

CONDUCT OF OPERATIONS

1.0 SCOPE

This Performance Assessment Guide for Conduct of Operations will be used to carry out the oversight responsibility of the U.S. Department of Energy (DOE) Brookhaven Group. This guide was prepared to assist in conducting performance-based assessments of the effectiveness of line management of both DOE prime contractors and subcontractors to ensure that their conduct of operations programs identify, dispositions, and take corrective action on issues that affect satisfactory facility performance. The goals are to ensure that laboratory employees and the public do not experience injuries and illness as a result of laboratory activities and that there is little or no economic loss to the Government.

Conduct of operations assessments will be directed at all prime contractors and subcontractors working at DOE sites. DOE line management must ensure that these contractors comply with DOE Orders and Federal and State regulations. Information developed from this assessment will determine the degree to which this is being done as well as the effectiveness of the laboratory's program.

2.0 ATTRIBUTES AND LINES OF INQUIRY

This section provides lines of inquiry to help assess whether the laboratory has implemented a program that ensures that conduct of operations requirements are incorporated into line activities. This section will be used to evaluate the laboratory's line organization.

2.1 The laboratory has approved procedures or other definitive documentation that specifies OSH policies that are to be applied for operations.

- Do these policies specify goals and the means to achieve them?
- Do these documents provide for the types of controls necessary to implement policies as discussed in the conduct of operations guidelines?
- Do operations procedures support site and DOE OSH guidance?

2.2 Sufficient resources in materials and personnel are provided to accomplish assigned OSH-related tasks.

- Do these resources include technical personnel needed to support OSH programs and activities?
- Has a long-range staffing plan been developed and implemented that anticipates personnel losses in safety and related positions?

2.3 The laboratory monitors, documents, and evaluates safety problems. Based on assessments of these problems, corrective actions are taken to improve safety performance.

- Do supervisors and managers frequently make direct observations of operations activities that include monitoring of OSH performance of operations personnel?
- Are OSH issues, requirements, and program information incorporated into training programs for managers and supervisors?
- Are safety goals used as a management tool for involving cognizant groups or individuals in improving operating performance and for measuring operating effectiveness?
- Are safety goals auditable, measurable, realistic, and challenging?
- Is a definite set of actions or an action plan developed to meet these goals?
- Was the action plan developed with input from personnel involved in conducting operations, reviewed by the operations supervisor at DOE facilities, and approved by management?
- Is progress toward completing the action plan and achieving goals monitored periodically?
- If results show a significant variance from the desired progress in achieving goals, does management review the action plan to ensure that it is adequate and is being executed?
- Are audits of performance relative to safety goals provided to site management and DOE?

- Do these summaries include an explanation of performance and actions planned to improve future performance?
- Are meaningful operating and safety goals set and used as motivators for improvement, not as ends in themselves?
- Are OSH inspections, audits, reviews, investigations, and self-assessments a part of the checks and balances in the operating program?
- Do line managers and supervisors perform routine observations of personnel performing operating activities, from the perspective of industrial safety?
- Are deficiencies identified, documented, trended, and corrected?
- Do other groups, such as quality assurance personnel, periodically review and assess OSH?

2.4 Workers and their supervisors are held accountable for safety performance on the job.

- Are personnel who are involved in significant or frequent violations of operating practices counseled, retrained, or disciplined, as appropriate?
- Do supervisor performance appraisals and promotions include an assessment of safety performance?

2.5 Site guidance exists that describes safety preplanning requirements for all operational activities.

- Does the guidance explain the role of safety analysis reviews, job safety analyses, and the handling of safety matters?
- Do all personnel understand the safety planning requirements?

2.6 Operations personnel adhere to the requirements of the site industrial safety program.

- Is proper hearing, eye, head, foot, and respiratory protection being worn in designated areas to reduce the potential for injury?
- Are ladders or other approved means used to access equipment located in the overhead when permanent steps or catwalks are not available, thus minimizing the potential for accidents?

- Do operators avoid routinely climbing or walking on facilities components and insulation?
- Do operators exercise appropriate precautions when entering or working in or around energized panels or equipment? For example, do operators ensure that electrical panel closures are securely fastened prior to making the breakers operable to energize equipment?

2.7 Operator tours are of sufficient detail to ensure that the site safety status is known. Each operator conducts a thorough tour of all areas within his/her responsibility, making appropriate equipment inspections at designated times at least once per shift. Plant security concerns do not override operator safety assessment duties.

- Do tours include inspection of equipment to ensure that it is operating properly or, in the case of standby equipment, that it is fully operable?
- Are the following activities conducted in conjunction with the tour:
 - Assessment of the status of equipment (i.e., operating, standby, work in progress, or out-of-service)?
 - Inspections for abnormal or unusual condition of components, such as electrical panels, alarm panels, auto-start standby equipment, and breakers?
 - Reporting to the control room of any unexpected conditions (e.g., equipment vibrations, unusual noises or smells, or excessive temperatures)?
- Do operators inspect all areas for which they are responsible and note any deficiencies that may be present, including steam, oil, or water leaks; fire and safety hazards or radiological problems; concerns such as open electrical panels and mobile objects; clogged floor drains; housekeeping or cleanliness problems; and building deficiencies such as inoperative lighting, roof leaks, or doors that do not close properly?
- Do operators take appropriate action to correct or report deficiencies noted during tours?

2.8 Tour inspection sheets are utilized for providing guidance on the extent to which equipment and areas should be inspected during routine tours.

- Are key equipment parameters recorded during tours to provide a record of equipment performance and to reconstruct events leading up to unusual occurrences or system malfunctions?
- Is short-term trending done so that undesirable trends and equipment safety problems can be identified and corrected?

2.9 Personnel are appropriately qualified to follow good personnel protection practices to maintain personnel exposure as low as reasonably achievable (ALARA) to radiation, chemicals, electromagnetic fields, toxic materials, or other personnel hazards.

- Do personnel adhere to all posted personnel protection requirements and observe proper practices and precautions while in controlled areas?
- Do personnel correctly use appropriate monitoring instruments when required?
- Are personnel cognizant of their own exposure levels and do they take appropriate action to minimize exposures?
- Are personnel knowledgeable of the proper use of applicable radiation work permits, safe work permits, or inhalation limits?
- Do personnel promptly report protection deficiencies and hazards to the control personnel or appropriate protection personnel, or both, and are appropriate immediate actions taken to reduce or correct the hazards?
- Are appropriate protection personnel informed before evolutions or activities that have a potential to significantly change conditions in the facilities?
- Do supervisory personnel periodically review exposure trends of operating personnel under their supervision?
- Is there an emphasis on determining the adverse factors that contribute to personnel exposures and minimizing those factors to keep exposures low?

2.10 Managers and supervisors ensure that only trained and authorized personnel operate equipment regulated by safety standards (i.e., cranes, forklifts, construction vehicles, etc.).

- What process exists to ensure that only trained and authorized personnel operate equipment regulated by safety standards?

2.11 Written materials and entertainment devices (such as radios, televisions, tape players, and computer games) not related to job duties are prohibited from use by on-duty personnel in order to minimize distractions from their responsibilities that may lead to unsafe conditions.

- What process exists to ensure that written materials and entertainment devices not related to job duties are prohibited from use by on-duty personnel?

2.12 Methods are in place and implemented to ensure that all site personnel are promptly alerted to site emergencies.

- Are alternate alerting methods used in areas where personnel cannot hear the public address system or emergency signals?
- Are emergency communications systems periodically tested to ensure that they are functional?
- Do control areas have the capability of overriding other users of the public address system for emergency announcements?

2.13 Use of the public address system (page) is administratively controlled to ensure it retains its effectiveness in contacting plant personnel.

- Is excessive use of the public address system for paging of personnel and unnecessary announcements avoided?
- Are telephones and other point-to-point communications channels used in lieu of the public address system whenever practical?

2.14 Methods are implemented to ensure that operators in control areas can quickly contact onshift operators or supervisors.

- Identify all the existing methods available for operators in control areas to quickly contact onshift operators or supervisors.

- Are the existing methods for contacting the onshift operators and supervisors adequate?
 - Is distinction made between routine and emergency notifications?
- 2.15** Radio usage is not allowed in areas where electronic interference with plant equipment may result.
- Are areas where radio use is prohibited delineated?
 - Are instructions regarding frequencies (channels) and postings provided?
 - Is consideration given to dedicating certain radio channels to specific groups or functions (e.g., a dedicated channel for security or a dedicated channel for emergency use)?
- 2.16** The laboratory uses standardized terminology and abbreviations during communications about site operations.
- Are only abbreviations and acronyms obtained from an approved list used in operations communications?
 - Are both written and spoken terms prescribed in the list?
 - Are oral instructions clear and concise? In all communications, are the sender and intended receiver readily identifiable?
- 2.17** Events that occur at the site and that adversely affect the safety of personnel and the environment receive a thorough investigation.
- Are criteria for when to perform an event investigation clearly established?
 - Are specific events requiring investigation listed for supervisory use, along with criteria for use in deciding what "near miss" situations should receive review?
 - Do "near miss" situations receive a formal review at the discretion of the responsible supervisor?
 - Does the operations supervisor or another manager have responsibility for event investigations?
 - Do knowledgeable and experienced individuals perform the investigation?

- Are these individuals technically knowledgeable, well respected by the site staff, unbiased, trained in major disciplines appropriate for the event under investigation, and trained in techniques for conducting an investigation?
- Are sufficient data collected to allow the event investigators to perform a reconstruction and analysis of the event?
- On completion of the data collection, is a structured review of the abnormal event conducted?
- Does each event investigation include—
 - Event reconstruction?
 - Event analysis and evaluation?
 - Root-cause determination?
 - Corrective action determination?
- Are investigative reports prepared within a time frame determined by the responsible authority?
- Do reports include a description of the event (including pertinent conditions), a discussion of the impact of the event, the root cause, the lesson or lessons learned, and the proposed corrective action(s)?
- Do reports include positive aspects of the event (such as particularly effective personnel responses)?
- Are investigative reports approved by the site manager and reviewed by appropriate supervisors, managers, and the safety review committee?
- Are the lessons learned from an event investigation shared with all appropriate personnel who could benefit from them?
- Are in-house events evaluated by the appropriate supervisor(s) to determine if the event should be included in the training program for their personnel?
- In the case of events of severe or safety consequences, does a mechanism exist so that appropriate personnel can be immediately trained on the event?

- Are patterns of deficiencies, such as operator errors or inadequate procedures, trended?
- Is a periodic summary report of events, causes, and trends submitted to department heads, the site manager, and other appropriate managers?
- Do department heads ensure that training programs include appropriate material from the summary report?

2.18 If an act of sabotage is discovered or suspected, is it immediately investigated to:

- Determine the condition of affected systems and operability of safety systems?
- Make decisions on continued operation or safe shutdown?
- Minimize the impact of discovered acts of sabotage and deter future such acts?

2.19 Shift personnel are required to notify off-shift management and supervisors of off-normal events and emergencies.

- Are procedures developed to address appropriate notifications and do they include:
 - Specific responsibilities for notifications?
 - Identification of events and conditions requiring notifications?
 - Identification of primary and alternate personnel to be notified?
 - Establishment of time requirements for notifications that are consistent with the site emergency plan?
 - Definition of recordkeeping requirements that document the reason for notifications, the time of notifications, and the person notified?
- Are names of primary and alternate contacts and current phone numbers and page codes readily available to the person assigned to make the notifications?
- Are all notifications documented and a formal record of notifications maintained?
- Is adequate communication equipment maintained in the main control area to meet the notifications objectives?

2.20 Equipment deficiencies are noted by site operating personnel and identified in the work control system for correction.

- Are methods established that identify deficient equipment to operating personnel?
- Does the operations supervisor or his/her designee authorize in writing all shift activities (including maintenance) on equipment that is important to safety, that affects operations, or that changes control indications or alarms?
- Is equipment tested, and testing documented, following maintenance to demonstrate that it is capable of performing its intended function?

2.21 Locks and tags are placed on controls when for safety or other special administrative reasons controls must be established.

- Are devices for energy or toxic material isolation locked out?
- Are isolating devices that cannot be locked out tagged out?
- Do new equipment and major modifications provide for lockout?
- Is administrative guidance established to outline acceptable controls over locked components?
- Are locks, tags, chains, wedges, key blocks, adapter pins, self-locking fasteners, or other hardware provided for isolating, securing, or blocking machines or equipment from energy sources?
- Are lockout/tagout devices singularly identified and do they meet OSH requirements?
- Is a lockout/tagout program established that consists of procedures to control potentially hazardous energy and materials as well as personnel training?
- Are clear and specific lockout/tagout procedures developed, documented, validated, and used for control of potentially hazardous energy or material?
- Is a clear and specific sequence of operations provided and used for temporary removal of lockout/tagout devices?
- Are periodic inspections conducted by authorized personnel, a supervisor, or an appropriate manager, to determine whether procedures are being followed and to correct any lockout/tagout deviations or inadequacies observed?

- Is use of caution tags for personnel protection administratively controlled and restricted?
- Is training provided and documented to ensure that the purpose and function of the lockout/tagout program are understood by all personnel and that they have the knowledge and skills required for safe application, use, and removal of lockouts and tagouts?
- Is lockout or tagout accomplished only by authorized, qualified personnel?
- Does a supervisor or appropriate manager notify affected personnel of the application and removal of lockout/tagout devices before the devices are applied and after they are removed?
- Do onsite and outside contractors inform each other of their respective lockout/tagout procedures and ensure that their personnel are aware of the changes?
- Are specific procedures used during shift or personnel changes to ensure the continuity of lockout/tagout protection, including provision for the orderly transfer of lockout/tagout devices between personnel or shifts?

2.22 Narrative logs are established at all key shift positions.

- Is safety and emergency information promptly recorded in the logs?
- Is written guidance provided to define thoroughly the type and scope of entries for each log and the format for making entries?
- Are log entries made in a manner such that they can be easily read and understood, and readily reproducible with standard photocopy machines?
- Is a standardized method for correcting any erroneous entries established?
- Does management provide written guidance on the disposition of completed logs?

2.23 Supervisory positions have and use a turnover checklist in the turnover process that is designed to transfer vital information that may impact safety, system status, events, and the like.

- Do oncoming operators and supervisors review documents specified on their checklists and ask pertinent questions prior to assuming responsibility for their shift position?

- Do off-going supervisors or operators explain all items noted on the turnover checklist to oncoming operators?
- Is a crew briefing conducted by the operations supervisor as required after he/she has accepted responsibility for the shift, including a review of status, problems with equipment, and evolutions in progress or planned during the shift?
- Do reliefs occurring during the shift (e.g., exchange of control supervisory function) have a turnover to ensure that the oncoming person is at least as knowledgeable of the conditions as he/she would have been had a complete shift turnover process been conducted?

2.24 Operators are knowledgeable about aspects of site safety that affect operation and are able to analyze off-normal situations and take appropriate action to correct the causes(s) of problems.

- Are operators familiar with the purpose and hazards associated with storage and use of such chemicals as boron, acids, caustics, chromates, hydrazine, ammonia, solvents containing chlorinated hydrocarbons, and chemicals containing organic solvents?
- Do operators understand chemical and radiochemical parameters, including calculations associated with technical specifications/operational safety requirements?
- Do operators monitor properties and hazards of such gases as hydrogen, nitrogen, carbon dioxide, chlorine, and halon?
- Are personnel knowledgeable of corrosion problems, including stress corrosion, intergranular cracking, and ammonia attack of copper alloys?
- Do operators understand chemical constraints, process equipment, and controls associated with the radioactive or toxic waste systems?
- Do operators understand operation of such water pretreatment equipment as clarifiers or charcoal filters (if such equipment is operated or monitored by operations personnel)?
- Are personnel knowledgeable of appropriate response and recovery from off-normal or hazardous conditions?
- Are the topics discussed above appropriately addressed in training programs?

2.25 The laboratory has a process to identify, route, and maintain a required-reading file of applicable memos, technical reports, and other pertinent operations, training, and industrial safety information for the use of supervisors and operators.

- Is there a method to designate which documents need to be read by the individuals filling each position, and are documents readily available to those individuals?
- Is a list maintained of operations, training, and industrial safety documents to be included in the required-reading file?
- Are required completion dates designated for reading each document?
- Is completion of the reading documented and the documentation retained?

2.26 Methods for developing new safety-related procedures and for procedure formats are clearly defined.

- Do administrative procedures or writers guides direct the development and review process for procedures?
- Are procedures developed for abnormal and emergency situations?
- Do preparation, verification, and validation of safety-related procedures receive high-level attention?
- Are procedure writers qualified by job, training, and experience?
- Are procedures formalized by verification and validation?
 - Who performs the verification and validation?
 - Are the persons performing the verification and validation qualified to do so?

2.27 The content of safety-related procedures conforms to prescribed guidelines.

- Are procedure scope and applicability readily apparent?
- Are emergency procedures distinguishable from other procedures?
- Do procedures incorporate appropriate information from applicable source documents?
- Are prerequisites and initial conditions detailed?

- Are definitions used in procedures explained?
- Are procedures correct and easily understood, and are actions clearly stated, with sufficient but not excessive detail?
- Do procedures contain only one action per step?
- Are warnings, notes, and cautions easily identifiable and in appropriate positions?
- Are limits or tolerances or both for operating parameters specified and consistent with the readable accuracy of instrumentation?
- Are acceptance criteria for surveillance or test procedures easily discerned, including tolerances and units?
- Are calculations clearly explained?
- Are procedures developed with consideration for the human-factor aspects of their intended use?
- Do emergency procedures provide guidance in responding to single and multiple casualties?
- Are portions or steps of other procedures that are used or referred to when performing a procedure specifically identified within the procedure so that personnel will not be confused when transferring between procedures.

2.28 The laboratory has an adequate approval and review process for procedure development and revision.

- Is the review and approval process for each procedure change or revision properly documented and initiated?
- Are procedure revisions implemented concurrently with modifications?
- Is important information regarding changed or revised procedures communicated to appropriate personnel via the required-reading system?
- Does the review process involve verification and validation of procedures using walkthroughs or similar methods?

- Are emergency procedures reviewed by the site facilities safety review committee or by another appropriate review mechanism?
- Are new and revised procedures reviewed prior to issuance and at periodic intervals to ensure that the information and instructions are technically accurate and that appropriate human-factor considerations have been included?
- Are applicable procedures reviewed following an unusual incident (i.e., emergency)?
- Is a controlled copy of all safety-related procedures maintained in the control area and at other appropriate locations for reference?

2.29 A labeling program is in place that helps ensure that site personnel are able to positively identify equipment and materials they handle.

- Is labeling on:
 - Valves?
 - Major equipment (e.g., tanks, pumps, and compressors)?
 - Switches?
 - Circuit breakers (4.16KV, 480V, 120VAC/DC, etc.)?
 - Fuse blocks or fuse locations?
 - Instruments and gauges?
 - Buses and motor control centers?
 - Cabinets ?
 - Room doors?
 - Emergency equipment?
 - Fire protection systems?
- Is information on labels consistent with the information found in site procedures, valve lineup sheets, piping and instrumentation diagrams, and hazardous materials containers?

- Are label abbreviations and nomenclature used standardized and understood by site personnel?
- Are labels permanent, securely attached, and do they have distinguishable, easy-to-read information?
- Where color-coding is used, are the colors applied consistently, with only one meaning per color or combination?
- Is piping labeled to indicate the fluid contained and the normal flow direction?
- Are pipes containing potentially radioactive fluids, toxic fluids, or explosive gases uniquely marked?
- Are labels made from materials that are compatible with their particular application? For example, chloride-free labels should be used on stainless steel piping, and temperature-tolerant labels should be used on hot components. Are adhesives used for label attachment verified for compatibility?
- Are labels oriented in a manner that is easy to read so that the correct component or material is easy to identify?
- Are labels placed so as not to interfere with equipment operation or obscure indicators?
- Are procedures established to ensure that misplaced or damaged labels are replaced?
- Does a method exist to help ensure the prompt identification and correction of labeling deficiencies?

3.0 STANDARDS AND REQUIREMENTS

3.1 Specific DOE Orders and Standards.

- DOE O 232.1A, "Occurrence Reporting and Processing of Operations Information."
- DOE O 440.A, "Worker Protection Management for DOE Federal and Contractor Employees."
- DOE 2300.1B, "Audit Resolution and Followup."
- DOE 2321.1B, "Auditing of Program and Operations."

- DOE 5480.19, "Conduct of Operations Requirements for DOE Facilities."
- DOE 5700.6C, "Quality Assurance."

3.2 Title 10 CFR Requirements.

- 10 CFR 830.120, "Quality Assurance Requirements for DOE Nuclear Facilities,".

4.0 GUIDANCE TO ASSESSOR

This assessment guide is intended to assist in conducting a performance assessment of conduct of operations. It is not to be considered as all- inclusive, inflexible, or limiting reasonable assessment concentration when lines of inquiry responses dictate that an area must be more thoroughly probed.

In performing an assessment of conduct of operations, the following documents will provide information needed to understand the site facilities and historical performance with regard to safety:

- Hazard analyses
- Mission statements
- Order compliance schedule agreements
- Site Emergency Plan
- Written safety programs
- Occurrence reports
- Performance indicators and trends
- Self-assessment reports
- Safety issues identified by internal or external groups
- Technical Safety Appraisals
- Tiger Team assessment reports

- Award Fee appraisals.

To performance-base the assessment, both formal and informal observations could include the following:

- Emergency drills
- Safety tagging or lockout
- Area cleanup following maintenance
- Material condition
- Posting of chemical/radiological/noise level/etc.
- Use of safety equipment
- Use of logs, procedures, checklists
- Presence of supervisors in the field
- On-the-job training of personnel
- Testing and surveillances
- Shift turnovers.