

Activity: Corrective Maintenance

1.0 Purpose: This guideline provides a method of assuring that corrective maintenance practices are in accordance with applicable standards, regulations, procedures and/or standards in effect at a nuclear power plant.

2.0 Scope: This guideline provides assurance that an effective program has been established and implemented for performance of corrective maintenance. Although the maintenance program provides for corrective maintenance on both safety related and non-safety related items, this guideline will be applicable to only safety related, essential, or other systems, components and structures required for safe and reliable operation of the plant.

Corrective maintenance applies to repair or rework of equipment that has failed in service or has been identified as nonconforming.

3.0 References:

3.1 NRC Inspection Procedure 62700, "Maintenance Program Implementation"

3.2 NRC Inspection Procedure 62702, "Maintenance Program"

3.3 NRC Inspection Procedure 62704, "Instrumentation Maintenance (Components and Systems) Observation of Work, Work Activities, and Review of Quality Records"

4.0 Guidelines:

4.1 In preparation for and during the conduct of this surveillance:

- E Obtain and review implementing procedures, instructions and drawings governing this activity.
- E Prepare a guide or checklist using the selected items from this guideline.
- E Review past surveys, audits, surveillances and other evaluations/assessments.
- E Ensure that checklists include, where applicable, actual observations of performance, general plant conditions, radiological work practices, housekeeping, work document controls and use, and safety practices.

NOTE: Refer to Guideline A.1, "General Quality Surveillance Guidance," for specific details on the attributes listed above.

4.2 Verify that the corrective maintenance program contains the following elements:

- A. Procedures have been established for initiating requests for routine and emergency maintenance.
- B. Criteria and responsibilities for the review of work requests and/or work orders have been established.
- C. Provisions have been established for defining the maintenance activity as either safety or non-safety related.
- D. Provisions have been provided for establishing QA/QC inspection hold points.
- E. Provisions have been provided for performing functional testing of systems, structures or components following performance of corrective maintenance and

- prior to their being returned to service.
- F. There are provisions for identification of the individual(s) who performed and inspected the task.
 - G. There are requirements for the description of work, cause of the malfunction or failure, identification of replacement parts.
 - H. There are provisions for minimizing rework, for reporting nonconforming conditions and for taking corrective action including periodic reviews for general implications.
 - I. There are requirements for the identification of Maintenance and Test Equipment used.
 - J. Work control procedures require special authorization for activities involving welding, open flame or ignition sources. This is to include fire watch requirements, etc.
 - K. Requirements specify system/equipment release from operating personnel prior to commencing work.
 - L. Tech specs are reviewed for operating requirements, restrictions, etc., and that this review is documented.
 - M. Housekeeping and cleanness controls requirements are defined and established.
 - N. Provisions are established for control of temporary system changes (i.e., lifting leads, installing jumpers, bypassing interlocks) including independent verification and restoration.

- O. Provisions are made for assuring special permits and tagging are accomplished (i.e., safety tagging, ALARA permits, etc.).
 - P. Special conditions and safety hazards are identified.
- 4.3 Corrective maintenance activities should be verified through real time surveillance observations utilizing a checklist prepared to verify that:
- A. Work documents are completed and have received the required reviews and approvals.
 - B. Required permits, clearances, temporary modifications, etc., have been obtained and completed prior to the start of work.
 - C. Work is performed in accordance with approved instructions/ procedures.
 - D. Procedures/Instructions are of the latest approved revisions, including temporary changes.
 - E. Drawings, manuals and other documents are controlled copies with the latest approved revision.
 - F. Operations personnel release the equipment to Maintenance prior to the start of work.
 - G. Safety precautions for any unsafe conditions are observed.
 - H. Procedures and instructions are sufficiently detailed for performance of the task. Consideration should be given to skills possessed by qualified individuals which may negate the need for detailed procedures and instructions.

- I. Activities are performed by qualified personnel.
- J. ALARA requirements are observed.
- K. QA/QC inspection hold points are observed, witnessed/verified and documented as required by qualified personnel.
- L. Maintenance and Test Equipment (M&TE) is adequate for the task and within its current calibration cycle. All M&TE is identified and tagged with an appropriate calibration sticker.
- M. M&TE used is recorded on the work documents.
- N. Maintenance personnel sign off the work steps, and make entries in the work documents to record the activities accomplished.
- O. System failures are documented and forwarded for review and reporting in accordance with 10CFR50.73.
- P. Parts and materials used are identified and meet specifications for the usage.
- Q. Special processes are controlled and documented.
- R. Adequate control of equipment configuration, including determined leads, jumpers, bypasses and mechanical blocks.
- S. Component/equipment/system cleanliness and housekeeping procedures are followed and are adequate.
- T. Equipment restoration is adequate and in accordance with approved procedures.
- U. Retesting/calibration is performed to verify normal operation of equipment. This includes functional testing and verification of removal of temporary changes.

5.0 Other Guidelines for Consideration:

- 5.1 A.1, "General Quality Surveillance Guidance"
- 5.2 L.1, "Cleanliness"
- 5.3 L.5, "Equipment History"
- 5.4 L.6, "I&C/Electrical Equipment"
- 5.5 L.7, "Housekeeping"
- 5.6 L.8, "Material Control"
- 5.7 L.9, "Mechanical Maintenance"
- 5.8 L.10, "Fuse Control"
- 5.9 M.6, "Nonconformances"
- 5.10 M.11, "Corrective Action"