

# NRC INSPECTION MANUAL

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## INSPECTION PROCEDURE 71111 ATTACHMENT 19

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### POST-MAINTENANCE TESTING

Effective Date: 01/01/2021

PROGRAM APPLICABILITY: IMC 2515 A

CORNERSTONES:        Initiating Events  
                             Mitigating Systems  
                             Barrier Integrity

INSPECTION BASES:    See IMC 0308, "Reactor Oversight Process Basis Document,"  
                             Attachment 2, "Technical Basis for Inspection Program"

#### SAMPLE REQUIREMENTS:

Sample Requirements		Minimum Baseline Sample Completion Requirements		Budgeted Range	
Sample Type	Section(s)	Frequency	Sample Size	Samples	Hours
Post-Maintenance Test (PMT)	03.01	Annual	20 per site	20 to 28	84 +/- 13 per site
			9 at Vogtle Units 3 & 4	9 to 11 at Vogtle Units 3 & 4	35+/-4 at Vogtle Units 3 & 4

#### 71111.19-01 INSPECTION OBJECTIVE

To confirm that PMT procedures and test activities adequately verify system operability and functionality.

#### 71111.19-02 GENERAL GUIDANCE

Select a reasonable distribution of PMT samples each quarter and on each unit at multiunit sites throughout the year. Performing more PMT samples during refueling outages may be appropriate.

Select PMT activities that affect risk-significant systems or components. The preferred sample candidates are risk-significant systems or components that have experienced recent performance problems or involve complex maintenance.

Sample Candidates	Priority	Example
Systems that the licensee credited as operable or functional that are adversely impacted by failure to adequately test or realign (e.g., remove test equipment)	<p>Select activities with the potential for common-mode failures or systems with a risk achievement worth (RAW)* greater than or equal to 1.3.</p> <p>Select activities with a recent record of maintenance and testing errors.</p> <p>Select activities across technical disciplines (e.g., electrical, mechanical, instrumentation and control)</p> <p>Select activities that are difficult to test at power.</p> <p>Select activities that have undergone a change in work scope or experienced problems.</p>	<p>PMT of the following:</p> <ul style="list-style-type: none"> <li>• online emergency diesel generator engine repairs</li> <li>• newly installed electrical/instrumentation components that control multiple integrated systems (e.g., loss of offsite power and loss-of-coolant accident circuits)</li> <li>• containment air lock leakage</li> </ul>

\* RAW is defined in NUREG-2122, "Glossary of Risk-Related Terms In Support Of Risk-Informed Decisionmaking."

For each sample, conduct a routine review of problem identification and resolution activities using Inspection Procedure (IP) 71152, "Problem Identification and Resolution."

### 71111.19-03 INSPECTION SAMPLES

#### 03.01 Post-Maintenance Test Sample

**Verify that PMT procedures and test activities adequately verify system operability and functionality.**

##### Specific Guidance

- a. For each testing activity selected, identify the affected system(s), component(s), or both and do the following:
  1. Review the 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. Review applicable corrective action and maintenance documents.
  3. If time permits, discuss the maintenance activity with plant personnel to gain insights.

4. If time permits, observe the associated maintenance activity to identify the affected safety function(s).
5. Review the licensee's test procedure, completed maintenance activities, and work orders before observing the PMT to verify the following:
  - (a) The procedure adequately tests the safety function(s) and function(s) important to safety that completed maintenance activities could have affected.
  - (b) Acceptance criteria in the procedure are consistent with information in the applicable licensing-basis and design-basis documents or appropriate standards.
  - (c) The procedure has been properly reviewed and approved.
  - (d) As applicable, operations ensured adequate fill and vent for portions of safety systems potentially drained during the maintenance activity.
- b. Observe prejob briefs, testing, and posttest critiques if time permits. Review the completed test procedure and data, perform a walkdown of the affected work site, and verify the following:
  1. The performance of the affected system(s) and component(s) satisfies the procedure's acceptance criteria.
  2. The scope of the test and its acceptance criteria provide reasonable assurance of system operability or functionality considering the scope of work. For example, the residual heat removal (RHR) system functions under a wide range of pressures. As applicable for the work performed, does the licensee perform the PMT at the highest reasonable pressure for the RHR system component?
  3. The effects of testing on the plant have been adequately addressed.
  4. Test equipment is calibrated and is within its current calibration cycle.
  5. The 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. The test is performed in accordance with the test procedure and other applicable procedures.

For example, during filling and venting operations, look and listen for potential signs of water hammer following pump starts, valve manipulations, or both. Following testing, review operating logs, PMT work orders, and corrective action condition reports for potential adverse conditions caused by the system water hammer. Perform walkdowns to independently verify this condition when appropriate.

9. Quality control hold points that are used to verify quality attributes that cannot be verified later were properly performed, second checked, and documented as appropriate.
  10. Jumpers that are installed and leads that are lifted during testing are appropriately controlled, restored, and removed.
  11. Test equipment is removed after testing.
  12. Electrical connections are secure and maintain their intended design function.
  13. After testing is completed, equipment is returned to the positions/status required to maintain the system in an operable or functional condition 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 are not left adrift where they may impede required system, component, or operator functions.
  16. Problems noted during testing are appropriately documented.
- c. 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 the following:
1. The PMT results are accurate, complete, and valid and have been properly reviewed and accepted.
  2. The PMT adequately tested the safety function(s) and function(s) important to safety considering all completed maintenance activities. Specifically, consider those maintenance activities that could have subsequently disabled functions after completion of the PMT or created the need to perform additional testing.

#### 71111.19-04 REFERENCES

IMC 2515, Appendix A, "Risk-Informed Baseline Inspection Program"

IMC 0308, Attachment 2, "Technical Basis for Inspection Program"

IP 71152, "Problem Identification and Resolution"

NUREG-2122, "Glossary of Risk-Related Terms In Support Of Risk-Informed Decisionmaking"

Cross-Reference of Generic Communications to IP 71111.19 and Inspection Resources:  
<http://drupal.nrc.gov/nrr/oqe/34015> (nonpublic)

Operating Experience Gateway:  
<http://drupal.nrc.gov/nrr/oqe> (nonpublic)

IHS Codes and Standards:

| <https://drupal.nrc.gov/tech-lib/35748> (nonpublic)

U.S. Nuclear Regulatory Commission (NRC) Technical Library:

| <https://drupal.nrc.gov/tech-lib> (nonpublic)

END

Attachment 1  
Revision History for IP 71111.19

Commitment Tracking Number	Accession Number Issue Date Change Notice	Description of Change	Description of Training Required and Completion Date	Comment Resolution and Closed Feedback Form Accession Number (Pre-decisional, Non-Public Information)
	04/03/00 CN 00-003	Initial Issuance.	None	
	<a href="#">ML020400004</a> 1/17/02 CN 02-001	Revision history reviewed for the last four years. Revised resource estimates and inspection level of effort.	None	
	<a href="#">ML11213A002</a> 11/08/11 CN 11-031	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.	None	<a href="#">ML112840030</a>
	<a href="#">ML13093A416</a> 09/24/14 CN 14-022	Incorporated ROP Enhancement Initiative Improvements ( <a href="#">ML14017A340</a> & <a href="#">ML14017A381</a> )	None	<a href="#">ML14233A107</a>
	<a href="#">ML18089A591</a> 06/07/18 CN 18-014	Added guidance to assess system filling, venting, and water hammer. Reformatted the guidance. Eliminate redundancy and improved the guidance for plain writing. Relocated optional requirements to the guidance section to better align with the sample completion requirements in Section 8.04 of Inspection Manual Chapter 2515, "Light-Water Reactor Inspection Program—Operations Phase."	None	<a href="#">ML18094A299</a> 71111.19-2280 <a href="#">ML18109A172</a>
	ML19291A213 10/06/20 CN 20-047	Added AP1000 sample requirements. Updated references.	None	ML19316B055 (2019) ML20233A520 (2020)