

NRC INSPECTION MANUAL

IRIB

INSPECTION PROCEDURE 71111 ATTACHMENT 13

INSPECTABLE AREA: Maintenance Risk Assessments and Emergent Work Control

CORNERSTONES: Initiating Events
Mitigating Systems
Barrier Integrity

EFFECTIVE DATE: January 1, 2016

INSPECTION BASES: Paragraph (a)(4) of 10 CFR 50.65, the Maintenance Rule (MR), requires licensees to assess and manage plant risk related to maintenance activities during all modes of plant operation. Risk is assessed and managed for both scheduled maintenance and emergent work. Risk management minimizes risk-significant configurations and initiating events and maximizes availability of mitigating systems and barriers to radiological releases.

LEVEL OF EFFORT: Sample maintenance activities before commencement, in progress, or completed, as available each calendar quarter. The goal is to inspect 14 to 24 maintenance activities including emergent work control activities in a year. The inspectors should include a mixture of scheduled and emergent work in selecting samples. Samples should take into account the relative plant risk and the prevalent type of work activities at the site. Although the number of required samples is an annual goal, available work activities should be inspected each quarter to ensure a reasonable distribution throughout the year. It is intended that (a)(4) inspection be integrated as much as practicable with other routine monitoring of plant activities and configuration.

71111.13-01 INSPECTION OBJECTIVES

- 01.01 Verification of performance of risk assessments (RAs) for planned or emergent maintenance activities during all modes of plant operation when required by 10 CFR 50.65(a)(4) and licensee procedures.
- 01.02 Verification of adequacy of quantitative, qualitative, or blended RAs for maintenance-related activities in all modes of plant operation, including external events or conditions. For purposes of this inspection procedure (IP), verification is limited to accuracy and

completeness of information considered in the RA and appropriate use of the RA tool or process. External events or conditions that should be considered in RAs include existing or anticipated degradation or loss of offsite power or maintenance activities which could affect offsite power and alternate A/C power sources.

- 01.03 Verification of management of resultant risk, including, as applicable, entry into appropriate licensee-established risk categories or bands, effective implementation of normal work controls or risk management actions (RMAs) in accordance with licensee procedures, and preservation of key safety functions.
- 01.04 Verification of effective planning and controlling of emergent work activities resulting from unforeseen situations, including prompt reassessment of the resultant plant risk and effective management of that risk, and also verification of the timely reassessment of plant risk resulting from changes in external events or conditions.

These external events or conditions would include existing or anticipated changes in offsite power/grid availability or reliability or plant activities or evolutions that could (a) require offsite power, (b) cause a loss or degradation of offsite power, or (c) impact the availability or reliability of alternate onsite A/C power sources (grid-risk-sensitive activities).

- 01.05 Verification of identification and resolution of problems associated with the licensee's implementation of 10 CFR 50.65(a)(4) and emergent work control.

71111.13-02 INSPECTION REQUIREMENTS

02.01 Risk Assessment and Management of Risk.

- a. Risk Assessment Performance. Verify performance of RAs when required by §50.65(a)(4) and in accordance with licensee procedures, prior to changes in plant configuration for maintenance activities, including preventive maintenance, surveillance and testing, (and promptly for emergent work) during all modes of plant operation. Verify RA performance for configuration changes involving structures, systems, or components (SSCs) within the scope of the MR or the licensee-established limited RA scope allowed by §50.65(a)(4) with emphasis on higher-safety/risk-significant configurations. For emergent work, verify that the licensee performs the RA (to the extent practicable and commensurate with safety) before changing the plant configuration further, but in any case, promptly and to the extent practicable concurrently with, but without delaying, plant stabilization and restoration. **Verify by walkdowns that work activities do not introduce new configuration risk, such as breaching fire, flooding or security barriers, blocking sprinklers, fire hose stations or security response equipment, or introduce temporary systems that create flooding hazards or violate electrical separation, etc.**
- b. Risk Assessment Adequacy. Verify the accuracy and completeness of the information considered in the RA. Verify the appropriate use of the licensee's RA tool, i.e., that the

licensee uses it a manner consistent with (1) its capabilities and limitations, (2) plant conditions and evolutions, (3) external events and containment status, and (4) licensee procedures. Engage the licensee when necessary to have inadequate RAs promptly and correctly re-performed. For completed work for which the normal plant configuration has been restored, an omitted (or inadequate) RA may still need to be performed (or re-performed correctly) by the licensee (or the configuration in question evaluated independently by the NRC if possible) in order to determine the associated change in plant risk for significance determination purposes.

- c. Risk Management. Verify that the licensee recognizes, and/or enters as applicable, the appropriate licensee-established risk category or band according to RA results and licensee procedures. Verify that normal work controls or risk management actions (RMAs) as required are promptly and effectively implemented commensurate with the risk band in effect and in accordance with licensee procedures. **Verify that risk management actions are effectively implemented in the plant, and remain implemented over the course of the period intended.** Verify that the key safety functions for the plant mode of operation are preserved. Re-verify implementation of RMAs (or different RMAs) that may now be required by licensee procedures following performance (or re-performance) of previously omitted (or inadequate) RAs.

02.02 Emergent Work Control.

- a. During emergent work (combined with scheduled work in progress or alone), verify that the licensee takes actions to minimize the probability of initiating events, maintain the functional capability of mitigating systems and maintain barrier integrity.
- b. Review emergent work-related activities such as troubleshooting, work planning and scheduling, establishing plant conditions and aligning equipment, tagging (clearances), temporary modifications and equipment restoration to ensure that the plant is not placed in an unacceptable configuration (including violation of Technical Specifications).

02.03 Problem Identification and Resolution. Verify that the licensee is identifying problems with maintenance-related risk assessment and management and emergent work control and entering them in the corrective action program. For a sample of significant problems documented in the corrective action program, verify that the licensee has identified, implemented, and resolved appropriate corrective actions in a timely manner. See Inspection Procedure 71152, "Identification and Resolution of Problems," for additional guidance.

71111.13-03 INSPECTION GUIDANCE

General Guidance

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. Vertical slice is not required for completion of this IP.

03.01 Risk Assessment and Management of Risk.

This inspection should be implemented in conjunction with IMC 2515, Appendix D, "Plant Status." During routine plant tours and plant status assessments, inspectors should look for potential activities that may create plant risk that may not have been fully evaluated. If the potential activity can be used as a sample, recommend performing one sample per quarter.

This inspection is intended to be performance based and risk informed. It is expected to be initiated only in response to plant configuration changes associated with actual scheduled and emergent maintenance activities, including ones that are planned, in progress, or have been completed. Emphasis should be on the higher risk-significant configurations/SSCs. It is not the intent of this procedure to perform a programmatic review of the licensee's §50.65(a)(4) program or to address those instances in which plant configuration is changed for non-maintenance purposes. In-depth examination of (1) the limited scope or the risk-informed evaluation process used to develop it, (2) the licensee's RA tool(s) or process(es) themselves, and (3) licensee risk bands or categories and RMAs is reserved for supplemental inspection by regional and/or headquarters inspectors and senior reactor analysts (SRAs) under IP 62709, "Configuration Risk Assessment and Risk Management Process."

To the extent practicable, the inspection activities prescribed by this IP should be integrated with the resident inspector's routine monitoring of plant activities and configuration.

The plant configuration changes to be inspected are those involving SSCs within the scope of the maintenance rule (or the limited scope as allowed by 10 CFR 50.65(a)(4)) and certain other risk-significant SSCs.

The significance of findings resulting from performance of this IP will be determined with the Reactor Safety Significance Determination Process (SDP) of NRC Inspection Manual Chapter 0609. The need for supplemental inspection will be determined on the basis of the requisite non-green findings in accordance with the NRC Reactor Oversight Program (ROP). Use of the Reactor Safety SDP for §50.65(a)(4) findings subsumes defining "planned maintenance" as scheduled or emergent, but properly risk-assessed and risk-managed in accordance with (a)(4).

Before performing this procedure, the inspector should develop an understanding of the licensee's program for conducting risk assessments and managing risk and become familiar with the associated procedures. Note that while it is not within the scope of this inspection to perform a programmatic review of the licensee's (a)(4) procedures, it would be appropriate to question and bring to the licensee's attention anything in the procedures discovered in the course of this familiarization that is not clear or appears to be incorrect.

03.02 Emergent Work Control.

For emergent work activities, inspectors should verify that the licensee is following the work schedule/work plan and has taken precautions to preclude affecting adjacent SSCs. Observe equipment lineups and tagging when potential errors could affect other operating systems. When appropriate, verify that redundant components are maintained in an operable status. See Baseline Inspection Procedure 71111.04, "Equipment Alignment," for additional guidance. The inspector should consider if potential maintenance errors could initiate an event or affect defense-in-depth when selecting work activities to review. When work activities involve safety significant part replacements, an inquiry into the part(s)' commercial grade dedication may add value. The review should be limited to emergent work activities that could cause an initiating event to occur or affect the functional capability of mitigating systems and barrier integrity.

03.03 Problem Identification and Resolution. No guidance is provided in this procedure.

71111.13-04 RESOURCE ESTIMATE

The annual resource expenditure for this inspection procedure is estimated to take 80 to 100 hours.

71111.13-05 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 inspecting 14 maintenance activities including emergent work control activities in a year per site.

71111.13-06 REFERENCES

NOTE: Please refer to <http://www.nrc.gov/reactors/operating/ops-experience/maintenance-effectiveness.html> for electronic versions of selected references in this section.

Section 50.65 of Part 50 of Title 10 of the *Code of Federal Regulations* (10 CFR 50.65), "Requirements for Monitoring the Effectiveness of Maintenance at Nuclear Power Plants"

Regulatory Guide 1.160, **Rev. 3**, "Monitoring the Effectiveness of Maintenance at Nuclear Power Plants" (**ML113610098**)

Regulatory Guide 1.187, "Guidance for Implementation of 10 CFR 50.59, Changes, Tests and Experiments," November 2000

The Nuclear Energy Institute's (NEI's), NUMARC 91-06, "Industry Guidelines for Shutdown Operations"

NUMARC 93-01, Revision 4A, "Industry Guideline for Monitoring the Effectiveness of Maintenance at Nuclear Power Plants" (ML11116A198)

NEI 96-07, Revision 1, "Guidelines for 10 CFR 50.59 Implementation," November 2000

Inspection Procedure 71111.04, "Equipment Alignment"

Inspection Procedure 71111.19, "Post Maintenance Testing"

Inspection Procedure 71111.20, "Refueling and Outage Activities"

Inspection Procedure 71152, "Identification and Resolution of Problems"
Supplemental Inspection Procedure 62709, "Configuration Risk Assessment and Risk Management Process"

NRC Inspection Manual Chapter 0609, "Significance Determination Process"

NRC Inspection Manual Chapter 2515, Appendix D, "Plant Status"

NRC Information Notice 2000-13, "Review of Refueling Outage Risk," dated September 27, 2000

NRC Generic Letter 2006-02, "Grid Reliability and the Impact on Plant Risk and the Operability of Offsite Power"

END

ATTACHMENT 1
Revision History for IP 71111.13

Commitment Tracking Number	Accession Number Issue Date Change Notice	Description of Change	Description of Training Required and Completion Date	Comment and Feedback Resolution Accession Number (Pre-Decisional, Non-Public)
N/A	3/13/2007	Revision history reviewed for the last four years - no generic requirements incorporated during this period.	None	N/A
[C1] SRM M050426	03/23/07 CN 07-011	This IP is revised to incorporate inspections for the offsite power system and the alternate AC power source.	Yes 12/13/2006	ML070680061
N/A	01/31/08 CN 08-005	This IP is revised to incorporate results of the ROP realignment in 2007, the references were updated to reflect the deletion of TI 2515/165 in CN 07-28 and minor typographical errors were corrected.	None	N/A
N/A	11/16/09 CN 09-027	This IP is revised to incorporate results from the ROP realignment in 2009. Recommendations from ROPFF 71111.13-1360 and 71111.12-1407 were also added. The table in the General Guidance section was deleted and editorial corrections were made.	None	ML093010336
N/A	ML11201A172 CN 11-025 10/28/11	This revision modifies the resource estimate to reflect the 2011 ROP Realignment.	None	

Commitment Tracking Number	Accession Number Issue Date Change Notice	Description of Change	Description of Training Required and Completion Date	Comment and Feedback Resolution Accession Number (Pre-Decisional, Non-Public)
N/A	ML15023A099 02/03/16 CN 16-005	Revision 3 to RG 1.160 and Revision 4A to NUMARC 93-01 were recently issued. IP 71111.12 has been revised to update references to the new revision numbers. Changes made in accordance with ROP Enhancement Project (see ML14017A381).		ML16007A383 71111.13-1951 ML16033A375 71111.13-2135 ML16033A384

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