNIQUE PROCESSES

1.0 PURPOSE

This chapter addresses the operations of facility chemistry and unique processes.

2.0 SCOPE

There are a few processes involving chemistry within the APS facility. Those that do exist are managed by Plant Facilities and Services (PFS). Their operations are addressed in the PFS operating procedures and guideline documents. There are no process systems involving chemicals for which APS personnel have responsibilities for controlling or monitoring. PFS advises the AES Conventional Facilities Group of the status of all the systems containing chemicals that they maintain and operate for the APS. The Conventional Facilities Group informs PFS of proposed system modifications or required changes in operating parameters required by APS Operations or the experimenters.

3.0 DEFINITIONS

None

4.0 RESPONSIBILITIES

4.0 RESPONSIBILITIES

4.1 Operator Responsibilities

PFS operators shall inform the AES Conventional Facilities Group (CFG) of the operating status of the water systems. This includes plans to change or replace filters, the occurrence of leaks, or contamination of the water.

4.2 Operator Knowledge

PFS operators should be knowledgeable of the general effects and results that contamination and leaks in the water system would have on water systems supporting the APS. They should know the procedures to be followed if such conditions occur, and who needs to be informed of such occurrences.

PFS operators shall know the immediate response procedures to be followed in case of accidents or emergencies involving use of chemicals associated with maintaining their water systems.

4.3 AES Conventional Facilities Group

The AES CFG shall provide the PFS APS Maintenance Supervisor with the desired facility operating parameters and the water quality requirements for the water system operations. The AES CFG shall inform PFS of all proposed design developments, new “tie-ins,” or any planned draw-down of process water that might affect the operation of the process water systems.

5.0 PROCEDURE

PFS operators shall provide AES CFG personnel with periodic reports on the status of the water system based on real-time monitoring of critical water system parameters. AES CFG and PFS support personnel shall work closely together to provide prompt corrective action when chemistry-related problems occur.

6.0 REFERENCES

DOE O 5480.19, Chg. 2, Conduct of Operations Requirements for
DOE Facilities

REQUIRED READING

1.0 PURPOSE

The purpose of this chapter is to provide requirements and instructions for a formal system that ensures that each individual receives all information necessary for job or experiment performance. The rigor used in controlling the reading of assigned materials will be based on the hazards and risks associated with the devices or processes covered in the reading material. Required reading documents and applicable laws, orders, regulations, and procedures will be readily available for reference.

2.0 SCOPE

It is usually not necessary for a document to be read by all personnel; however, it is essential that a method be provided to ensure that each individual receives the information important to his or her position. The method should designate which individuals are required to read a given document, and the required completion date. Personnel should be required to understand assigned material. When reading material is not understood, appropriate questions should be directed to supervisors.

3.0 DEFINITIONS

None

4.0 RESPONSIBILITIES

4.0 RESPONSIBILITIES

The Division Directors, or designees, are responsible for overall administrative control of the required reading programs in their respective areas.

5.0 PROCEDURE**5.1 APS Required Reading**

There are cases where it is deemed necessary for individuals throughout the APS to read certain documents before performing work. An example is the case of working in any of the accelerator enclosures. Required reading of this sort is made available on the intranet. Upon reading these documents, individuals submit a response indicating completion of reading. An on-line database is maintained indicating who has read the material and when, if applicable, re-reading is necessary.

5.2 ASD Operations and Analysis Group Required Reading

The ASD Operations and Analysis Group maintains a system of required reading as determined by the Operations and Analysis Group Leader.

6.0 REFERENCES

DOE O 5480.19, Chg. 2, Conduct of Operations Requirements for DOE Facilities

APS Procedure #1110-00068, Operator Qualification Procedure

ORDERS TO MCR OPERATORS

1.0 PURPOSE

The purpose of this chapter is to provide a means for APS management to disseminate essential information and administrative instructions to MCR operators. Other means of disseminating guidance to MCR operators are addressed in Chapter 14, Required Reading, and Chapter 16, Operations Procedures.

2.0 SCOPE

The changing needs and requirements of APS facility operations necessitate that a program be implemented to disseminate information to operations personnel in a timely manner. To ensure that this information remains current, periodic reviews to remove outdated information should be included in the program.

This chapter provides a means of transmitting management direction to MCR operators and a method of periodic review to remove outdated information.

3.0 DEFINITIONS

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

4.0 RESPONSIBILITIES

STANDING ORDER: An order accessed from an Operations and Analysis Group Web Page that generally falls into one of two categories: 1) an order that has been in place for several runs and has been moved to this location while a procedure is prepared to replace it; 2) an order that is likely to be permanent and is of sufficient brevity that a procedure is not appropriate. For example, the operating envelope is a permanent standing order.

TIMELY ORDER: An order accessed from an Operations and Analysis Group Web Page that is considered short term, typically in place for one operational run. For example, MCR operators are instructed to perform a certain task until a problem is fixed during the next long maintenance period.

DAILY ORDER: An order maintained in the on-line log book that is typically in place for days to weeks. For example, MCR operators are instructed to perform a special task until a piece of equipment is repaired during the next weekly repair period.

4.0 RESPONSIBILITIES

The Operations and Analysis Group Leader or COs shall issue orders. This responsibility may be delegated.

5.0 PROCEDURE

Orders shall be issued by the Operations and Analysis Group Leader, COs, or other APS staff whenever necessary to communicate with shift personnel. Information such as special operations, instructions on the need for and performance of specific tasks or tests, administrative directions, special data-collection requirements, requests to plot process parameters, work priorities, announcements of policy information and other similar short-term matters may be included in timely orders.

Information intended to permanently change or supplement operating procedures should be evaluated for incorporation into the appropriate procedure by a procedure change or revision.

Orders shall be clearly written and marked with the date of issuance, and the name of the person making the order.

Orders shall be made easily accessible to the MCR operators.

Daily orders shall be read by appropriate shift personnel prior to assuming their shift.

Daily orders shall be reviewed daily and updated as necessary by the crew chiefs and COs. Timely orders are reviewed regularly by COs and the OAG Group Leader. They are updated at least once per operational run.

Standing orders are reviewed and updated by the COs and OA Group Leader no less than annually.

Whenever timely or standing orders are updated, all MCR operators will be notified.

6.0 REFERENCES

DOE O 5480.19, Chg. 2, Conduct of Operations Requirements for DOE Facilities

OPERATIONS PROCEDURES

1.0 PURPOSE

Operations procedures are written to provide specific direction for operating systems and equipment during normal and postulated abnormal and emergency conditions.

Operations procedures should provide appropriate direction to ensure that the facility is operated within its design bases and should be effectively used to support safe operation of the facility.

2.0 SCOPE

This chapter provides instructions to ensure that procedure development, content, changes and revision, approval, review, availability, and use appropriately address and support safe operation of the facility. Other methods of disseminating operational information are addressed in Chapter 15, Orders, and Chapter 17, Operator Aid Postings.

Due to its complexity, much of the operation of the accelerator and its subsystems is automated through software. Such software procedures are beyond the scope of the present chapter. Revision, review, testing, and approval of software procedures is performed by the cognizant CO, Machine Manager, technical group personnel, and software developers. The Operations and Analysis Group Leader has responsibility for establishing good software develop-

3.0 DEFINITIONS

ment and testing practices in line with the APS Quality Assurance Plan.

3.0 DEFINITIONS

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.

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

PROCEDURE REVISION: A reissued edition of a procedure.

4.0 RESPONSIBILITIES

The Division Directors or the Operations Directorate (depending on the scope) shall be responsible for development, review, recommend, and availability of all operations procedures.

5.0 PROCEDURE

5.1 Procedure Development

To ensure consistency among operations procedures, the methods for developing new procedures and for revising procedures, outlined in this chapter, shall be standard APS practices

- Administrative procedures and/or writers' guides shall be used in the development and review process for procedures.
- All procedures shall provide administrative and technical direction to conduct the procedure effectively.
- The extent of detail in a procedure shall depend on the complexity of the task, the experience and training of the user(s), the frequency of performance, and the significance of the consequences of error.
- Appropriate attention shall be given to writing, review-

ing, and monitoring operations procedures to ensure that the content is technically correct and the wording and format are clear and concise. Although a complete description of a system or process may not be needed, operations procedures should be sufficiently detailed such that the required functions can be performed without direct supervision.

5.2 Procedure Content

To provide uniformity, the content of procedures shall conform to prescribed guidelines. The considerations described below should be followed when developing operations procedures.

The scope and applicability of individual procedures shall be readily apparent. In addition, to enhance rapid retrieval, emergency procedures shall be distinguishable from other procedures.

Procedures shall incorporate information from applicable source documents, such as the facility design documents, Safety Assessment Document (SAD), and vendor technical manuals. Procedures shall stay within the “safety envelope” defined by the SAD.

Prerequisites and initial conditions shall be detailed with careful consideration given to the location of this information within the procedure in order to help ensure that the intent of the procedure is understood.

- Meters, tools, and other testing equipment shall be verified operable, calibrated (where applicable) or inspected, and in good condition before implementing any test procedure, to ensure that they function as expected during the test.
- Verification shall be identified in the prerequisite section, with completion sign-offs required when appropriate.
- “Hold” points (requiring independent verification and/or approval) shall be clearly delineated.

Definitions used in the procedure shall be explained.

Procedures shall be easily understood, and actions shall be clearly stated.

Procedures shall contain only one action per step.

Procedures shall contain sufficient but not excessive detail.

Warnings, notes, and cautions shall precede the step to which they apply, shall be easily identifiable, and shall not contain action statements. The probability of missing an action step increases when it is included in a warning, note, or caution.

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 sign-offs 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.

The sequence of procedural steps shall conform to the normal or expected operational sequence. Training on this sequence, reinforced with procedures that show the same sequence, will serve to improve operator performance by development of patterns of action that are more easily remembered.

Procedures shall be developed with consideration for the human-factor aspects of their intended use.

Emergency operating procedures shall provide guidance in responding to single and multiple incidents.

Portions or steps of other procedures that are used or referred to when performing a procedure shall be specifically identified within the procedure so that operators will not be confused when transferring between procedures.

Component or system shutdown, startup, and restoration requirements following shutdown or a surveillance or test activity shall be specific and controlled by the procedure.

5.3 Procedure Changes and Revisions

Procedure changes and revisions are necessary to ensure that procedures reflect current operating practices and requirements. The review and approval process for each procedure change or revision shall be documented.

Procedure changes and revisions shall conform to the following practices:

- Procedure changes intended for use more than one time shall be documented in a location readily available for operator reference. To avoid the possibility of error, these changes shall also be referenced in the procedure copies used by operators. Within two weeks, procedure changes should be concurred with by the individuals who would normally approve a revision or the initial version of the procedure.
- Appropriate procedure changes and revisions shall be initiated when procedure inadequacies or errors are noted.
- Procedure revisions shall be initiated when a significant change has been outstanding for greater than six months.
- All currently effective procedure changes shall normally be incorporated when the procedure is revised.
- Procedure changes/revisions shall be implemented concurrently with modifications. Procedure updates required by temporary modifications should be handled as a procedure “change” and implemented concurrently with the temporary modification installation.
- Important information regarding changes or revised procedures shall be communicated to appropriate operations personnel via the required reading system, pre-shift briefing, or a similar method.
- Documentation of the reason for key procedure steps shall be maintained and reviewed when implementing changes or revisions that alter these steps. This practice

is important to ensure that the reason for any step is not overlooked.

- The review process shall involve validation of the procedure using walkthroughs or similar methods.

5.4 Procedure Approval

Prior to use, all new and revised operating procedures shall be approved by the appropriate Technical Group Leader, Associate Division Director, or Division Director, depending on the scope and nature (e.g., safety, radiation, QA) of the procedure. Each division has specific guidelines for its personnel.

The level of review and approval are described in the document *Managing APS Facilities Procedures*.

Changes that alter the intent of a procedure shall receive the same formal approval as a new or revised procedure.

5.5 Procedure Review

5.5.1 New Procedures

New procedures shall be reviewed prior to issuance. The purpose of this review is to ensure that information and instructions are technically accurate and that appropriate human-factor considerations have been included. The System/Responsible Engineer has the responsibility for selecting individuals qualified to perform the review. Reviewers' names shall appear on the review with sign-offs. Validation shall be supplemented by a walkthrough of the procedure in the facility. Where appropriate, procedures shall be compared to source documents to verify their accuracy.

5.5.2 Periodic Reviews

Procedures shall be reviewed periodically (e.g., annually, but at least every two years) to verify that they continue to be accurate and relevant. The System/Responsible Engineer is responsible for performing this review and making any needed revisions.

The frequency of any particular review depends on the complexity and critical nature of the procedure.

5.5.3 Post-Incident Reviews

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

5.6 Procedure Availability

All procedures maintained on the APS intranet are considered to be the “controlled copies.” Personnel should verify that all printed copies are current before using them.

5.7 Procedure Use

Facility operation shall be conducted in accordance with applicable procedures.

The requirements for use of procedures shall be clearly defined and understood by all personnel.

If an employee does not understand a procedure or its intent, the employee shall seek clarification from the appropriate System/Responsible Engineer or Technical Group Leader before proceeding.

Procedures are prepared for anticipated facility conditions. Personnel may take whatever action is 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.

Procedures shall be read and followed step-by-step when:

- A trainee is conducting activities under the supervision of a qualified individual.
- The operation being conducted is non-routine, complicated in nature, or infrequently performed.
- Prior incidents or observations reveal a general weakness in procedural knowledge.
- The procedure contains signoffs.

6.0 REFERENCES

- An error in performance could cause significant adverse impact on the equipment or system.
- The procedure is intended to keep the facility within the Operational Safety Envelope/Technical Specification, as defined in the Final Safety Assessment Document.

An employee will not be required to work directly from a procedure if:

- The operation is routine and is of such a nature that an error in performance will not have a significant adverse impact on the equipment or system.
- The procedure is readily available and the operation is being conducted exactly as stated in the procedure.

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. Written procedures shall be referred to during infrequent or unusual situations when the operator is not intimately familiar with the procedure requirements.

During the course of operations, technical and operational requirements change and better ways of doing things develop. To ensure that procedures in use provide the best possible instructions for the activity involved, periodic review and feedback of information are essential.

Consistency in procedure format, content, and wording is essential to achieve a uniformly high standard of operator performance. Operators should not be expected to compensate for shortcomings such as poor format or confusing, inaccurate, or incomplete information.

6.0 REFERENCES

DOE O 5480.19, Chg. 2, Conduct of Operations Requirements for DOE Facilities

APS Document AP&P 3.1.5 Managing APS Facilities Procedures

OPERATOR AID POSTINGS

1.0 PURPOSE

Facility operator aids (information posted for personnel use) should provide information useful to operators in performing their duties. The purpose of this chapter is to provide guidelines pertaining to operator aids.

2.0 SCOPE

This chapter describes the process to ensure that operator aids are current, complete, and necessary. Information utilized in the operation of facility systems must be properly controlled. The use of informal, unauthorized, or out-of-date instructions, notes, graphs, drawings, and other documents in the facility can jeopardize proper operation or maintenance. Operator aids play a role in the safe operation of the facility. Operator aids may take various forms: the most common are e-mail, items in the on-line logbook, and context-sensitive help.

3.0 DEFINITIONS

None

4.0 RESPONSIBILITIES

4.0 RESPONSIBILITIES

4.1 Operations and Analysis Group Leader

The ASD Operations and Analysis Group Leader is responsible for:

- Providing overall direction and administration of this procedure.
- Reviewing all information for accuracy and timeliness.

4.2 Crew Chiefs

The crew chiefs are responsible for:

- Ensuring that operator aids are properly entered into the on-line log.
- Ensuring that paper-based operator aids are placed in their assigned locations.

5.0 PROCEDURE

5.1 Operator Aid Guidelines in the Main Control Room

For many activities it is sometimes useful to post and use aids to assist in the operation of instruments or facilities, to call attention to key steps, or to identify critical control points or values. Many of the programs utilized by the operators in running accelerator hardware employ context-sensitive help. This set of help features is provided by the programmer, and is reviewed by control room personnel for accuracy.

Useful information is recorded in the on-line logbook in the section entitled 'Operator Aids.' It is subject to the same review as the Timely Orders.

Any APS employee may develop an operator aid. In general these are sent to the Operations and Analysis Group by e-mail. The OAG Group Leader or appropriate Chief of Operations approves the posting and placement into the on-line logbook.

Control Room personnel may develop written notes for use during their shift. It is expected that any information that needs to be passed on to the next shift will be recorded in the on-line log, and no paper notes will remain on control room equipment. The appropriate Chief of Operations will review these 'on-line operator aids' for timeliness and, where necessary, establish them in other ways (e.g., context-sensitive help).

5.2 Use of Operator Aids

Operator aids shall not be utilized to bypass the normal facility procedure review and approval process. Operator aids that alter such procedures shall not be approved. Instead, appropriate procedures shall be changed to incorporate the necessary information.

6.0 REFERENCES

DOE O 5480.19, Chg. 2, Conduct of Operations Requirements for DOE Facilities

EQUIPMENT, CABLING, AND PIPING LABELING

1.0 PURPOSE

This chapter provides a method to implement a standardized facility equipment and piping labeling program. A well-established and maintained labeling program should help ensure that facility personnel are able to positively identify equipment they operate. In addition, equipment labeling is required by Occupational Safety and Health Administration (OSHA) regulations.

2.0 SCOPE

This chapter assigns responsibilities and provides instructions for identification of facility equipment using approved labels. Proper implementation of this program will result in consistent, readable, and permanent identification of facility components, rooms, valves, instruments, pipes, breakers, switches, cabling, electrical and control panels, and electrical components inside panels. Additionally, methodology for replacement of lost or damaged labels is provided.

A good labeling program, understood and maintained by operating and maintenance personnel, will enhance training effectiveness and will help reduce operator and maintenance errors resulting from incorrect identification of equipment. Personnel radiation exposure or exposure to hazardous materials will also be reduced if operators spend less time identifying components.

3.0 DEFINITIONS

The labeling program should continue throughout the life of the facility. Because equipment labels are prone to loss or damage, an ongoing labeling program should exist to allow personnel to identify components needing labels, to identify a person or persons responsible for making new labels, and to ensure that new labels are correct and placed on the proper equipment. In addition to equipment, doors to rooms should be labeled so that personnel can identify the room and, if applicable, the equipment inside.

3.0 DEFINITIONS

None

4.0 RESPONSIBILITIES

4.1 Division Directors

The Division Directors are responsible for ensuring that the equipment, cabling, and piping labeling program addresses the following:

- Approving labeling materials for use.
- Assigning unique facility identification designators to unidentified components.
- Ensuring that facility piping and instrument drawings are revised to reflect component identifiers.
- Providing labels that conform to a labeling standard (for example, OSHA, ANSI, NEC, ANL and other regulatory requirements) for components added or changed by facility modifications.
- Ensuring that an equipment, cabling, and piping labeling deficiency program is in place that includes guidance and training on labeling conventions and procedures to be followed.

4.2 Technical Group Leaders

Each Technical Group Leader is responsible for ensuring that facility equipment, experimental equipment, cabling, and piping under his or her group's purview are properly labeled.

4.3 All Personnel

All personnel are responsible for reporting labeling deficiencies by notifying the appropriate Technical Group Leader or Systems Manager in writing. Personnel shall look for missing or damaged labels during their normal tours and during other routine activities. Housekeeping and material condition inspections offer additional opportunities for identifying labeling deficiencies. Special attention shall be given to the following:

- Post-maintenance tests.
- Modification and construction.

5.0 PROCEDURE

5.1 General

APS shall ensure that equipment, cabling, and piping are labeled in accord with OSHA, ANSI, NEC, ANL, and other regulatory requirements. Particular emphasis shall be placed on proper labeling of equipment, cables, and piping that present potential hazards. Line management, with the assistance of the ESH organizations, has the responsibility of ensuring that its personnel understand the standard labeling conventions used throughout ANL. Line management should also establish additional labeling requirements specific to its operation, where beneficial, to improve efficiency of operations.

5.2 Labels

Procedures should be established to ensure that misplaced or damaged labels are replaced. Since labels are often missing after main-

6.0 REFERENCES

tenance, the post-maintenance test could require a check to ensure that the appropriate labels are attached.

Personnel should take note of situations where a marking pen has been used for labeling (and the original message sometimes crossed out and relabeled) and should replace these informal labels with the proper labels.

Labels shall be developed using an appropriate labeling standard.

When an individual identifies a need for equipment and piping labeling, he or she should request in writing that a label be installed. The label request should be forwarded to the appropriate ESH Coordinator, Technical Group Leader, Supervisor, or designee for approval and processing.

5.3 Installation and Verification

Line managers shall ensure that all labels are properly installed.

6.0 REFERENCES

DOE O 5480.19, Chg. 2, Conduct of Operations Requirements for DOE Facilities

GLOSSARY

ACCELERATOR ENCLOSURE

Any one of the areas that contains accelerator components through which accelerated particles pass. (ch 9)

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. (ch 1)

ACCIDENT

An undesired event that results in injury, illness, damage to equipment, or insult to the environment. (ch 6)

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. (ch 8)

ALD-SUF 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. (ch 1)

APS ENGINEERING SUPPORT DIVISION (AESD):

The AES Division provides mechanical engineering, controls engineering, information technology, and database management support to the Accelerator Systems and X-ray Science Divisions. AESD also manages the user ESH program and the APS radiation program, and the APS building and conventional facilities. (ch 1)

APS-MANAGED BEAMLINER 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. (ch 8)

ASSISTANT CHIEF OF OPERATIONS (ACO)

A senior operator who is qualified on all APS accelerators and given significant responsibility in training other operators. (ch 1)

ASSOCIATE DIVISION DIRECTOR FOR X-RAY OPERATIONS AND RESEARCH (ADDXOR) - XSD

An individual responsible for the operation of XOR beamlines and the quality and productivity of the research conducted on those beamlines. (ch 1)

AUTHORIZED ACCESS

Access to an accelerator enclosure by an authorized person without MCR intervention. (ch 9)

AUTHORIZED EMPLOYEE

An employee who has approval from the supervisor and has been trained to lock out energy sources in accordance with ANL and APS procedures in order to service or maintain machines or equipment. (ch 9)

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. (ch 8)

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 performed in accordance with the scientific and technical goals of the
- 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 X-Ray Operations and Research (XOR) within XSD has these responsibilities for all APS operated beamlines. (ch 1)

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 operator 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 O&A Group and the technical groups.
- Be on-call to assist the Operators, Machine Managers, and O&A 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 the O&A Group in his/her area of expertise. (ch 1)

COLLABORATIVE ACCESS TEAM (CAT)

A Partner User group organized to develop and operate beamlines in a designated APS sector or sectors. (ch 1)

COLLABORATIVE DEVELOPMENT TEAM (CDT)

Collaborative Development Team (CDT): An external partner group that drives the development of a beamline that will be ultimately operated by the APS. (ch 1)

CTD DIRECTOR

Has the same roles and responsibilities as a CAT Director for CTD beamlines. (ch 1)

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. (ch 11)

CONCERN

Matter of interest that may involve an event or condition with an adverse impact on safety, health, quality assurance, or the environment. (ch 7)

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. (ch 8)

CREW CHIEF

The operator qualified on all APS accelerators who is in charge of the MCR during a shift. The Crew Chief is often, but not always, an ACO. While on shift, the Crew Chief is the designated supervisor of the other operators. (ch 1)

CRITICAL COMPONENT SYSTEM MANAGER (CCSM)

The CCSM oversees work on radiation safety systems in the accelerator, front ends, and beamlines. The CCSM insures 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. (ch 8)

DAILY ORDER

An order maintained in the on-line log book that is typically in place for days to weeks. For example, MCR operators are instructed to perform a special task until a piece of equipment is repaired during the next weekly repair period. (ch 15)

DATA LOGGERS

Programs running on the APS controls system computers that record, at a prescribed frequency, the operational state of the APS facility. (ch 11)

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. (ch 1)

DIVISION ESH COORDINATOR

An individual, appointed by and reporting to a Division Director, who develops and implements that Division's ESH programs. (ch 1)

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. (ch 1)

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. (ch 1)

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. (ch 6)

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. (ch 10)

INTRANET

An APS-wide implementation of Internet and World Wide Web technology used for internal (i.e., APS) communications. (ch 8)

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 insuring 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. (ch 9)

LOCKOUT

The application of a lock and a tag identification on an energy-isolating device in accordance with an established procedure. (ch 9)

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. (ch 8)

MACHINE MANAGER

An individual designated as having responsibility for the performance of one of the APS accelerators: linac, PAR, booster, storage ring, and the low-energy undulator test line (LEUTL). These individuals define and maintain performance parameters and must be involved in any design changes that affect performance parameters. (ch 1)

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. (ch 11)

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). (ch 6)

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 ANL ESH Manual Chapter 1-8, Occurrence Reporting. Occurrences are reportable to DOE via the ORPS reporting system. (ch 6)

ON-SHIFT TRAINING (OST)

That portion of an operator qualification program where the trainee receives training within the job environment and with as much hands-on experience as possible. (ch 5)

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 ANL Radiation Safety Officer. (ch 2)

OPERATIONS AND ANALYSIS GROUP - ASD

The Operations and Analysis Group has the responsibility of providing around-the-clock coverage in the MCR 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 Operators 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. (ch 1)

OPERATIONS AND ANALYSIS GROUP LEADER

The Operations and Analysis 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 O&A 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 O&A Group Leader, Chief of Operations, or Crew Chief with the ASD Division Director or his designee. (ch 1)

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. (ch 1)

OPERATIONS PERSONNEL

Members of the ASD Operations and Analysis Group authorized to conduct hands-on operations of the APS accelerator systems. (ch 1)

OPERATOR

An individual who is either qualified or becoming qualified to operate all APS accelerators. This individual need not be a dedicated accelerator operator. For example, ACOs and Machine Managers, when suitably qualified, may perform as operators when circumstances require it. (ch 1)

ORDER

A written communication, posted on the APS intranet, that contains information prepared by management to relay instructions to MCR operators. It is expected that MCR operators know and follow all orders. (ch 15)

PROCEDURE CHANGE

An immediate change to a procedure, whether for permanent or one-time use, which does not involve reissuing of the procedure. (ch 16)

PROCEDURE REVISION

A reissued edition of a procedure. (ch 16)

RESIDENT BEAMLINER PERSONNEL

Beamline personnel who are onsite at the APS collectively for three of the twelve months in a calendar year. (ch 8)

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. (ch 16)

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. (ch 2)

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. (ch 1)

STANDING ORDER

An order accessed from an Operations and Analysis Group Web Page that generally falls into one of two categories: 1) an order that has been in place for several runs and has been moved to this location while a procedure is prepared to replace it; 2) an order that is likely to be permanent and is of sufficient brevity that a procedure is not appropriate. For example, the operating envelope is a permanent standing order. (ch 15)

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. (ch 1)

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. (ch 1)

TIMELY ORDER

An order accessed from an Operations and Analysis Group Web Page that is considered short term, typically in place for one operational run. For example, MCR operators are instructed to perform a certain task until a problem is fixed during the next long maintenance period. (ch 15)

USER

An individual authorized to conduct research operations at an APS beamline. A user may be an employee of the APS, of an ANL 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. (ch 1)

USER ESH SUPPORT GROUP - AES:

The User ESH Support Group 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, MCR Operators 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. (ch 1)

USER ESH SUPPORT GROUP LEADER

The User ESH Support 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 User ESH Support Group Leader also serves as the APS User Safety Officer. (ch 1)

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. (ch 8)

X-RAY OPERATIONS AND RESEARCH

The XSD department that performs the APS directed x-ray science research and development and manages the operation of the APS beamlines.

X-RAY SCIENCE DIVISION (XSD)

The APS division that manages x-ray science programs conducted under the XSD Associate Division Director for X-ray Operations and Research (XOR), 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. (ch 1)