ATTACHMENT 71111.19

INSPECTABLE AREA: Post-Maintenance Testing

CORNERSTONES: Initiating Events

Mitigating Systems

Barrier Integrity

INSPECTION BASES: Inadequate maintenance activities and post-maintenance testing (PMT) can result in inoperable and non-functional equipment being returned to service. Significant risk can be accrued when inoperable and non-functional equipment remains unidentified for long periods of time.

LEVEL OF EFFORT: Review 20-28 PMT activities in a year. Although the number of required samples is an annual goal, available PMT samples should be inspected each quarter to ensure a reasonable distribution throughout the year. For multi-unit sites, attempts should be made to evenly balance the PMT samples between each unit on site. Where special conditions or circumstances warrant, such as unit specific PMT deficiencies, deviations from evenly balanced PMT samples may be appropriate.

71111.19-01 INSPECTION OBJECTIVE

01.01 This inspection will verify that the post-maintenance test procedures and test activities are adequate to verify system operability, and functional capability.

71111.19-02 INSPECTION REQUIREMENTS

02.01 Inspection Planning. Select PMT activities each calendar quarter that affect risk significant systems or components. Sufficient preparation time should be devoted to reviews of deficiency identification and maintenance documents, and discussions with plant personnel to understand the scope and details of the maintenance activity performed. If any risk significant systems or components have a recent record of performance problems and the maintenance activities performed are complex in nature, then preferentially select PMT activities that affect those systems or components.

02.02 Inspection Activity

1. For each testing activity selected, identify the affected system(s), component(s), or both, and:
   1. Review applicable licensing basis and design-basis documents to identify the safety functions and functions important to safety for the affected systems and components, as appropriate;
   2. Observe the associated maintenance activity if time permits to identify affected safety function(s).
   3. Review the licensee’s test procedure, completed maintenance activities, and work orders prior to observing the PMT to verify that:
      1. Procedure adequately tests the safety function(s) and function(s) important to safety that could have been affected by completed maintenance activities;
      2. Acceptance criteria in the procedure are consistent with information in the applicable licensing basis, design-basis documents, or appropriate standards, and;
      3. Procedure has been properly reviewed and approved.
2. Observe pre-job briefs, testing, and post-test critiques if time permits. Review the completed test procedure and data. Walkdown the affected work site. Verify that:
   1. Performance of the affected system(s) and component(s) satisfies the procedure’s acceptance criteria;
   2. Scope of the test and its acceptance criteria provides reasonable assurance of system operability or functionality considering the scope of work. For example, the residual heat removal (RHR) system functions at a wide range of pressure. As applicable for the work performed, does the licensee perform the PMT at the highest reasonable pressure for the RHR system component?;
   3. Effects of testing on the plant have been adequately addressed;
   4. Test equipment is calibrated, and is within its current calibration cycle;
   5. Test equipment used is within its required range and accuracy;
   6. Applicable prerequisites described in the test procedure are satisfied;
   7. Affected systems or components are removed from service in accordance with approved procedures;
   8. Test is performed in accordance with the test procedure and other applicable procedures;
   9. Jumpers installed and leads lifted during testing are appropriately controlled, restored, and removed;
   10. Electrical connections are secure and maintain their intended design function;
   11. Test data is accurate, complete, and valid;
   12. Test equipment is removed after testing;
   13. After completion of testing, equipment is returned to the positions/status required to maintain the system operable or functional, in accordance with approved procedures;
   14. Enclosures, seals, shielding, and protective features are appropriately restored;
   15. Work site cleanliness is maintained. Tools, rags, and other debris is not left adrift where it may impede required system, component, or operator functions;
   16. Problems noted during testing are appropriately documented;
   17. Quality control hold points, used to verify quality attributes that cannot be verified later, were properly performed, second checked, and documented as appropriate; and
3. For each testing activity, review the licensee’s completed test results, completed maintenance activities, and work orders after the system or component has been declared operable or considered functional to verify that:
   1. PMT results have been properly reviewed and accepted; and
   2. PMT adequately tested the safety function(s) and function(s) important to safety considering all completed maintenance activities. Specifically, considering those maintenance actives which could have subsequently disabled functions after completion of the PMT or created the need to perform additional testing.

02.03 Problem Identification and Resolution. Verify that the licensee is identifying PMT problems at an appropriate threshold and entering them in the corrective action program. For a sample of significant PMT problems documented in the corrective action program, verify that the licensee has identified and implemented appropriate corrective actions. Refer to Inspection Procedure (IP) 71152, “Problem Identification and Resolution,” for additional guidance.

71111.19-03 INSPECTION GUIDANCE

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| Sample Candidates | Priority | Example |
| Systems, credited by the licensee as operable or functional, which are adversely impacted by failure to adequately test or realign (e.g., remove test equipment). | Select activities with potential for common mode failures or systems with a risk achievement worth greater than or equal to 1.3.  Select activities where there is a recent record of maintenance and testing errors.  Select activities across technical disciplines (electrical, mechanical, instrumentation and control)  Select activities that are difficult to test at power.  Select activities that have undergone a change in work scope or experienced problems. | PMT of:  On-line emergency diesel generator engine repairs  Newly installed electrical/  instrumentation components that control integrated multiple systems, for example loss of off-site power and loss of coolant accident circuits  Containment air lock leakage |

For a given maintenance activity, a “vertical slice” review involves performing (as applicable) an associated sample in IP 71111.04, “Equipment Alignment,” IP 71111.12, “Maintenance Effectiveness,” IP 71111.13, “Maintenance Risk Assessments and Emergent Work Control,” IP 71111.19, “Post-Maintenance Testing,” and IP 71111.22, “Surveillance Testing.” Once or twice a year, inspectors should consider conducting a “vertical slice” review of a maintenance activity to assess whether different parts of the maintenance process work together effectively.

71111.19-04 RESOURCE ESTIMATE

The annual resource expenditure is estimated to be 71 to 97 hours per site regardless of the number of reactor units at the site.

71111.19-05 COMPLETION STATUS

Inspection of the minimum sample size will constitute completion of this procedure in the Reactor Programs Systems (RPS). That minimum sample size will consist of 20 PMT activities annually regardless of the number of reactor units at the site. Refer to Inspection Manual Chapter (IMC) 2515, “Light-Water Reactor Inspection Program - Operations Phase” for further guidance on procedure completion.

71111.19-06 REFERENCES

IP 71111.04, “Equipment Alignment”

IP 71111.12, “Maintenance Effectiveness”

IP 71111.13, “Maintenance Risk Assessments and Emergent Work Control”

IP 71111.22, “Surveillance Testing”

IP 71152, “Problem Identification and Resolution”

IMC 2515, “Light-Water Reactor Inspection Program - Operations Phase”

Operating Experience Smart Samples: <http://nrr10.nrc.gov/ope-info-gateway/ope-smart-samples_2007_2008.html>

Additional References: <http://nrr10.nrc.gov/rorp/ip71111-19.html>

END

Attachment 1 – Revision History for IP 71111.19

| Commitment Tracking Number | Accession Number  Issue Date  Change Notice | Description of Change | Training Required and Completion Date | Comment and Feedback Resolution Accession Number |
| --- | --- | --- | --- | --- |
| N/A | 04/03/00  [CN 00-003](http://www.nrc.gov/reading-rm/doc-collections/insp-manual/changenotices/2000/00-003.html) | Initial Issuance. | No |  |
| N/A | [ML020400004](https://nrodrp.nrc.gov/idmws/ViewDocByAccession.asp?AccessionNumber=ML020400004)  1/17/02  [CN 02-001](http://www.nrc.gov/reading-rm/doc-collections/insp-manual/changenotices/2002/02-001.html) | Revision history reviewed for the last four years. Revised resource estimates and inspection level of effort. | No |  |
| N/A | [ML11213A002](http://pbadupws.nrc.gov/docs/ML1121/ML11213A002.pdf)  11/08/11  [CN 11-031](http://pbadupws.nrc.gov/docs/ML1131/ML113130061.pdf) | Revised to incorporate feedback associated with Feedback Form No. 71111.19-1549. A four-year historical search for commitments was conducted and no commitments were found. | No | [ML112840030](https://nrodrp.nrc.gov/idmws/ViewDocByAccession.asp?AccessionNumber=ML112840030) |
| N/A | ML13093A416  09/24/14  CN 14-022 | Incorporated ROP Enhancement Initiative Improvements ([ML14017A340](https://nrodrp.nrc.gov/idmws/ViewDocByAccession.asp?AccessionNumber=ML14017A340) & [ML14017A381](https://nrodrp.nrc.gov/idmws/ViewDocByAccession.asp?AccessionNumber=ML14017A381)) | No | [ML14233A107](https://nrodrp.nrc.gov/idmws/ViewDocByAccession.asp?AccessionNumber=ML14233A107) |