

## MAINTENANCE PROGRAM

### 1.0 Objective

The objective of this performance assessment is to evaluate the effectiveness of the laboratory's maintenance program as implemented in the facility. The Facility Representative or Environmental Safety, and Health Support Specialist reviews policies, procedures, programs, and processes implemented in the facility to conduct maintenance of facility structures, systems, and equipment. The assessment covers all aspects of maintenance program implementation including deficiency identification, work planning, conduct of maintenance and program self-assessments. In completing this assessment, the Facility Representative or Environmental Safety, and Health Support Specialist conducts observations, walkthroughs, document reviews, and personnel interviews.

### 2.0 Definitions

Concern - A determination of a programmatic breakdown or widespread problem supported by one or more findings or observations.

Finding - An individual item which does not meet requirements.

Functional Area - A discrete group of related safety and support programs.

Lines of Inquiry - Questions that guide the assessor in planning and conducting the performance assessment.

Observation - A condition or practice that does not provide or promote effective protection of the health and safety of the public or DOE's workers or the environment.

Performance Assessment - An evaluation of a program or functional area to verify laboratory line management effectiveness in ensuring the health and safety of the public and of DOE's workers and in ensuring protection of the environment.

Performance Attributes - Key elements, functions, or activities to be assessed in a particular functional area.

### 3.0 References

- 3.1 DOE 4330.4B, *Maintenance Management Program*
- 3.2 INPO 85-038, Rev. 1, *Guidance for the Conduct of Maintenance of Nuclear Power Stations*

- 3.3 INPO 90-008, *Maintenance Programs in the Nuclear Power Industry*
- 3.4 DOE-STD-1050-93, *Guideline to Good Practices for Planning, Scheduling, and Coordination of Maintenance at DOE Nuclear Facilities*
- 3.5 DOE-STD-1051-93, *Guideline to Good Practices for Maintenance Organization and Administration of DOE Nuclear Facilities*
- 3.6 DOE-STD-1052-93, *Guideline to Good Practices for Types of Maintenance at DOE Nuclear Facilities*
- 3.7 DOE-STD-1053-93, *Guideline to Good Practices for Control of Maintenance Activities at DOE Nuclear Facilities*
- 3.8 DOE-STD-1054-93, *Guideline to Good Practices for Control and Calibration of Measuring and Test Equipment at DOE Nuclear Facilities*
- 3.9 DOE-STD-1055-93, *Guideline to Good Practices for Maintenance Management Involvement at DOE Nuclear Facilities*
- 3.10 DOE-STD-1059-93, *Guide to Good Practices for Maintenance Supervisor Selection and Development*
- 3.11 DOE-STD-1064-94, *Guideline to Good Practices for Seasonal Facility Preservation at DOE Nuclear Facilities*
- 3.12 DOE-STD-1065-94, *Guideline to Good Practices for Post-Maintenance Testing at DOE Nuclear Facilities*
- 3.13 DOE-STD-1067-94, *Guideline to Good Practices for Maintenance Facilities, Equipment and Tools at DOE Nuclear Facilities*
- 3.14 DOE-STD-1068-94, *Guideline to Good Practices for Maintenance Tools and Equipment Control at DOE Nuclear Facilities*
- 3.15 DOE-STD-1071-94, *Guideline to Good Practices for Material Receipt Inspection, Handling, Storage, Retrieval, and Issuance at DOE Nuclear Facilities*
- 3.16 DOE-STD-1072-94, *Guide to Good Practices for Facility Condition Inspections at DOE Nuclear Facilities*

## 4.0 Performance Assessment Activities

The assessor initially reviews applicable program documents and implementing procedures that establish the maintenance program for their facility. Appendix A provides a suggested list of documents that the assessor may review during preparations for the assessment.

During the assessment, the assessor evaluates selected performance attributes by developing and applying lines of inquiry for each performance attribute. Appendix B provides a listing of suggested performance attributes and lines of inquiry that are applicable to all DOE facilities. (i.e. both nuclear and non-nuclear). In pursuing lines of inquiry selected for the assessment, the assessor may perform various activities, including review of maintenance work packages, and other documents, observation of maintenance in progress, interviews with personnel, reviews of maintenance history, and reviews of maintenance training. The assessor may choose to use existing surveillance guides in completing specific portions of the assessment. The surveillance guides that may be useful include:

MAS 10.1	Maintenance Activities
MAS 10.2	Control of Measuring and Testing Equipment
MAS 10.3	Seasonal Protection

During the assessment, the assessor will focus on how effectively the maintenance program is implemented in the facility. In performing the assessment, balance must be maintained between reviews of site-wide programs, facility-specific procedures, and actual implementation. The following questions provide a general framework that should be used in planning, conducting, and documenting the assessment:

- Is management commitment to timely and effective maintenance evident?
- Is maintenance work in the facility effectively controlled through work packages, use of procedures, and formal administrative processes?
- Is maintenance work performed safely?
- Is the interface between maintenance and other facility support programs smooth?

**APPENDIX A**  
**POTENTIAL DOCUMENTS FOR REVIEW**

Site or Facility Maintenance Implementation Plan  
Maintenance program plans  
Maintenance implementing procedures  
Maintenance work packages  
Procurement documents  
Maintenance training materials  
Self-assessment reports  
Occurrence reports involving equipment failures

## **APPENDIX B**

### **PERFORMANCE ATTRIBUTES AND LINES OF INQUIRY**

**PERFORMANCE ATTRIBUTE: I.** The maintenance organization and administration provide for effective implementation and control of maintenance activities.

**LINES OF INQUIRY:**

1. Has a clearly defined maintenance organization with specific lines of authority, responsibility, and accountability been implemented?
2. Have requirements for communication and interface between maintenance and other facility organizations been defined and implemented?
3. Are a sufficient number of properly trained management, supervision, and craft personnel available to perform required maintenance functions?
4. Does the maintenance program include administrative controls to ensure effective implementation and control of maintenance activities?
5. Are written performance standards developed, communicated to maintenance personnel, and implemented for maintenance activities?
6. Are the written performance standards periodically assessed and are personnel held accountable for their performance to those standards?
7. Are maintenance policies, goals and objectives documented and communicated to all maintenance personnel?
8. Are effective safety programs implemented to protect workers performing maintenance?

## **APPENDIX B**

### **PERFORMANCE ATTRIBUTES AND LINES OF INQUIRY**

**PERFORMANCE ATTRIBUTE: II.** Effective training and qualification programs have been established to ensure that maintenance personnel have the required knowledge skills and abilities.

#### **LINES OF INQUIRY:**

1. Are training and qualification programs established and implemented for managers, supervisors, planners, and craft personnel?
2. Have the required knowledge, skills, and abilities been defined based on analysis of job duties and responsibilities?
3. Is appropriate training provided to develop the required knowledge, skills, and abilities?
4. Does the training program provide continuing training and re-training as appropriate?
5. Is on-the-job training conducted by qualified personnel?
6. Is on-the-job raining performed using established learning objectives and performance measures?
7. Are knowledge transfer and skills mastery measured objectively?
8. Are maintenance training programs periodically evaluated and improved based on feedback from trainees, maintenance supervisors, the maintenance manager, and facility performance?

## **APPENDIX B**

### **PERFORMANCE ATTRIBUTES AND LINES OF INQUIRY**

**PERFORMANCE ATTRIBUTE: III.** The condition of the facility and the effectiveness of housekeeping practices are routinely evaluated through periodic management walkthroughs and condition assessment surveys.

#### **LINES OF INQUIRY:**

1. Do facility managers and supervisors personally conduct periodic walkdowns and inspections to identify deficiencies and housekeeping discrepancies?
2. Are walkthroughs effective in identifying significant conditions?
3. Are results of inspections transmitted to the facility manager or maintenance manager for action?
4. Are deficiencies or housekeeping discrepancies corrected in a timely manner?
5. Are condition assessment surveys performed in accordance with DOE 4320.2A, *Capital Asset Management Process*?
6. Are condition assessments performed so that they provide early detection of problems to prevent deterioration, damage to adjacent material and component failure?
7. Are effective corrective actions initiated to eliminate deficient conditions and their root causes?

## **APPENDIX B**

### **PERFORMANCE ATTRIBUTES AND LINES OF INQUIRY**

**PERFORMANCE ATTRIBUTE:** IV. The laboratory has developed and implemented a Site Maintenance Plan or a Maintenance Implementation Plan that clearly defines how the laboratory complies with DOE 4330.4B.

#### **LINES OF INQUIRY:**

1. Does the Site Maintenance Plan or the Maintenance Implementation Plan define:
  - a. Structures, systems, and components included in the program?
  - b. Management systems to control maintenance activities?
  - c. Responsibilities and authorities for all levels in the maintenance organization?
  - d. Mechanisms to provide feedback to management in support of performance improvement?
  - e. Provisions for identifying, evaluating, and correcting problems?
  - f. Performance measures to be used in monitoring program performance?
  - g. Interfaces between maintenance and other organizations?
  - h. A maintenance self-assessment program?
  - I. Provisions for planning, scheduling, and coordinating maintenance activities?
2. Has the site maintenance plan been updated so that it reflects the current mission and circumstances of the facility?
3. Are annual status submittals provided to establish the Site Maintenance Action Plan?
4. Does the annual update include the following:
  - a. Summary of maintenance initiatives completed during the past fiscal year?
  - b. Summary of maintenance initiatives planned for the current fiscal year?
  - c. Summary of performance indicators?
  - d. Summary of maintenance backlog?
  - e. Contractor's fiscal data on maintenance for a three-year period?

## **APPENDIX B**

### **PERFORMANCE ATTRIBUTES AND LINES OF INQUIRY**

**PERFORMANCE ATTRIBUTE: V.** An effective work control system has been established for identifying, prioritizing, planning, and completing maintenance on facility equipment and structures.

#### **LINES OF INQUIRY:**

1. Has the laboratory established an effective work request system that can be used by all personnel who may identify a need for maintenance?
2. Does the work request system include adequate provisions for emergency maintenance activities?
3. Is a system implemented for prioritizing maintenance work to ensure that maintenance tasks affecting public or worker safety are completed expeditiously?
4. Has the laboratory implemented a formal work planning process to control preparation, review, approval, and issuance of technical work documents?
5. Do work planning procedures ensure that the following are addressed in maintenance work packages:
  - a. Required support from other organizations?
  - b. Availability of special tools, equipment, repair parts, and materials?
  - c. Required manpower and special skills?
  - d. Definition of pre-requisite conditions, hold points, quality control inspection points, etc?
  - e. Applicable work instruction?
  - f. Clear definition of hazards such as radiation, toxic or carcinogenic materials, etc?
  - g. Necessary intermediate permits such as lockout/tagout documents, radiation work permits, hot work permits, confined space entry permits, etc?
6. Are work packages reviewed by key plant disciplines, such as radiological protection, engineering, operations, industrial safety, and quality assurance?
7. Are pre-job briefings conducted to discuss the planned work with maintenance workers including special hazards, hold points, or unique aspects of the work?

## **APPENDIX B**

### **PERFORMANCE ATTRIBUTES AND LINES OF INQUIRY**

**PERFORMANCE ATTRIBUTE: VI.** The laboratory has established a program to ensure that procedures for maintenance activities are developed, controlled, and used appropriately?

**LINES OF INQUIRY:**

1. Has the laboratory clearly defined expectations regarding preparation of, and compliance with procedures?
2. Have formal controls been implemented over preparation, review, approval, and revision of procedures?
3. Are procedures clear, unambiguous, usable by the craft laborers, and contain sufficient detail to safely perform the required work?
4. Are procedures consistent with the authorization basis, design documentation, and the as-installed plant configuration?
5. Are new and revised procedures reviewed or verified for technical accuracy and validated to ensure usability and accuracy?
6. Do procedures contain cautions, warnings, and hold points as needed?
7. Are effective controls exercised over temporary changes to procedures?
8. Has a formal program been established to periodically review procedures for technical accuracy, human factors considerations, and inclusion of operating experience?
9. Does a system or mechanism exist so that maintenance personnel can provide input to correct deficiencies in procedures or improve usability of procedures?

## **APPENDIX B**

### **PERFORMANCE ATTRIBUTES AND LINES OF INQUIRY**

**PERFORMANCE ATTRIBUTE: VII.** The laboratory provides appropriate facilities and equipment to support routine and non-routine maintenance work.

**LINES OF INQUIRY:**

1. Are maintenance facilities, including storage facilities, laydown areas, and staging areas adequate to support routine maintenance work?
2. Are lighting, temperature, and other environmental conditions adequate to support safe and effective working conditions?
3. Is facility equipment accessible for maintenance and have adequate provision been made for maintenance such as hoists, ladders, catwalks, platforms, etc?
4. Are facility equipment and associated components properly labeled with sufficient information so that they can be easily identified by maintenance personnel?
5. Are work areas uncluttered and orderly?
6. Are proper tools, equipment and consumable supplies available to support work requirements?
7. Are tools properly stored and are administrative controls over issuance of tools adequate?
8. Are worn, defective, or unusable tools identified, segregated, and disposed of so that only safe, usable tools are available for use?

## **APPENDIX B**

### **PERFORMANCE ATTRIBUTES AND LINES OF INQUIRY**

**PERFORMANCE ATTRIBUTE: VIII.** The laboratory has implemented effective programs to control procurement, and issuance of parts and materials for maintenance and modifications work.

#### **LINES OF INQUIRY:**

1. Do procurement documents provide clear and adequate technical and quality assurance requirements that are consistent with design specifications?
2. Is proper engineering control and approval maintained over all deviations from technical requirements in procurement documents?
3. Are parts and materials inspected upon receipt to ensure conformance with purchasing requirements?
4. Are deficient, non-conforming, counterfeit, or suspect items resolved in an effective and timely manner?
5. Are material safety data sheets obtained for chemicals or hazardous materials that are procured?
6. Are effective controls established over storage and issuance of parts and materials?
7. Are parts and materials stored in accordance with manufacturer recommendations/requirements?
8. Has a shelf-life control program been implemented for items that are important to safe and reliable operations?
9. Have flammable and hazardous materials been identified, segregated, and properly controlled during receipt, inspection, storage and issuance?

## **APPENDIX B**

### **PERFORMANCE ATTRIBUTES AND LINES OF INQUIRY**

**PERFORMANCE ATTRIBUTE: IX.** The laboratory's maintenance program provides an appropriate balance between preventive and corrective maintenance and all maintenance work is performed safely.

#### **LINES OF INQUIRY:**

1. Does the preventive maintenance program include systems and equipment that affect safe and reliable facility operations?
2. Are preventive maintenance tasks scheduled based on operating experience, vendor recommendations, engineering analysis, cost/benefit analysis, and reliability considerations?
3. Are preventive maintenance tasks performed when scheduled?
4. Are surveillance tests, including functional tests, where appropriate, performed and documented for facility equipment?
5. Have administrative systems and controls been established to provide for timely completion and review of results from surveillance tests?
6. Is trending data acquired and used as part of the maintenance program?
7. Is corrective maintenance performed in a timely manner to return equipment to service or full performance?
8. Is effective control maintained over corrective maintenance activities to ensure systems and components are returned to service without altering their configuration or design basis?
9. Does corrective maintenance ensure that conditions causing failure or degradation in performance are identified, analyzed, and corrected?
10. Is maintenance work performed safely in accordance with applicable occupational safety and health requirements?
11. Are pre-job briefings conducted before maintenance to discuss potential job hazards and mitigation strategies?
12. Are modifications and temporary modifications subject to the same administrative controls as maintenance work?

## **PERFORMANCE ATTRIBUTES AND LINES OF INQUIRY**

**PERFORMANCE ATTRIBUTE: X.** The laboratory has established a program of routine evaluation and analysis to provide for continuous improvement of maintenance activities.

### **LINES OF INQUIRY:**

1. Are recurring maintenance problems identified and eliminated by correcting the root causes for the problems?
2. Are provisions made for transferring lessons learned from ongoing maintenance activities and root cause analyses to other facilities?
3. Is the maintenance program periodically evaluated by the laboratory to identify areas that could be improved?
4. Does management periodically review a broad range of performance indicators to identify potential program improvements?
5. Has a work sampling program been implemented to determine utilization of craft labor?
6. Does the laboratory use results from external audits, self-assessments, and internal audits to identify and implement improvements in the maintenance program?
7. Does the laboratory evaluate maintenance experience and operations data from other facilities or sites to identify potential improvements in the maintenance program?