

NRC INSPECTION MANUAL

IRIB

INSPECTION PROCEDURE 71111

REACTOR SAFETY - INITIATING EVENTS, MITIGATING SYSTEMS, BARRIER INTEGRITY

Effective Date: January 1, 2023

PROGRAM APPLICABILITY: IMC 2515 A

71111-01 INSPECTION OBJECTIVE

01.01 To **independently verify that** licensee performance meets the following cornerstone objectives:

- **Initiating Events:** To limit the frequency of those events that upset plant stability and challenge critical safety functions, during a shutdown as well as power operations.
- **Mitigating Systems:** To ensure the availability, reliability, and capability of systems that mitigate initiating events to prevent reactor accidents.
- **Barrier Integrity:** To ensure that physical barriers protect the public from radionuclide releases caused by accidents.

71111-02 INSPECTION REQUIREMENTS

02.01 Reactor Safety Baseline Inspection Attachments

Plan and perform inspections in accordance with the following attachments to this procedure:

Attachment 01:	Adverse Weather Protection
Attachment 02:	(Reserved)
Attachment 03:	(Reserved)
Attachment 04:	Equipment Alignment
Attachment 05:	Fire Protection
Attachment 06:	Flood Protection Measures
Attachment 07:	Heat Exchanger /Sink Performance
Attachment 08:	Inservice Inspection Activities
Attachment 09:	(Reserved)
Attachment 10:	(Reserved)
Attachment 11:	Licensed Operator Requalification Program and Licensed Operator Performance
Attachment 12:	Maintenance Effectiveness
Attachment 13:	Maintenance Risk Assessments and Emergent Work Control
Attachment 14:	(Reserved)
Attachment 15:	Operability Determinations and Functionality Assessments

Attachment 16:	(Reserved)
Attachment 17:	Evaluations of Changes, Tests, and Experiments (INACTIVE)
Attachment 18:	Plant Modifications
Attachment 19:	Post-Maintenance Testing (INACTIVE)
Attachment 20:	Refueling and Other Outage Activities
Attachment 21M:	Comprehensive Engineering Team Inspection
Attachment 21N:	Fundamental Engineering Inspection
Attachment 21N.01:	(Reserved)
Attachment 21N.02:	Design-Basis Capability of Power-Operated Valves Under 10 CFR 50.55A Requirements
Attachment 21N.03:	Commercial Grade Dedication
Attachment 21N.04:	Age-Related Degradation
Attachment 21N.05:	Fire Protection Team Inspection
Attachment 22:	Surveillance Testing (INACTIVE)
Attachment 23:	(Reserved)
Attachment 24:	Testing and Maintenance of Equipment Important to Risk

Each inspection procedure (IP) attachment lists the applicable cornerstones.

02.02 Problem Identification and Resolution (PI&R).

In accordance with IP 71152, "Problem Identification and Resolution," all baseline inspection procedures include verification that licensees identify issues at an appropriate threshold and enter them into their PI&R program. Inspectors may follow-up on PI&R issues as part of the baseline IP sample selection to verify the licensee's corrective actions were complete and effective. Additional guidance can be found in the individual IP attachments and in IP 71152.

02.03 Review of Third-Party Evaluations.

As they occur, review significant site-specific Institute of Nuclear Power Operations (INPO) and similar independent, third-party evaluation reports in accordance with OEDO Procedure – 0220, "Coordination with the Institute of Nuclear Power Operations (INPO)." Document the review in accordance IMC 0611, "Power Reactor Inspection Reports."

71111-03 INSPECTION GUIDANCE

General Guidance

Applicable Performance Indicators:

The inspections conducted under this procedure provide information on licensee performance in areas that are not measured by the following performance indicators (PIs): unplanned scrams, unplanned power changes, and unplanned scrams with complications (Initiating Events); safety system functional failures and mitigating system performance indices (Mitigating Systems); and reactor coolant system (RCS) specific activity and RCS identified leak rate (Barrier Integrity). In fulfilling the inspection requirements of the attachments, the inspector needs to exercise care to not spend time inspecting activities or characteristics that are already covered by a PI, although the PI verification procedure IP 71151, "Performance Indicator Verification" does gather such information.

Risk-Informed Inspection Planning:

This section provides guidance on the risk-informed aspect of planning the performance-based inspections in the baseline inspection program.

In accordance with NRC Commission Policy, a “risk-informed” approach to regulatory decision-making represents a philosophy whereby “risk insights” are considered together with other factors to establish requirements that better focus licensee and regulatory attention on design and operational issues commensurate with their importance to public health and safety. This Policy defines the term “risk insights” as the results and findings that come from risk assessments. It is in this context that the terms “risk-informed” and “risk insights” are used in the following discussion of risk-informed inspection planning and in the determination of what to inspect using a risk-informed approach.

Risk-informed inspection planning (i.e., the selection of risk-informed inspection samples) is based on the following:

- Extracting risk insights from a risk model;
- Using these insights to select structures, systems, components (SSCs), and activities for inspection; and
- Using insights from plant-specific and industry operational experience to add SSCs into the inspection sample.

Frequently used risk insights for inspection planning can be obtained from the site-specific Plant Risk Information Book (PRIB), the site-specific Standardized Plant Analysis Risk (SPAR) model, the internal (non-public) NRC SPAR Dashboard ([SPAR-DASH](#)), and licensee generated risk models and insights. NRC inspectors can install and use SAPHIRE application for review the SPAR model and related analyses. Typical risk insights for inspection planning include:

- lists of dominant accident sequences and their contribution to core damage frequency (CDF) and large early release frequency (LERF),
- lists of accident initiators, components, systems, and operator actions ranked by importance measures, such as Risk Achievement Worth (RAW), Risk Reduction Worth (RRW), Birnbaum, Fussell-Vesely (F-V),
- lists of accident sequence cutsets and system level cutsets (useful for if the inspector wants to review the Probabilistic Risk Assessment (PRA) model in detail), and
- lists of potential severe-accident vulnerabilities.

These risk insights are useful in selecting SSCs for inspection but should be informed by site-specific conditions and activities. As plant configurations change from online maintenance or plant modifications, the relative importance of an SSC or an accident sequence may change. Plant risk can change dynamically based on operational activities and ongoing maintenance; therefore, inspection planning needs to be flexible and consider changes in SSC importance for inspection priority.

In addition to the frequently used risk insights listed above, the following items are considered general guidance for developing and using other risk insights throughout the inspection process.

- Inspectors should consider the inputs to the Significance Determination Process (SDP) throughout the inspection process, both planning and implementation. For example, the SDP screens as very low significance (green) inspection findings that affect only one train of mitigating system for a single initiating event. Therefore, inspectors should consider planning inspections that target combinations of SSCs that are related within an accident sequence and affect more than one train.
- Inspectors should consider the SDP during plant status tours (IMC 2515, Appendix D) to identify potential **inspection samples** (i.e., single train failure during testing), and plan inspections **with considerations** to SDP Phase 1 screening criteria.

Specific Guidance

03.01 Reactor Safety Baseline Inspection Attachments.

Once or twice a year, inspectors should consider conducting a “vertical slice” to review work activities on safety-significant systems in order to assess how different aspects of the licensee’s processes work effectively together. A “vertical slice” review is a focused integrated sampling of a particular licensee work activity or system using a selection of the following baseline inspection procedures:

- IP 71111.04, “Equipment Alignment”
- IP 71111.12, “Maintenance Effectiveness”
- IP 71111.13, “Maintenance Risk Assessments and Emergent Work Control”
- IP 71111.15, “Operability Determinations and Functionality Assessment”
- IP 71111.18, “Plant Modifications”
- IP 71111.24, “Testing and Maintenance of Equipment Important to Risk”
- IP 71152, “Problem Identification and Resolution”

03.02 Problem Identification and Resolution (PI&R).

The inspector should use the guidance in IP 71152, “Problem Identification and Resolution,” and IMC 2515, Appendix A, when verifying the effectiveness of corrective actions.

03.03 Review of Third-Party Evaluations.

IMC 0611 provides guidance on documenting the NRC review of INPO evaluations, accreditations reports, or other third-party reviews. NRC personnel should not take possession of INPO evaluation documents, make copies for NRC internal distribution absent extraordinary circumstances, or use these documents to form a basis for regulatory action. Inspectors should normally review hardcopies of INPO evaluations on licensee-owned property outside of the Resident Inspector’s Office or electronically using the licensee’s information system to preclude taking possession of confidential commercial information. These restrictions do not apply to INPO Event Reports (IER) or INPO Significant Event Evaluation and Information Network (SEE-IN) reports, which are covered in the NRC/INPO Memorandum of Agreement and are available on the NRC’s intranet.

71111-04 REFERENCES

OEDO Procedure – 0220, “Coordination with the Institute of Nuclear Power Operations (INPO)”

IMC 0609, “Significance Determination Process”

IMC 0611, “Power Reactor Inspection Reports”

IMC 2515, Appendix A, “Risk-Informed Baseline Inspection Program”

IMC 2515, Appendix D, “Plant Status”

IP 71151, “Performance Indicator Verification”

IP 71152, “Problem Identification and Resolution”

Memorandum of Agreement Between Institute of Nuclear Power Operations and the U.S.
Nuclear Regulatory Commission ([ML20125A374](#))

END

Attachment 1: Revision History for IP 71111

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 Issue	None	
N/A	12/11/00 CN 00-024	Revised to add requirements and guidance for reviewing major INPO reports to satisfy EDO Field Policy Manual on the topic. Guidance was also added about using SDP, when applicable, to evaluate the significance of INPO findings. No change in IP resources or effort.	None	N/A
N/A	05/06/03 CN 03-015 ML031550187	Revised to include pilot program procedure attachments developed to consolidate baseline inspection procedures. This pilot program will be implemented at two power reactor sites in each region for a period of one year.	None	N/A
N/A	05/16/08 CN 08-015 ML080701033	This document is being revised to reflect changes resulting from the 2007 ROP Realignment, update the list of performance indicators, and remove reference to a pilot program that was conducted in 2003. Completed 4-year historical CN search.	None	N/A
N/A	10/28/11 CN 11-025 ML111511016	Added a reference to OEDO-0220 which contains additional guidance and direction for the review of INPO reports. Added additional guidance related to protection of confidential commercial information. This resolves FF 71111-1674.	None	ML112140265

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)
N/A	ML22221A227 10/13/22 CN 22-022	Five-year review. IP Attachments updated to reflect current baseline inspection program. References updated to reflect changes since last update.	None	ML22242A144 FBF 71111-2323 ML22221A226