

ATTACHMENT 71111.04

INSPECTABLE AREA: Equipment Alignment

CORNERSTONES: Initiating Events
Mitigating Systems
Barrier Integrity

INSPECTION BASES: Systems or components that are not properly aligned can lead to the initiation of an event and can impact the availability and functional capability of plant equipment, thereby significantly increasing the overall risk to the plant. Inspection activities would normally be performed following emergent work activities and planned removal of risk-significant systems for online maintenance.

LEVEL OF EFFORT: Conduct approximately three risk-significant system partial walkdowns per calendar quarter and one complete risk-significant system walkdown **semiannually**. The goal is to perform 12-16 partial walkdowns and 2 complete walkdowns per **calendar** year, depending on the number of reactor units at a given site. Unit differences at a particular site may necessitate more walkdowns to adequately complete **site specific** inspection objectives at each unit.

71111.04-01 INSPECTION OBJECTIVES

01.01 To verify equipment alignment and identify any discrepancies that impact the function(s) of the system and, therefore, potentially increase risk.

01.02 To verify that the licensee has properly identified and resolved equipment alignment problems that could cause initiating events or impact the availability and functional capability of mitigating system or barrier.

71111.04-02 INSPECTION REQUIREMENTS

Inspectors **shall** perform approximately three partial walkdown inspections each calendar quarter to verify the operability of a redundant or backup system/train or a remaining operable system/train with a high risk significance for the current plant configuration (considering out-of-service (OOS), inoperable, or degraded condition); or a risk-significant system/train that was recently realigned following an extended system outage, maintenance, modification, or testing; or a risk-significant single-train system. This inspection activity **shall** be performed during both shutdown and operating conditions.

Inspectors **shall** perform one complete walkdown **semiannually**. **One of the two annual complete walkdowns must be on a mitigating system.**

02.01 Partial Walkdown

- a. Select a redundant or backup system/train or a remaining operable system/train with a high risk significance for the current plant configuration (considering OOS, inoperable, or degraded condition); or a risk-significant system/train that was recently realigned following an extended system outage, maintenance, modification, or testing; or a risk-significant single-train system.
- b. Review documents to determine the correct system lineup. Consider plant procedures, including abnormal and emergency operating procedures, **updated final safety analysis report, technical manuals,** and drawings.
- c. Verify that the critical portions of the selected system/train are correctly aligned, and identify any discrepancies.

02.02 Complete Walkdown

- a. **Select a system to walkdown based on risk-informed insights from site-specific risk studies together with other factors, such as engineering analysis and judgment, operating experience, performance history, current plant mode, and/or previous walkdowns. One walkdown must be performed on a mitigating system every calendar year.**
- b. Review documents to determine the correct system lineup. Consider plant procedures, including abnormal and emergency operating procedures, drawings, the updated final safety analysis report, and vendor manuals.
- c. Review any outstanding maintenance work requests on the system/train and any deficiencies that could affect the ability of the system to perform its function(s).
- d. Review any outstanding design issues, including temporary modifications, operator workarounds, and items that are tracked by the engineering department.
- e. Perform the walkdown inspection. Identify any discrepancies between the existing alignment of the system equipment and the correct alignment. Use the following examples to identify items to review during the walkdown.
 1. Valves are correctly positioned and do not exhibit leakage that would impact the function(s) of any given valve.
 2. Valves are locked as required by the licensee's locked valve program.
 3. Electrical power is available as required.
 4. Major system components are correctly labeled, lubricated, cooled, ventilated, etc.
 5. Hangers and supports are correctly installed and functional.
 6. Essential support systems are operational.
 7. Ancillary equipment or debris does not interfere with system performance.
 8. Tagging clearances are appropriate.

02.03 Problem Identification and Resolution

- a. If an equipment alignment problem occurs or the inspector becomes aware of a significant equipment alignment problem that affects the ability of a mitigating system or barrier to perform its function(s), perform additional review to determine if the problem is accurately described and classified in the licensee’s corrective action program.
- b. During each complete system walkdown inspection, sample the licensee’s corrective action program records to verify that the licensee is identifying equipment alignment problems at an appropriate threshold and evaluate their resolution. This review includes equipment alignment problems for all risk-significant systems and is not restricted to the system being inspected. See Inspection Procedure (IP) 71152, “**Problem** Identification and Resolution,” for additional guidance.
- c. Follow up on any equipment alignment problems that have been identified during daily plant tours and control room walkdowns performed using Inspection Manual Chapter (IMC) 2515, Appendix D, “Plant Status.” The objective of this followup is to determine if the problem is accurately described and classified in the licensee’s corrective action program.

71111.04-03 INSPECTION GUIDANCE

General Guidance

Inspection findings that affect risk involve equipment alignment problems that could cause an initiating event or impact the function(s) of a mitigating system or barrier (e.g., valves misaligned in the suction, discharge, or recirculation flowpaths, or an alternate electrical alignment that could affect the system function(s) under certain accident sequences). Such findings exclude minor alignment problems (e.g., valves misaligned in drain or vent paths that do not affect the system function(s)).

Note that the most risk-significant system may not be the redundant or backup train; (for example, the most risk-significant system could be the electrical bus that provides power to the redundant or backup train). Also, risk insights might be available regarding the initiating events of greatest significance for the given plant equipment configuration. Such insights might be used to assess the licensee’s awareness of the need for compensatory measures pursuant to 10 CFR 50.65(a)(4). Refer to IP 71111.13, “Maintenance Risk Assessments and Emergent Work Control,” for more information.

The following table provides general inspection guidance to assist inspectors in selecting inspection activities to achieve each cornerstone objective and to identify those activities that have a risk priority.

Cornerstone	Inspection Objective	Risk Priority	Example
Initiating Events	Identify any equipment alignment discrepancies that could result in a risk-	Shutdown - Equipment lineups during special tests or evolutions	System lineups during PWR mid-loop operation or BWR vessel draindown.

Cornerstone	Inspection Objective	Risk Priority	Example
Initiating Events	significant initiating event and impact the availability and functional capability of plant equipment.		Misalignment of electrical equipment during shutdown could cause LOSP and affect decay heat removal.
Mitigating Systems	Identify any equipment alignment discrepancies that could impact the availability and functional capability of a risk-significant mitigating system.	Operating - Equipment lineups following system restoration or equipment lineups that support another alternate system/train when a Maintenance Rule system is OOS.	Safety trains on the remaining emergency bus when one EDG is OOS or failed.
		Shutdown - Equipment lineups that affect shutdown risk or equipment lineups that support another alternate system/train when Maintenance Rule system is OOS.	Safety trains on the remaining emergency bus when one EDG is OOS or failed.
Barrier Integrity	Identify any equipment alignment discrepancies that could degrade the integrity of the fuel barrier, reactor coolant system, or containment.	Operating - Fuel cladding degradation can result from both inadequate human and equipment performance. Reactivity control systems must be properly configured to prevent and/or mitigate adverse reactivity transients and neutron flux distributions.	Verify reactivity control systems (e.g., control rod drives, rod block monitors, rod worth minimizers, etc.). Verify that operation of containment isolation valves, such as containment purge valves, is consistent with the technical specifications and/or licensing basis.

Cornerstone	Inspection Objective	Risk Priority	Example
Barrier Integrity		Shutdown - Equipment lineups that affect RCS inventory and containment	<p>Verify containment configuration during risk-significant evolutions (e.g., PWR mid-loop operation, BWR cavity draindown).</p> <p>Ensure provisions for achieving containment closure in a timely manner during periods when the containment is permitted to be open.</p>

Specific Guidance

03.01 and 03.02 No specific guidance provided.

03.03.a The intent of paragraph 02.03.a is to ensure that the licensee's corrective action program accurately classifies and describes any and all equipment alignment problems that have affected or could potentially affect the ability of a mitigation system or barrier to perform its function(s). The licensee is expected to take the appropriate immediate and long-term corrective actions to address equipment alignment issues in a timely manner commensurate with their risk.

Although the inspector can select a system that has recently been identified as exhibiting an equipment alignment problem as one of the systems on which to perform the partial or full system walkdowns, such decisions should be founded on the inspector's determination that an additional equipment alignment inspection by the resident inspector staff is warranted, given the risk associated with the misalignment or the inadequate quality of the licensee's response to and resolution of the equipment alignment issue.

71111.04-04 RESOURCE ESTIMATE

The annual resource expenditure for this inspection procedure is estimated to be 68 to 92 hours to conduct partial and full system walkdowns at a site regardless of the number of reactor units at that site.

71111.04-05 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 14 samples representing 12 partial system walkdowns and 2 complete system walkdowns in a year.

71111.04-06 REFERENCES

| Inspection Procedure 71152, “**Problem** Identification and Resolution”

Inspection Procedure 71111.13, “Maintenance Risk Assessments and Emergent Work Control”

END

Attachment 1 - Revision History for IP 71111.04

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	711111.01 has been issued to provide the minimum inspection oversight for determine the safety performance of operating nuclear power reactors.	No	
N/A	01/17/02 CN 02-001	IP 71111.04 has been revised to provide clarifications to the inspection requirements concerning partial walkdowns and identification and resolution of problems. In addition, inspection resource estimates and level of effort are revised to provide a band for more inspection flexibility.	No	
N/A	ML070370430 02/27/07 CN 07-007	IP 71111.04 has been revised to address feedback form 71111.04-721 to clarify the wording in the Inspection Requirements section to address systems of high risk significance. Revision history reviewed for the last four years.	No	
N/A	ML11201A173 10/28/11 CN 11-025	The sample size for IP 71111.04 has been revised to reflect the 2011 ROP Realignment.	No	
N/A	ML13025A338 04/24/13 CN 13-012	Revised to allow the flexibility to perform one of the two complete system walkdowns outside of the mitigating systems cornerstone.	No	ML13060A500 FF 71111.04-1856