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## DOE STANDARD

# GUIDELINE TO GOOD PRACTICES FOR FACILITY CONDITION INSPECTIONS AT DOE NUCLEAR FACILITIES



U.S. Department of Energy  
Washington, D.C. 20585

AREA MNTY

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## **FOREWORD**

The purpose of the *Guideline to Good Practices for Facility Condition Inspections at DOE Nuclear Facilities* is to provide contractor maintenance organizations with information that may be used to verify adequacy of and/or modify existing or develop new maintenance programs for performing periodic facility condition inspections. This document is intended to be an example guideline for the implementation of DOE Order 4330.4A, *Maintenance Management Program*, Chapter II, Element 14, Facility Condition Inspection. DOE contractors should not feel obligated to adopt all parts of this guide. Rather, they should use the information contained herein as a guide for developing maintenance facility inspection programs that are applicable to their facility.

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## 1. INTRODUCTION

### 1.1 Purpose

This guide is intended to provide a means for owner/operators to have an awareness of the way business is actually being conducted on the shop floor. Also, this guide is intended to provide a means for maintenance managers to impart their expectations to craftspersons as to how maintenance should be conducted. It is expected that each DOE facility may use different approaches or methods than those defined in this guide. Explanation of the intent of this guide is provided in the Discussion section, and the specific guidelines that follow reflect generally accepted industry practices. In some cases, example situations accompany these guidelines. These examples have been provided only as an aid in clear understanding of the guidelines and should not be construed as the only method for meeting the intent of the guidelines. Therefore, deviation from any particular guideline would not, in itself, indicate a problem. If substantive differences exist between the intent of the Guideline and actual practice, management should evaluate current practice to determine the need to include/exclude proposed features. A change to maintenance practice would be appropriate if a performance weakness was determined to exist. Development, documentation, and implementation of other features which further enhance these guidelines for specific applications, is encouraged.

This guide describes key features of programs that support maintenance facility inspection. The implementation of this program should accomplish the following:

- a) documentation of materiel conditions in a consistent manner
- b) materiel deficiencies may be effectively identified for corrective actions
- c) support continued safe, reliable, and efficient facility maintenance operations

This guide also assigns responsibility to all facility personnel to be alert for and identify materiel deficiencies. Further, it describes the method by which these deficiencies are clearly marked and translated to the work control system. This deficiency identification system serves the following functions:

- a) to notify other facility personnel that a deficiency has been identified and that the necessary documentation has been submitted to initiate corrective action
- b) to alert operational personnel to inaccuracies in facility instrumentation or degraded conditions of facility equipment and components
- c) to enhance facility status monitoring, maintenance planning, and facility materiel condition

d) to eliminate multiple submissions of maintenance job requests on the same deficiency

Additional information pertinent to the implementation of this guideline may be found in the following Guidelines:

- 1) DOE-NE-STD-1003-91, “*Guidelines to Good Practice for Training and Qualification of Maintenance Personnel*”
- 2) DOE-STD-1050-93, “*Guidelines to Good Practices for Planning, Scheduling, and Coordination of Maintenance Activities at DOE Nuclear Facilities*”
- 3) DOE-STD-1055-93, “*Guidelines to Good Practices for Management Involvement at DOE Nuclear Facilities*”

Appendix A is provided for use by facility trainers who provide training regarding this element.

## **1.2 Background**

The information in this guide was developed from commercial and DOE sources. Each facility should select those details that are applicable, add any unlisted knowledge or experience that are applicable, and develop and implement facility-specific maintenance management programs. Facilities that have existing maintenance facility inspection programs should review this guide to identify details that may enhance their existing programs.

## **1.3 Application**

The content of this guide is generally applicable to all DOE nuclear facilities. Portions of the programs outlined may not be applicable to all facilities because maintenance organizations, disciplines, titles, and responsibilities may vary among DOE nuclear facilities. Facility maintenance personnel may verify the adequacy or improve existing maintenance facility inspection programs by adapting this guide to their specific facility and individual maintenance disciplines.



## 2. DEFINITIONS

- 2.1 Acronyms used in this standard. The acronyms used in this standard are defined as follows:
- a. HVAC - Heating, Ventilation, and Air Conditioning
  - b. M&TE - Measuring and Test Equipment
  - c. MJR - Maintenance Job Request
  - d. MSDS - Material Safety Data Sheets
- 2.2 Corrective Action. The action required to bring a deficient item into conformity with a standard. For materiel deficiencies requiring maintenance action, the corrective action may consist of identifying the deficiencies, submitting a maintenance job request for corrective activities, and tracking the deficiency. Deficiencies should be reported in accordance with applicable policies and procedures.
- 2.3 Deficiency. An item that does not meet specified standards and requires corrective action.
- 2.4 Deficiency Identification Sticker. (Appendix B) A small, adhesive-backed form which may be used primarily to identify deficiencies in those situations that preclude the use of a Deficiency Identification Tag. The sticker should also be marked with a serialized number. A duplicate should not be required since most stickers are used in control rooms where the deficiency information may easily be directly placed on a maintenance job request.
- 2.5 Deficiency Identification Tag. (Appendix B) A two-part form that includes a string for ease of attachment and may be used to identify a facility materiel deficiency. The tag should be marked with a serialized number that is used for administrative control and for deficiency location by maintenance personnel. The hard copy of the tag should be placed on or near the deficiency in the facility. The duplicate or carbon of the tag serves as a temporary record of the deficiency until the data is transferred to a maintenance job request.
- 2.6 Housekeeping. The cleaning and preservation of the facility, its systems and components. Also used to refer to the condition of facility cleanliness, orderliness, and preservation. Examples of housekeeping deficiencies are listed in Appendix C.
- 2.7 Industrial Safety Program. The overall program designed to minimize work-related injuries and illnesses through the identification, assessment, and correction of

unsafe work practices and conditions. Examples of industrial safety deficiencies are listed in Appendix D.

- 2.8 Inspection Coordinator. A designated member of facility staff who is responsible for the overall coordination of inspection activities.
- 2.9 Inspection Zone. A physical area of the facility that is identified for inspection purposes.
- 2.10 Maintenance Job Request (MJR). Means of obtaining maintenance services, available on both paper and electronic mediums and initiated by maintenance customers. An MJR is normally issued to Maintenance Planners and Estimators and is used to define, plan, and execute maintenance activities. It serves as documentation of a deficient equipment condition and requires detailed documentation of work performed, spare parts, procedures, or testing to verify that maintenance was performed correctly. The MJR may also serve as documentation for completion of minor maintenance activities such as lubrication, light-bulb replacement, etc. "MJR" is the equivalent of a "Work Request." (see DOE-STD-1050-93, "*Guidelines to Good Practices for Planning, Scheduling and Coordination of Maintenance Activities at DOE Nuclear Facilities*")
- 2.11 Materiel Deficiency. An installed system or component with a physical defect that does not conform to specified standards. Examples of materiel condition deficiencies are provided in Appendix E.
- 2.12 Radiological Protection Deficiency. A condition that if allowed to exist may result in the contamination of personnel and areas, unnecessary radiation exposure, and generation of excessive radiological waste. Examples of radiation protection deficiencies are provided in Appendix F.

### **3. FACILITY INSPECTION PROGRAM**

#### **3.1 DISCUSSION**

The objectives of a facility inspection program are (1) to provide a means for owner/operators to have an awareness of the way business is actually being conducted on the shop floor and (2) to provide a means for maintenance managers to impart their expectations to craftspersons as to how maintenance should be conducted.

Key indicators of a well-maintained and operated facility are the appearance and proper functioning of facilities, systems, and equipment.

Daily observation of conditions should be performed at local job sites by the owner/operator. However, all facility personnel should be encouraged to be active observers during the normal course of daily duties. Good materiel condition, cleanliness, and housekeeping are established and maintained by a knowledgeable work force alert to deficiencies in their work areas and who inform responsible managers for prompt corrective actions.

Effective implementation of this program ensures that facility materiel condition, industrial safety practices, housekeeping, and radiological protection practices conform to management's standards.

This program should also be used as a feedback and communication tool. Many management studies show that worker morale and motivation improve when management demonstrates interest in their activities. These inspections provide a good opportunity for positive and constructive feedback. Additionally, the facility inspection program may be a beneficial tool when used to recognize the performance of individuals or groups that have made positive efforts in improving the facility materiel condition.

A facility inspection program should include the following key elements:

- a systematic approach that ensures information is gathered throughout the facility. Ideally, the program should ensure that each area of the facility is inspected by a manager/supervisor on a periodic basis.
- a focal point to evaluate the gathered information, identify recurring problems, and develop corrective action plans
- conscientious management involvement in specifying corrective action and assigning responsibility for implementation
- a means to follow up on the program to measure its effectiveness

Additionally, this inspection program may be used in conjunction with a program that assigns individuals to specific areas of the facility for overall accountability of the condition of that area.

An example of a program that addresses these elements has been attached for your consideration.

### **3.2 SCOPE**

This guideline provides information to develop a facility materiel inspection program. The program addresses the following:

- 3.2.1 materiel condition and documentation
- 3.2.2 industrial safety
- 3.2.3 housekeeping practices
- 3.2.4 radiological protection practices
- 3.2.5 opened system and component protection
- 3.2.6 reporting and follow-up

### **3.3 RESPONSIBILITIES**

#### **3.3.1 Owner/Operator**

Owner/Operators are responsible for the effectiveness of this program. They should ensure that responsible managers and supervisors understand and support established standards. Also, they should designate an inspection coordinator to assist in administering this program.

#### **3.3.2 Inspection Coordinator**

The inspection coordinator should perform the following:

- a) divide the facility into inspection zones
- b) assign inspection zones and inspection categories to responsible managers and supervisors
- c) establish inspection schedules

- d) receive inspection reports, assign follow-up action responsibility if required, and forward copies to the affected manager(s) for corrective action
- e) submit reports to the owner/operator as required in paragraph 3.4.6.5

### 3.3.3 Responsible Managers

Responsible managers are accountable for the implementation of this guideline. Each manager or designated representative should perform the following:

- a) ensure that all personnel are familiar with established standards and criteria
- b) conduct inspections of their assigned inspection zones as scheduled
- c) assign corrective action accountability, and submit inspection reports to the inspection coordinator as described in paragraph 3.4.6.1
- d) ensure timely correction and follow-up of deficiencies falling under their jurisdiction
- e) monitor facility materiel conditions to ensure that materiel deficiencies are identified for corrective action in accordance with this guideline.

### 3.3.4 Facility Personnel

All facility personnel are responsible for the prompt identification and documentation of materiel deficiencies in accordance with this guideline.

### **3.4 FACILITY INSPECTION GUIDELINES**

#### **3.4.1 Inspection Zones**

The following process applies to inspection zones:

- 3.4.1.1 The facility should be divided into inspection zones. Inspection zones should be numbered for identification.
- 3.4.1.2 Inspection zones should be assigned to department managers by job title (e.g., zone 1 assigned to the maintenance administration manager).
- 3.4.1.3 Periodically, each inspection zone should be assigned to a different department manager. This should help ensure consistency throughout the facility.

#### **3.4.2 Scheduling**

The following process applies to scheduling:

- 3.4.2.1 A schedule should be established that ensures each inspection zone is inspected approximately every two weeks.
- 3.4.2.2 Schedules should specify the week in which the inspection should be accomplished and what general inspection category should be concentrated on. The day and time of inspection should be left to the department manager's discretion.
- 3.4.2.3 At the beginning of the quarter, the inspection coordinator should notify each department manager of the inspection zones for which he/she is responsible by publishing a schedule matrix. This schedule should indicate the inspector, zone, and type of inspection for each week of the quarter. An example facility inspection quarterly schedule is illustrated in Attachment E.

### 3.4.3 Types of inspections

The following process applies to types of inspection:

3.4.3.1 Inspections should be separated into general categories and identified as follows:

- a) material condition (M)
- b) industrial safety (S)
- c) cleanliness/housekeeping (H)
- d) radiological protection/control (R)

3.4.3.2 Each inspection should concentrate on one general category. This should allow an in-depth look at one specific aspect of facility performance. However, other deficiencies should not be overlooked.

3.4.3.3 All applicable general categories should be completed for each inspection zone by the end of each calendar quarter.

### 3.4.4 Conduct of Inspections

The following process applies to the conduct of the inspection:

3.4.4.1 Each department manager or his/her designated representative should conduct an inspection of his/her assigned inspection zone during the week scheduled. The inspection may be conducted as one evolution, or as a series of smaller inspections during the week.

3.4.4.2 Each inspection should include detailed walk-downs of the inspection zone. Key areas to consider are out-of-the-way and limited-access areas. The inspection should not only identify deficiencies; it should also identify those things that are being done to improve facility conditions. In this manner, the program serves as a positive feedback mechanism.

3.4.4.3 Subordinates should be included on inspections-periodically. This should provide a method to teach inspection techniques and convey high standards.

3.4.4.4 The owner/operator should accompany each department manager periodically to ensure his/her (owner/operator's) standards are adequately understood by other department managers.

### 3.4.5 Inspection Techniques

#### 3.4.5.1 Observations

While inspections are performed, observe the following:

- a) safety practices
- b) work habits
- c) radiological control practices
- d) work site orderliness and protection of open systems/components

#### 3.4.5.2 Inspections

Attachments A through D list many examples of deficiencies for each general inspection category. Appendix H is an example of an inspection checklist which may be used. Typically, in-depth inspections include the following techniques:

- a) Bearing housings, motors, and pumps should be touched to check for excessive heating or vibration.
- b) Inspectors should be alert for abnormal sounds or unusual odors.
- c) A flashlight should be used throughout the inspection.
- d) Deficiencies should be conspicuously tagged and documented during the inspection to provide accurate description and location information for each problem. (see Section 3.5 of this Guideline, *Facility Materiel Deficiency Identification* )
- e) Deficiencies should be referenced to specific maintenance procedures or requirements.



### 3.4.6 Reporting and Follow-UP

- 3.4.6.1 Inspection results should be reported to the inspection coordinator. A typical inspection report form with a continuation page is illustrated in Attachment F.
- a) The inspection coordinator should provide blank inspection report forms to inspectors as needed.
  - b) The inspection report should be submitted within three working days of the inspection.
- 3.4.6.2 For those deficiencies that the inspector may make on-the-spot corrections, corrective action should be initiated at the time of the inspection. The report should note the corrective action that was initiated.
- 3.4.6.3 The inspection coordinator should forward copies of each inspection report to appropriate department managers for corrective action. He/she should maintain the original inspection reports on file for tracking and evaluating program effectiveness. He/she should periodically review his/her files to identify repetitive problems and trend progress.
- 3.4.6.4 Department managers should note on the inspection report the corrective actions conducted/planned for each deficiency under their responsibility and return the inspection report to the inspection coordinator to clear deficiencies on file.
- 3.4.6.5 The inspection coordinator should keep the owner/operator informed of program progress. This may be done by written report or by verbal update, and should include discussions of generic or specific performance deficiencies, as well as particularly good areas.

### 3.5 FACILITY MATERIEL DEFICIENCY IDENTIFICATION

3.5.1 An individual noting a facility materiel deficiency should clearly identify the problem as set forth below.

3.5.1.1 Deficiency Identification Tags (Appendix B) should be uniquely numbered and coded to facilitate tracking. The tags do not have to be used in sequential order nor is there to be accountability for blocks of numbered tags. Enter a description of the deficiency in the "Note" section of the tag. Multiple deficiencies of a similar nature that are to be included on the same MJR and that are in close proximity require only one tag, e.g., ten fasteners missing from a motor control center. The fact that the tag is for multiple deficiencies should be indicated in the "Note" section of the tag. Entry of the date is particularly important. The date should be used in conjunction with the tag number to obtain the MJR number that corresponds to the identified deficiency (see Section 3.5.2.1).

3.5.1.2 Remove the duplicate portion of the tag and attach the hard copy portion to the equipment or component, as close as possible to the deficiency. If the tag was properly completed, the duplicate contains the necessary information to complete the MJR. The duplicate should be retained until a MJR is initiated.

- a) Where the deficiency is inaccessible due to radiation or physical reasons, the hard copy of the deficiency tag should be hung in a clearly visible area as close as possible to the deficiency, i.e., at eye level, directly below a valve leak in the overhead, or on/near the access door to a high radiation area.
- b) For those situations in which the hanging of a deficiency tag may restrict the visibility of facility instrumentation or controls, the smaller Deficiency Identification Sticker (Appendix B) should be used. This situation generally pertains to deficiencies within the control room or on facility control panels.

3.5.1.3 Blank Deficiency Identification Tags and Stickers should be kept in the control rooms and the maintenance shops. The tags and stickers are for field completion at the time a deficiency is identified without the necessity to have obtained additional information or MJR numbers. Operations personnel should be encouraged to carry a supply of tags with them on their rounds through the facility. Maintenance personnel and engineers should be encouraged to carry tags with them while working in the facility.

- 3.5.2 The individual identifying the deficiency should initiate a MJR. (see DOE-STD-1050-93, *“Guidelines to Good Practices for Planning, Scheduling, and Coordination of Maintenance Activities at DOE Nuclear Facilities”*)
- 3.5.2.1 The Deficiency Identification Tag or Sticker number should be entered in the MJR index. Since the date on the deficiency tag is the date of the MJR, the index provides any necessary cross-reference.
- 3.5.2.2 The duplicate portion of the Deficiency Identification Tag should be used to enter key information on the MJR.
- a) The tag or sticker serial number, date, and description of deficiency should be recorded on the MJR.
  - b) If the Deficiency Identification Tag was not placed in close proximity to the deficiency, this fact should be noted. Such a notation should assist maintenance personnel in locating the tag prior to starting work and in removing the tag upon completion of the work.
  - c) The duplicate may be affixed to the MJR or discarded. The system now provides complete traceability from a deficiency, using the tag number and date, to the MJR index and then to the MJR, which contains the tag or sticker serial number and a copy of the original tag. The age of a deficiency may be determined in the field from the date on the tag and the status of its repair, determined from the work control system.
- 3.5.3 Maintenance personnel should ensure that deficiency tags and stickers are removed following the completion of corrective maintenance after the resolved condition has been functionally verified as satisfactory and complete.
- 3.5.3.1 The mechanic or technician assigned to the work should locate the Deficiency Identification Tag or Sticker prior to starting work. If the tag or sticker cannot be located, the mechanic or technician should verify that they are at the location of the equipment or component specified by the MJR before work is started.
- 3.5.3.2 The mechanic or technician actually performing the work should remove the tag or sticker when the job is complete. The tag may be destroyed. If the tag is lost, or cannot be located, the circumstances should be noted on the original MJR.
- 3.5.3.3 As a part of their review of the completed MJR, the maintenance supervisor should verify that the tag or sticker has been removed,

3.5.4 Periodically, at least semi-annually, the Maintenance Planning Manager should initiate the following review to check the use of Deficiency Identification Tags and Stickers. This review should be a management tool only and should not be considered a permanent record.

3.5.4.1 A representative sample of pending MJRs should be randomly removed from the files and the presence of the tag or sticker serial number verified.

3.5.4.2 The fact that the original tag or sticker is in place in the facility should also be verified for the MJR removed from the files.

3.5.4.3 A representative sample of completed MJRs should be randomly selected from the work control index and removed from the files. Field locations should be checked to verify that a deficiency tag is not still in place.

3.5.4.4 A completed Deficiency Identification Review Form (Appendix J) should be submitted to the maintenance manager.

**APPENDIX A**  
**FACILITY CONDITION INSPECTIONS**  
**SAMPLE LESSON PLAN**

**APPENDIX A**

**FACILITY CONDITION INSPECTION**

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LESSON PLAN

1. The instructor should be familiar with the following background information:
  - a. The fundamental indicator of a well-maintained and efficiently operated facility is the appearance and proper functioning of process systems and equipment. These conditions are a direct reflection on the standards and attitudes of those who manage and work within that facility.
  - b. One successful approach to improve facility and housekeeping conditions is to establish a program which includes periodic inspections by management, corrective actions for identified deficiencies, and follow-ups to ensure deficiency correction.
  - c. The involvement of facility management personnel in periodic inspections and walk-downs of operating equipment and spaces accomplishes the following two important purposes:
    - those who have overall responsibility for the facility are provided regular opportunities to see the condition of their responsibility, and
    - management is afforded a direct means to transmit their standards of excellence to facility personnel.
2. To teach this lesson, the following training housekeeping items are required:
  - a. Location for the training,
  - b. Approximately 30 minute time period for the training,
  - c. Notification of selected employees, and
  - d. A copy of the facility condition and housekeeping inspection program.
3. This lesson has the following trainee enabling objective:

Explain the purpose of a facility condition and housekeeping program.

4. The fundamental indicator of a well-maintained and operated facility is the appearance and proper functioning of process systems and equipment. These conditions are a direct reflection on the standards and attitudes of those who manage and work within that facility. A facility-wide inspection program is an effective means to identify and correct deficiencies. Considerations for this type of program include the following:
  - a. Some programmatic elements to be considered:
    - managers should set high standards for housekeeping and the condition of facility equipment,
    - all personnel should have a clear understanding of these standards,
    - all managers and supervisors should participate in these inspections,
    - inspection areas should be assigned to cover the entire facility, including out-of-the-way locations, and
    - identified deficiencies should be corrected in a timely manner.
  - b. Some indicators of good facility condition and housekeeping standards are as follows:
    - equipment is properly lubricated and has the appropriate preventive maintenance performed,
    - equipment operating temperatures and vibration levels are within design limits,
    - fluid system leaks are minimized or are properly contained,
    - instruments and gages are indicating correctly and are on a periodic calibration program,
    - electrical equipment doors and closures are installed to maintain proper design integrity,
    - equipment and systems are preserved to minimize corrosion,
    - industrial safety and radiological hazards are controlled and minimized,
    - walkways and equipment access are clear and easily recognizable,
    - equipment is clean and free of debris,

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- no evidence of improper housekeeping following completion of maintenance work activities, such as tools and materials left in various areas of the facility,
  - unauthorized modifications do not exist, and
  - facility lighting is maintained at a level to support operations and maintenance.
- c. In addition to an inspection program, all site personnel should be responsible for the prompt identification, correction, or documentation of facility condition and housekeeping deficiencies during the normal course of their duties.
5. Discuss with the trainees the facility's material condition and housekeeping program.



**APPENDIX B**  
**EXAMPLE DEFICIENCY IDENTIFICATION**  
**TAG AND STICKER**

**APPENDIX B**

**EXAMPLE DEFICIENCY IDENTIFICATION TAG**

(Two Parts - Hard Copy and Carbon)

<p><b>O</b></p> <p><b>DEFICIENCY IDENTIFICATION</b></p> <p><b>41906</b></p> <p><b>EQUIPMENT</b> _____</p> <p>_____</p> <p><b>NOTE</b> _____</p> <p>_____</p> <p>_____</p> <p>_____</p> <p><b>DATE</b> _____</p>
---

**EXAMPLE DEFICIENCY IDENTIFICATION STICKER**

(Adhesive Back)

<p><b>WORK REQUESTED</b></p> <p>_____</p> <p><b>DATE</b> _____</p> <p><b>37684</b></p>
--

**APPENDIX C**  
**EXAMPLE HOUSEKEEPING/CLEANLINESS**  
**DEFICIENCIES**

**APPENDIX C**

**EXAMPLE HOUSEKEEPING/CLEANLINESS DEFICIENCIES**

1. Cluttered areas, dirt accumulation
2. Undisposed of packaging material
3. Cigarette butts on floors, equipment, or structures
4. Improper waste disposal (e.g., waste in wrong cans, lids missing)
5. Tool cribs in disarray
6. Tools or parts left unattended for prolonged periods of time
7. Caked dirt on equipment and bed plates
8. Signs and labeling in disarray
9. Storage areas disorderly
10. Shop areas cluttered; old parts lying about

**APPENDIX D**  
**EXAMPLE INDUSTRIAL SAFETY DEFICIENCIES**

**APPENDIX D**

**EXAMPLE INDUSTRIAL SAFETY DEFICIENCIES**

1. Ladders - no chain safety barrier across access, ladder rungs broken; poorly lighted, improperly positioned and secured
2. Catwalks or elevated workspaces - no safety rails installed, lack of a 4 to 6 inch toe board at bottom
3. Scaffolding - improperly installed or secured; in poor repair; not authorized
4. Compressed gas bottles - unsecured, caps missing, improper environment, unlabeled
5. Tripping/slipping hazards - temporary hoses, piping, holes in floor, oil or water on floor
6. Water leakage in the immediate vicinity of energized equipment
7. Protrusions into aisle ways without protection devices/warnings
8. Unsafe work habits
  - a. personnel failing to wear hard hats, safety glasses, proper shoes, ear protection when needed
  - b. working on energized equipment without proper approval and protective equipment and clothing
  - c. handling chemicals without proper protection - no apron, face shield, glove, respirator, boots
  - d. improper lifting of heavy objects
  - e. lack of fire-watch for welding, cutting, and grinding operations
  - f. smoking in prohibited areas
  - g. working at heights without safety belt
  - h. improper hoisting and rigging
  - i. misused or missing safety devices (e.g., locks, limit switches, etc. )
9. Maintenance shop equipment does not have guards installed, safety signs, work space marked off around each piece of equipment
10. Fire hazards - untreated wood, packing boxes, flammables in unauthorized containers

11. Fire protection equipment
  - a. hoses improperly racked - inspection not up to date
  - b. fire extinguishers not in place, inspection not up to date, safety pin not sealed
  - c. emergency cabinets improperly stocked or in disarray
  - d. access to safety equipment not clear
  - e. hose/equipment through fire doors
12. posting and control of hazardous or confined areas
  - a. zones not clearly marked or posted; permits not posted
  - b. warning signs not posted or not understandable
13. Eyewash stations/showers
  - a. instructions not posted
  - b. not located near hazard; access is restricted
  - c. not well maintained or tested
14. Non-compliance with facility safety policies and procedures
15. Heavy or vibrating equipment stored in elevated positions.





**APPENDIX E**  
**EXAMPLE MATERIEL CONDITION DEFICIENCIES**

**APPENDIX E**

**EXAMPLE MATERIEL CONDITION DEFICIENCIES**

1. Leaks - water, steam, oil, air:  
packing  
stem  
seal  
flange  
body to bonnet  
internal leak by
2. Lubrication - oil, grease, water: evidence of too little or too much as noted by:  
sight glasses, bull's eyes, flow indicators, dip sticks, grease cups, and grease (zirc)  
fittings
3. Handwheels/operators - missing, key or pin missing, identification label missing
4. Filters/screens/louvers - clogged, dirty, missing
5. Gauges/instruments - not in calibration, inoperable, face broken, pointer  
missing/bent
6. Drains/drain holes - clogged, full, plugged, screens or grating missing
7. Drain and vent hoses improperly stored or installed
8. Vent and drain caps improperly installed
9. Lines/pipes - loose, un-bracketed, insulation missing
10. Fasteners - loose, stripped, missing
11. Indicating lamps - missing, burned out, cover missing
12. Panels - covers missing, open, loose, dirt and debris
13. Electrical box covers improperly installed and loose
14. Area lighting - burned out, bulbs missing
15. Packing - bottomed-out adjustment, dirty or rusted glands
16. Cables/leads - unsecured, worn or frayed insulation, improper terminations

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17. Motors/generators - dirty, brush rigging pigtails broken, ground straps loose/missing, excessive noise/vibration
18. Preservation - rust, corrosion
19. Environmentally qualified components - materiel condition - items identified above indicate qualification not being maintained
20. Labels - missing, unclear, inaccurate
21. Radiation/contamination areas not clearly identified
22. Fire doors open, fire barriers not intact, and fire hazards present
23. Safety tags not properly completed, adequately attached, and authorized (spot check)
24. Equipment access unsatisfactory or hampered by scaffolding or other material
25. Noise and vibration levels abnormal
26. Insulation damaged or missing
27. Pipe hangers missing, loose, or misused
28. Unsatisfactory area cleanliness
29. Improper or misused electrical grounding devices



**APPENDIX F**  
**EXAMPLE RADIOLOGICAL PROTECTION DEFICIENCIES**

**APPENDIX F**

**EXAMPLE RADIOLOGICAL PROTECTION DEFICIENCIES**

1. Postings - radiological protection signs not legible, understandable, or appropriate
2. Barriers
  - a. Barriers (rope, fences, etc.) not properly positioned to require conscious action to cross them
  - b. Purpose of all radiological protection barriers not easily determined
3. Poor personnel radiological protection practices
  - a. personnel wearing or removing protective clothing improperly
  - b. personnel monitoring (frisking) themselves incorrectly (too fast, incomplete, etc.)
  - c. personnel smoking, eating, drinking, and/or chewing in radiologically controlled areas
  - d. wearing dosimetry improperly (wrong location, separated)
4. Radiological protection equipment and instruments damaged or overdue for calibration
5. Radioactive material improperly identified or wrapped to control contamination
6. Protective clothing containers overflowing or protective clothing outside of contaminated areas
7. Items that should not be radioactive in radwaste containers (e.g. cardboard cartons, computer print-outs, newspapers, etc.)
8. Accumulation of radioactive materials, tools, drums in other than designated areas
9. Spills or leaks not redirected or contained to prevent spread to non-contaminated areas
10. Missing or incomplete bulletins: Right to Know, MSDS Postings
11. Improper storage: Markings/labeling, cleanliness, type of cabinets, improper logging of data (e.g., 90 day accumulation site), material compatibility, flammable materials

12. Missing or improper Emergency Response: spill response material, overpack drums, emergency notification data/means, drum/container closure equipment, personal protection equipment
13. Improper containment: Container integrity, Secondary containment
14. Improper or inadequate training: Spill response, hazard identification, employee responsibility
15. Improper decontamination: Procedures, materials/equipment, waste containers, worker practices, signage





**APPENDIX G  
EXAMPLE FACILITY INSPECTION QUARTERLY  
SCHEDULE**

## APPENDIX G

## EXAMPLE FACILITY INSPECTION QUARTERLY SCHEDULE

FOR \_\_\_\_\_ QUARTER 199\_

INSPECTOR / WEEK	1	2	3	4	5	6	7	8	9	10	11	12
Maint. Administration	1M	9R	2S	10H	3M	11R	4S	12H	5M	13R	6S	14H
Maint. Training	2R	10S	3H	11M	4R	12S	5H	13M	6R	14S	7H	15M
Maint. Engineering	3S	11H	4M	12R	5S	13H	6M	14R	7S	15H	8M	16R
General Maint.	4H	12M	5R	13S	6H	14M	7R	15S	8H	16M	9R	1S
Facility Maint.	5M	13R	6S	14H	7M	15R	8S	16H	9M	1R	10S	2H
Maint. Planning Oversight	6R	14S	7H	15M	8R	16S	9H	1M	10R	2S	11H	3M
Electronic Maint.	7S	15H	8M	16R	9S	1H	10M	2R	11S	3H	12M	4R
Utilities Maint.	8H	16M	9R	1S	10H	2M	11R	3S	12H	4M	13R	5S

Zones

1 through 16 = various areas of the facility

General Categories

M Materiel Condition  
 R Radiological Protection  
 S Industrial Safety  
 H Housekeeping/Cleanliness

**APPENDIX H**  
**EXAMPLE INSPECTION CHECKLIST**

**APPENDIX H**

**EXAMPLE INSPECTION CHECKLIST**

Responsible Person: \_\_\_\_\_ Zone \_\_\_\_\_

Inspector: \_\_\_\_\_ Building \_\_\_\_\_

Date performed: \_\_\_\_\_ Area \_\_\_\_\_

Room \_\_\_\_\_

<u>Grade</u>	<u>PMT</u>	<u>Adjective</u>	<u>Description</u>
4	Green	Outstanding	Creative or innovative activities
3	Green	Superior	Efforts significantly beyond what is normally expected as acceptable
2	Yellow	Satisfactory	Complies with what is normally expected as acceptable
1	Yellow	Marginal	Somewhat less than what is normally acceptable
0	Red	Unsatisfactory	Effort significantly below what is normally expected

Grades of 0 and 1 require Action by the Responsible Person (i.e., MJR, Memo to supervision, verbal reply, etc.)

<u>STANDARD</u>	<u>GRADE</u>	<u>REQUIRED ACTION</u>
1. Aisleways are clearly distinguished from work areas.		
2. Aisleways, doorways, ramps, stairs provide direct and clear egress from the shop.		
3. Stairs and ramps have proper handrails.		
4. Lighting is adequate for all aisleways, stairs, workbenches, machines, and storage areas.		
5. Emergency lighting illuminates egress paths and exists are clearly identified.		

<u>STANDARD</u>	<u>GRADE</u>	<u>REQUIRED ACTION</u>
<p>6. The shop is weather-tight.</p> <p>7. The physical enclosure of the shop (i.e., ceiling, walls, support structure, floor) are in serviceable condition.</p> <p>8. Coatings and coverings for ceilings, walls, floors are continuous, clean, and sound.</p> <p>9. Fire protection (i.e., sprinklers, extinguishers) are adequate, properly charged, and not blocked or otherwise inhibited in their intent.</p> <p>10. Insect and pest control is effective.</p> <p>11. Signs in the area are appropriate, visible, properly located and clearly communicates the intent.</p> <p>12. Trash receptacles:</p> <ul style="list-style-type: none"> <li>a) clearly indicate the intended contents</li> <li>b) are located convenient to users</li> <li>c) are regularly emptied</li> </ul> <p>13. MSDS and other procedures/documents are stored orderly, and are readily accessible.</p> <p>14. Housekeeping:</p> <ul style="list-style-type: none"> <li>a) aisleways are free of debris/fluids</li> <li>b) workbenches are uncluttered</li> <li>c) storage areas are orderly, packing materials are disposed of properly.</li> </ul> <p>15. The general area is uncluttered and orderly</p> <p>16. Fixed hoists, ladders, work-platforms, etc. are provided where needed.</p> <p>17. Special equipment is labeled to encourage access and proper use.</p> <p>18. File cabinets, storage cabinets, and other doors/drawers are closed when not in use.</p>		

STANDARDGRADEREQUIRED ACTION

- | <u>STANDARD</u>  | <u>GRADE</u> | <u>REQUIRED ACTION</u> |
|--|--------------|------------------------|
| 19. Bulletin boards are provided and used for the intended purpose and are orderly.  |              |                        |
| 20. Utility service levels are controlled (i.e., electrical power, HVAC, water, drainage, exhaust/supply, etc) are consistent with shop needs, and are available at locations convenient to the primary users.   |              |                        |
| 21. Piping, valves, and electrical circuits are visibly labeled to identify contents and there are no visible signs of deterioration and their operating status is clearly identified.   |              |                        |
| 22. Electrical power disconnects are not blocked.  |              |                        |
| 23. Electrical circuits are not jeopardized by wet or contaminated conditions.   |              |                        |
| 24. Equipment with specific hazards have proper personnel guarding in-place.   |              |                        |
| 25. Adequate ear protection is provided and used to properly suppress excessive noise.   |              |                        |
| 26. Portable and hand tools and equipment are returned to designated storage areas when not in-use or at the end of the shift.   |              |                        |
| 27. Storage areas: <ul style="list-style-type: none"> <li>a) identify the hazard of materials stored</li> <li>b) segregate materials by type (i.e., electrical, sheet metal, piping, conduit, electronic, lubricant, etc. )</li> <li>c) segregation considers application (i.e., staging, defective waiting disposition, shipping, receiving, M&amp;TE, etc.)</li> </ul> |              |                        |
| 28. Unauthorized storage does not exist.   |              |                        |
| 29. Stored items are not in excessive quantities.  |              |                        |
| 30. Storage does not exceed the limits of shelves/racks/stacking, etc.   |              |                        |

<u>STANDARD</u>	<u>GRADE</u>	<u>REQUIRED ACTION</u>
<p>31. Storage areas provide adequate physical/ environmental protection for stored items.</p> <p>32. Storage areas are convenient to users</p> <p>33. Communications equipment is reliable and provides adequate coverage.</p> <p>34. Audible and visual alarms are operational.</p> <p>35. Equipment/tools are in a high state of readiness for use. Worn/defective items are properly segregated for disposition and to inhibit unauthorized use.</p> <p>36. The work area of machines is clean of unnecessary/ excess debris and foreign objects.</p> <p>37. Facilities are sized, organized, and equipped for safe/ effective work consistent with the workload, work performed, crew size, and mission and include:</p> <ul style="list-style-type: none"> <li>Equipment/machines</li> <li>Personal portable tool boxes</li> <li>Diagnostic and verification tools/devices</li> <li>Lay-out space</li> <li>Staging areas</li> <li>Storage</li> <li>Temporary areas (i.e., gloveboxes, screening, etc.)</li> <li>Offices</li> <li>Restroom access</li> <li>Designated eating area</li> </ul>		





**APPENDIX I**  
**EXAMPLE INSPECTION REPORT FORM**

**APPENDIX I**

**EXAMPLE INSPECTION REPORT FORM**

TO: (Inspection Coordinator)  
FROM: (Inspector)  
SUBJECT: Inspection Report

On \_\_\_\_\_, I made a tour of zone \_\_\_\_\_. During this tour I noted the  
(Date) (Number)  
deficiencies/conditions listed on the attached pages.

---

(Signature / Date)

---

TO: (Responsible Manager)  
FROM: (Inspection Coordinator)  
SUBJECT: Inspection Report

Forwarded for action for each item as indicated.

---

(Signature / Date)

---

TO: (Inspection Coordinator)  
FROM: (Responsible Manager)  
SUBJECT: Inspection Report

Corrective action for each item assigned to me has been completed as noted on the attached pages.

---

(Signature / Date)

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LOCATION	DESCRIPTION	CORRECTIVE ACTION	DATE INITIATED	RESPONSIBLE ORGANIZATION
(Should describe the exact location of deficiency e.g., system, elevation, etc.)	(Include a description and magnitude of the problem; e.g., packing leak of 1 quart per minute on FW-V-37)	(Include work order number, purchase order number, etc.)	(e.g., date work order was written)	(As determined by inspector or inspection coordinator)



**APPENDIX J**  
**EXAMPLE DEFICIENCY IDENTIFICATION**  
**REVIEW FORM**

**APPENDIX J**

Example Deficiency Identification Review Form

TO: Maintenance Manager  
FROM: Maintenance Planning Manager  
SUBJECT: Deficiency Identification Review

Pending Work:

Number of job requests reviewed \_\_\_\_\_

Number of job requests having tag serial numbers \_\_\_\_\_

Number of tags/stickers posted at identified deficiency \_\_\_\_\_

Problems Noted: \_\_\_\_\_  
\_\_\_\_\_

Completed Work:

Number of job requests reviewed \_\_\_\_\_

Number of tags/stickers remaining in facility \_\_\_\_\_

Problems Noted: \_\_\_\_\_  
\_\_\_\_\_

Comments:

The functioning of the deficiency identification system is considered to be \_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_

\_\_\_\_\_  
Maintenance Planning Manager







**CONCLUDING MATERIAL**

**Review Activity:**

DOE  
FM  
DP  
EH  
EM  
ER  
NE  
NS  
RW

Field Offices

AL  
CH  
ID  
NV  
OR  
RL  
SR  
OAK  
RF

**Preparing Activity:**

DOE-EH-63

**Project Number:**

MNTY-0012

Area Offices

Amarillo  
Brookhaven  
Fernald  
Kansas City  
Kirtland  
Princeton

Facilities

ANL  
KC AlliedSignal  
NBL  
LBL  
LANL  
LLNL  
ORAU  
PANTEX M&H  
PNL  
PPPL  
RF-EG&G  
SNL  
NV REECo.  
NV EG&G  
OR OSTI  
WHC  
ID-EG&G  
RF  
SLAC  
WSRC