
INSPECTION MANUAL CHAPTER 2515 APPENDIX D

PLANT STATUS

Effective Date: 01/01/2023

2515D-01 PURPOSE

Resident inspectors (RIs) have a specific responsibility, outside of direct inspection activities, to be aware of plant conditions on a routine basis. This appendix provides guidance regarding these plant status activities at light water reactors in the operations phase.

2515D-02 OBJECTIVES

- 02.01 To ensure that inspectors are routinely aware of emergent plant issues, potential adverse trends, current equipment problems, and ongoing activities, including their impact on plant risk.
- 02.02 To monitor security-related systems structures and components (SSCs).
- 02.03 To monitor the licensee's management of fatigue under 10 CFR 26, "Fitness for Duty Programs."
- 02.04 To conduct the routine review of licensee's problem identification and resolution (PI&R).
- 02.05 To provide guidance on when to transition to direct inspection activities.

2515D-03 APPLICABILITY

See section 2515-03 of Inspection Manual Chapter (IMC) 2515, "Light-Water Reactor Inspection Program – Operations Phase."

2515D-04 RESPONSIBILITIES AND AUTHORITIES

See section 2515-05 of IMC 2515, "Light-Water Reactor Inspection Program – Operations Phase."

2515D-05 REQUIREMENTS

See section 2515-11 of IMC 2515, "Light-Water Reactor Inspection Program – Operations Phase."

06.01 Transition to Baseline Inspection

RIs should transition into the appropriate inspection procedure whenever their effort shifts from collecting status information to evaluating a potential inspection issue. Specific issues identified during tours of the licensee facility can be referred to regional specialists for follow-up inspection(s) as appropriate (e.g., security issues to regional security inspectors). The inspector should transition into the appropriate inspection procedure if the information collection activity will exceed about 1/2 hour for any single issue. Scope of activities conducted under the Plant Status procedure does not require documentation in inspection reports.

06.02 Control Room Walkdown

The purpose of the control room walkdown is to help enable the inspector to stay current of plant status as well as to identify unexpected plant conditions that warrant additional inspection under the baseline inspection program.

See Inspection Procedure (IP) 71153, "Event Follow-up," appendix B, for guidance on NRC inspector conduct while in the control room during events in order to preclude NRC intrusion in licensee response activities.

Examples of items for which inspectors should identify during control room walkdowns may include:

- a. Look for system components that are in unexpected configurations or parameters that are at unexpected values based on the operational mode of the plant
- b. Identify any alarming or locked-in annunciator conditions.
- c. As available, discuss plant status with control room operators.
- d. Note whether any adverse plant parameter trends exist (e.g., unidentified and identified leakage, RCP seals, SRV tailpipe temperatures, etc.); determine whether the licensee is aware of the trends.
- e. Identify the major plant schedule items for the day. Note whether the plant risk model reflects the current plant configuration. Transition to IP 71111.13, "Maintenance Risk Assessments and Emergent Work Control," as appropriate.
- f. Identify whether the plant is in any technical specification (TS) limiting conditions for operation (LCOs), whether the TS action statements are being met, and those TS requirements and license conditions are being met.
- g. Determine if the licensee is operating with multiple, repetitive, or unplanned TS action statement entries caused by degraded equipment conditions; that they are assessing and managing the risk associated with this condition in accordance with licensees' procedures; and that the issue associated with the degraded equipment conditions is entered into the corrective action process.
- h. Determine if the licensee is operating within licensed power levels. Guidance for evaluating brief power level fluctuations above 100% is given in NRC Regulatory

Issue Summary (RIS) 2007-21, "Adherence to Licensed Power Limits," Revision 1 (ML090220365).

- i. Any radiation dose implications associated with repetitive tasks should be reviewed by applicable radiation safety baseline IPs. In the control room or other appropriate locations, review visible portions of radiation monitors or other indications that could provide indication of an apparent uncontrolled release.
- j. Observe equipment and / or operator actions for open phase condition monitoring as specified by licensee commitments or NRC requirements. Additional guidance for open phase condition monitoring exists in IP 71111.04, "Equipment Alignment."
- k. Maintain awareness of the local weather forecast and any impacts on plant configuration and operation. Transition to IP 71111.01, "Adverse Weather Protection," as appropriate.

Review control room logs, equipment out-of-service or clearance logs, compensatory action logs, TS logs, chemistry logs, standing orders, and night orders several times each week to become aware of potential risk-related problems that occurred since the previous review. Licensees may refer to compensatory actions as Operator Work Arounds, Operator Burdens, etc. Determine whether the logs appropriately reflect the plant status observed during the control board walkdown and whether TS requirements are being met. A review of the operator shift logs and standing orders may provide insights regarding equipment operability. Pursue any operability or functionality concerns using IP 71111.15, "Operability Determinations and Functionality Assessments."

Report primary-to-secondary leakage in steam generators greater than three gallons per day to NRC headquarters staff. For additional information on the reporting guidance, see section 07.05 of IMC 0327, "Steam Generator Tube Primary-To-Secondary Leakage."

If the licensee documents waivers of work-hour controls in the control room logs or shift manager logs, then periodically review the waiver(s) to determine that the granting of the waiver(s) addressed circumstances that could not have been reasonably controlled. If further inspection guidance is needed then IP 93002, "Managing Fatigue," may be referenced on an "as needed" basis.

To ensure that the licensee properly monitors for Reactor Coolant System (RCS) pressure boundary leakage or potential unidentified leakage exceeding TS limit, attachment 1, "Reactor Coolant System (RCS) Pressure Boundary Leakage Monitoring," provides guidance for the inspector when conducting control room tours and reviewing logs. Ensure licensees are monitoring and trending unidentified leak rates; particularly changes in unidentified leakages, but also monitors other containment parameters such as containment sump in-leakage rates, the containment air/gaseous radiation monitor indication, the containment particulate radiation monitor indication, and the containment humidity indication to validate potential RCS leakage trends. Attachment 1 specifies inspector action levels and expectations for adverse RCS leakage trends.

06.03 Status Meetings

Select and attend licensee meetings, on a routine basis, that provide an overall status of the plant and pertinent ongoing activities. These meetings could include the licensee's plan of the day meeting, shift turnover meeting, emergent work meeting, equipment

prioritization meeting, and PI&R document review meetings. Note that during or in preparation phases of the plant refueling or maintenance outages, licensees may conduct additional meetings and staff additional information centers such as the outage control center. Inspectors should attend these meetings to understand the scope, schedule, and risk-significant activities of these outages. This will enable the inspectors to plan and implement applicable baseline inspection procedures that needed an outage.

The purpose of attending the status meetings is to gather information about overall site activities in order to determine what activities will be or are being conducted so that inspection resources can be appropriately focused on those activities with the higher risk significance.

06.04 Plant Tours

On a regular basis, tour accessible areas of the plant containing risk-significant SSCs, areas that contain significant radiological hazards, and areas with important security SSCs. Focus on areas of the plant that inspectors have not entered while performing other inspections. The frequency of the plant status review effort should be risk informed and determined by the inspector based on current plant conditions and activities. Inspectors should use plant-specific risk information to determine what SSCs and activities are of higher risk significance given the present plant configuration.

Resident Inspectors should periodically (once a quarter) conduct tours of security-related areas in order to identify any security-related issues which may warrant follow-up by region-based security inspectors. Section 06.05 has further guidance on reactor safety/security interface and IMC 2201, "Security Inspection Program for Operating Commercial Nuclear Power Reactors," has guidance for resident tours.

Inspectors should coordinate with the licensee to tour normally inaccessible areas when they become accessible to assess the material condition and status of SSCs. While some areas not normally accessible might be obvious such as heater bays in BWRs, other areas may take additional effort to identify and plan for a tour (such as essential service water, radwaste vaults, and outdoor underground vaults that contain risk-significant SSCs). The inspectors should review and discuss areas not normally accessible with the licensee to ensure the inspectors are aware of their existence (some areas may not be obvious) and plan logistics such as ensuring advance notification of when they will be accessible, if appropriate, and any special arrangements needed for entry (i.e., special training for fall protection or confined space entry). The inspectors can also review the results of licensee's direct observations (video movies, and digital photographs) when direct inspections by inspectors were not possible or if other factors such as personnel safety or the radiation levels in the area to be inspected warrant use of licensee's direct observations. It is not the intent of this guidance to force licensees to make every not normally accessible area of the plant accessible for NRC inspection or to place RIs in harm's way unnecessarily.

During changing plant conditions (plant refueling or maintenance outages), the frequency and scope of plant status tours may be increased to tour areas not normally accessible and to observe material condition and equipment in an abnormal lineup.

It is important that inspectors maintain awareness of situations that may result in increased fatigue (i.e., unit outages, short duration LCOs, staff shortages, etc.). When evidence of fatigue is identified, inspectors should immediately notify licensee

management of any observed condition that indicates signs of fatigue so they can evaluate the need for a fatigue assessment per 10 CFR 26.211, "Fatigue Assessments." Additionally, the inspector should be aware that work-hour controls may change with a unit in an outage and an increase in the use of waivers, self-declarations, or fatigue assessments may occur. Refer to IP 71111.20, "Refueling and Other Outage Activities," for further guidance on fatigue inspection during outages.

Plant tours should occasionally include on- and off-site emergency response facilities, independent spent fuel storage facilities, and storage locations for equipment used for diverse and flexible mitigation strategies (FLEX). In addition, the inspector may accompany a plant operator performing equipment rounds to gain insights regarding undocumented plant deficiencies, work arounds, or temporary modifications.

The purpose of the tours is to provide an independent evaluation of ongoing plant activities that may affect plant performance in the cornerstones. In performing the tours, the inspector should keep in mind the integrated effect of plant problems on plant safety. Areas to note may include:

- a. Plant activities taking place that may affect the operability of the required SSCs and/or increase plant risk including on-line (pre-outage) maintenance activities, such as the erection of temporary scaffolding, the installation of temporary services, and/or placement of other structures or material that may interfere with the safety-related function of SSC.
- b. The overall status of plant SSCs, including general material condition or the installation of unauthorized modifications that could affect the SSC's function. Pursue any unauthorized or temporary modification deficiencies using IP 71111.18, "Plant Modifications."

A degraded condition is one in which the qualification of an SSC or its functional capability is reduced. Examples of degraded conditions are failures, malfunctions, deficiencies, deviations, and defective material and equipment. Examples of conditions that can reduce the capability of a system are aging, erosion, improper operation, and inadequate maintenance.

Obvious signs of degraded material condition of piping or other components, such as substantial corrosion, loose anchor bolts, leakage, standing water accumulation, cable insulation cracked or charred, or other conditions, may call into question operability or design margins of the equipment.

Signs of aging management concerns with active and/or passive SSCs. Licensees in their extended period of operation have aging management programs (AMPs) with additional guidance for monitoring of these SSCs.

Inspectors should ensure that identified material condition deficiencies are captured in the licensee's PI&R program. Inspectors should consult with appropriate regional and headquarters specialists if there are any questions regarding the operability or adequate design margin associated with degraded SSCs. Inspectors should attempt to obtain video movies and/or digital photographs of the degraded equipment (either on their own or through the licensee) to assist the specialists in evaluating the degraded material condition. IMC 0620, "Inspection Documents and Records,"

contains guidance on the use of photographs or videos during the inspection process.

- c. Any deficient condition which may be indicative of equipment tampering. Inspectors should also evaluate whether licensees actively consider potential for tampering when equipment deficiencies are identified.
- d. Fire hazards that could increase risk, and overall status of fire protection equipment.
- e. Status of emergency response facilities (on-site and off-site) and security alarm stations (central and secondary).
- f. Plant activities which are taking place that may affect the security of the facility such as: 1) security shift turnovers; security officers on posts; 2) security equipment testing and/or review of equipment testing results; 3) security force drills or exercises; and 4) security logs for degraded conditions and compensatory measures. Guidance for observing these activities is contained in IMC 2201, Appendix D, "Facility Status Reviews for Security and Safeguards Inspection Program."
- g. The status of doors to locked high radiation areas and required radiation postings. Consider referring concerns to regional HP inspectors for follow-up.
- h. Any leakage involving radioactive liquids or gases. Consider referring concerns to regional HP inspectors for follow-up.
- i. Status of remote or alternate shutdown panel areas, including locally required procedures, materials, or communications equipment needed to perform any required actions from these areas.
- j. Signs of personnel fatigue or impaired individual alertness which could create a reasonable doubt that an individual is fit to safely and competently perform his or her duties. This applies to all personnel that are granted unescorted access to nuclear power reactor protected areas and individuals that are required to physically report to the licensee's Technical Support Center or Emergency Operations Facility by licensee emergency plans and procedures.

06.05 Reactor Safety/Plant Security Interface

The maintenance of both plant security and safety requires coordination of activities to ensure that actions taken to address security concerns do not adversely affect safety, including emergency preparedness, and that maintenance, operations, or engineering activities do not introduce security concerns. Examples include:

- the addition of locks or other barriers to improve security that impedes the ability of operators to take actions included in emergency operating procedures
- maintenance or construction activity that interferes with security barriers or intrusion detection devices
- temporary conditions warranting compensatory measures from either security or operations because the conditions differ significantly from plant or risk profiles assumed in either the operating or security procedures

- changes in site layouts, ingress or egress routes, or security procedures that affect emergency preparedness in areas such as emergency response facility access, emergency preparedness equipment access, site assembly, or staff augmentation times

In observing security activities and especially the addition or modification of security features, the inspector should consider and, as appropriate, question the licensee regarding possible safety/security interface issues. In particular, the inspector should look for changes that might adversely affect **SSCs** or operator actions credited in:

- Traditional Licensing & Design Bases Functions (e.g., accident analysis, station black out, fire protection programs)
- Emergency Operating Procedures
- Severe Accident Management Guidelines
- **FLEX Strategies**
- Probabilistic Risk Assessments
- Radiation Protection Emergency Plan & Emergency Plan Implementing Procedures

In observing plant activities such as maintenance, operations, emergency preparedness, and engineering, the inspector should consider and, as appropriate, question the licensee regarding possible safety/security interface issues. In particular, the inspector should look for changes that might adversely affect:

- barriers and fences
- intrusion detection systems
- alarm and communication systems security event response
- assumptions for and access to readily available equipment for responding to conditions described in each plant's mitigating strategies table
- modification to equipment relied on in the Emergency Action Level scheme
- changes to set points contained in the Emergency Action Level scheme

06.06 Construction and Decommissioning Activities Near Operating Units

Construction and decommissioning activities may occur in the vicinity of operating unit(s). These activities could include reactors, or other infrastructure projects that in any way could potentially impact operating units (e.g., gas pipelines, renewable energy projects, and hydrogen production facilities). Resident Inspectors assigned to operating unit(s) should be aware of such activities which may affect the operating unit(s)' safety systems. The impact of such activities on operating units will depend on multiple factors such as activity distance from the operating unit(s) and the number of shared SSCs between operating unit(s) and units under construction/decommissioning.

Construction activities for a nuclear power plant may not commence without a construction permit, limited work authorization, or combined license. Activities that are construction are defined by 10 CFR 50.10(a). An applicant may undertake a range of pre-construction activities without a construction permit, limited work authorization, or combined license as defined in 10 CFR 50.10(a)(2). Resident Inspectors should contact their regional management regarding any questionable activities to ensure unauthorized construction activities are not occurring and do not have an impact on risk significant **SSCs**.

The operating licensee will continue to have the responsibility for ensuring that any site activities do not impact risk significant **SSCs** to the operating unit(s) or Independent Spent Fuel Storage Installation (ISFSI). The operating licensees are required to consider the impacts on various aspects of operations, such as emergency planning, radiological protection, security, and demolition of existing facilities and structures. At multi-unit sites, a unit under construction is required, in part, to have managerial and administrative controls to provide assurance that the LCOs are not exceeded as a result of construction activities (10 CFR 52.79(a)(31)). The **RI**s should understand how construction issues, that may affect the operating unit, are communicated and dispositioned at the operating unit(s).

Resident Inspectors should be alert to situations with potential adverse impact (e.g., unit transients or reactor trips). Understanding potential adverse impacts from the pre-construction, construction, and/or decommissioning activities should allow the inspector to implement the appropriate IP to evaluate the potential risk significant **SSCs**. Examples of how construction/decommissioning activities could adversely impact the operating unit(s) include, but are not limited to, the following:

- a. effects on seismic monitoring from sheet piling installation or explosives used during excavation
- b. damage to underground piping, electrical cables, fiber-optics, and telecommunications during excavation or movement of heavy loads
- c. disruptions in the switchyard and electrical transmission and distribution systems during movement of heavy loads and associated crane operations
- d. emergency preparedness affected by traffic issues from additional personnel for construction/decommissioning or movement of heavy loads
- e. **temporary or permanent effects on the security**
- f. heatsink, coolant reservoir intake and discharge structures or piping for the operating unit(s) affected by construction/decommissioning activities occurring near the structures
- g. construction/decommissioning activities that cause damage or unexpected changes to the operating unit(s) physical protection **SSCs** which render them nonfunctional
- h. fire protection plan impacted by construction/decommissioning activities preventing operator actions through the unavailability of equipment or limited methods to access equipment locations
- i. material or debris from the construction/decommissioning site that could impact the operating unit(s) **SSCs**, switch yard, or off-site power supplies during extreme weather conditions
- j. wrong unit maintenance or work activity
- k. ISFSI impacted by construction activities.

- I. temporary equipment, buildings, debris, lay-down yards that adversely affect dikes, drainage, or otherwise disrupt flow of floodwater

Multiple heavy load movement and associated crane operation evolutions are expected to occur during pre-construction and construction activities in and around operating unit(s) which have the potential to affect risk significant SSCs. The potential adverse impact of these evolutions on operating unit(s) depends on the distance from vital SSCs and buried piping, the number access roads supporting pre-construction and construction activities and operating unit(s), and if they occur near transmission lines providing off-site power to operating unit(s) and switch yards. RIs should be aware of licensee's plans for heavy load movements and crane operations. Additionally, concrete booms can extend to heights where impact with off-site power lines maybe a concern. Additional guidance can be found in Operating Experience Smart Sample FY2007 03, Revision 3, "Crane and Heavy Lift Inspection, Supplemental Guidance for IP 71111.20 and IP 71111.13," September 1, 2018, and NUREG 0612, "Control of Heavy Loads at Nuclear Power Plants: Resolution of Generic Technical Activity A 36," issued July 1980.

Changes to the operating reactor's security program may require that the licensee submit revisions to its security plan in accordance with 10 CFR 50.4, "Written Communications," 10 CFR 50.54, "Conditions of Licenses," or 10 CFR 50.90, "Application for Amendment of License, Construction Permit, or Early Site Permit." Examples include the following:

- a. pre-construction, construction, and decommissioning activities that have the potential to affect the integrity, functionality, or performance effectiveness of the operating unit's security response capability, fields-of-fire, security barriers, illumination capabilities, intrusion detection systems or devices, and access control measures
- b. pre-construction, construction, and decommissioning activities that are conducted in areas where access control is performed for the operating reactor
- c. pre-construction, construction, and decommissioning activities performed in areas adjacent to or in isolation zones of the operating reactor that limit the ability of the operating reactor's security force to detect, assess, and interdict potential threats
- d. pre-construction, construction, and decommissioning activities that could prevent operator actions through the unavailability of equipment or limited methods to access equipment locations
- e. temporary conditions warranting compensatory measures from either security or operations because the conditions differ significantly from plant or risk profiles in either the operating or security procedures
- f. changes in site layouts, ingress or egress routes, or security procedures that affect emergency preparedness in areas such as site assembly, staff augmentation times, or accountability of construction personnel.

06.07 Routine Review of Problem Identification and Resolution (PI&R)

Resident Inspectors should screen each item entered into the licensee's problem identification and resolution system to select samples for follow-up. This review can be accomplished by attending daily PI&R program review board meetings; reviewing

computerized PI&R program entries; or reading hard copies of PI&R program documents. The intent of this review is for inspectors to be alert to conditions such as repetitive, long-term, or latent equipment failures or cross-cutting aspect breakdowns that might warrant additional follow-up through IP 71152, Problem Identification and Resolution or other baseline inspections. Inspectors must be alert for adverse performance trends and risk-significant or repetitive equipment failures. Repeated failures to meet a technical specification limiting condition of operation or its associated action(s) may be an example of an adverse performance trend. [C1]

One of the primary goals of the routine reviews is to verify that licensees are identifying issues at an appropriate threshold and entering issues into the PI&R program. This can be accomplished by having inspectors compare issues identified by the NRC during the conduct of the plant status and inspectable area portions of the baseline inspection program IPs with those issues identified by the licensee. The routine review facilitates the selection of issues and operational occurrences for follow-up through the baseline inspection program to ensure that corrective actions commensurate with the significance of the issues have been identified and implemented by the licensee.

Resident Inspectors should also periodically observe licensee management's review of plant deficiencies by attending meetings such as the plant operations review committee and off-site nuclear review board meetings. In addition, most licensees hold Nuclear Safety Culture Monitoring Panels at some periodicity throughout the year (usually quarterly). These meetings allow the licensee to self-assess and determine if there are safety culture or Safety Conscious Work Environment issues before they become larger problems. Inspectors should consider attending Nuclear Safety Culture Monitoring Panels. The inspector should be knowledgeable of major findings from licensee self-assessment activities.

During inspections and plant status reviews, inspectors should be alert for potential performance deficiencies as may be associated with equipment failures, inadequate maintenance work practices, personnel errors, inadequate risk assessments, management and emergent work control problems, procedure deficiencies, or non-compliances with procedures or regulatory requirements. When inspectors identify such conditions, they should examine the licensee's PI&R program records and/or attend licensee PI&R program meetings to verify that the licensee either previously identified and documented the conditions noted by the inspector or acknowledged the inspector's observations and entered those conditions into the PI&R program. Inspectors should be aware of any contribution that cross-cutting aspects make to these performance deficiencies and consider insights that these issues may provide into the licensee's progress in addressing any developing or existing cross-cutting themes.

Inspectors should consider the potential for long-term degradation of SSCs or acceptance of long-standing degraded SSCs, as indicated by multiple similar entries in the licensee's PI&R program. The licensee's evaluation and resolution of such degraded SSCs should be considered for further inspection utilizing the appropriate baseline inspection procedure. For example, "use-as-is" determinations, revision of engineering or operational acceptance criteria, reductions in design or operational margin, and repetitive work orders could be indicative of licensee acceptance of a long-standing degraded condition.

*During routine screening, **RI**s should evaluate whether the licensee should perform an evaluation in accordance with 10 CFR Part 21—REPORTING OF DEFECTS AND NONCOMPLIANCE of any defect or non-conformance that has been identified.*

Inspectors should review and be aware of applicable 10 CFR 21 notifications and verify that the issues have been entered into the licensee's PI&R program for evaluation and disposition. [C2] Additionally, inspectors should be cognizant of the appearance of counterfeit, fraudulent, and suspect items (CFSI) and ensure that any potential CFSI issues are screened through the Operating Reactor Experience Clearinghouse.

Degradation and failures due to aging effects, such as loss of material, loss of preload, or cracking, can occur. Plants with renewed licenses have established AMPs to identify, address, and/or prevent aging effects prior to loss of intended function for those SSCs within the scope of the AMP. When degradation or failures occur that appear to be age-related, inspectors should **consider performing additional review using IP 71111.12, "Maintenance Effectiveness,"** to determine whether the SSC is being managed by an AMP. If so, the inspector should also determine whether the activities in the AMP are adequate to identify the aging effect prior to loss of SSC intended function, and whether the licensee's corrective actions address the adequacy of the AMP. Consult with the regional license renewal point of contact for support in evaluating the adequacy of the AMP.

Inspectors should remain alert to problems or conditions that could have more than minor safety significance and for which the licensee's investigation, conclusions, and/or corrective actions appear to be inadequate. Inspectors should follow-up on concerns through the appropriate baseline inspection procedures.

2515D-07 RESOURCE ESTIMATE

The yearly resource expenditures for plant status activities are estimated to be on average: 720 hours for a single-unit site; 770 hours for a dual-unit site; and 1080 hours for a triple-unit site. Resource estimate for Vogtle Unit 1 & Unit 2 is 770 hours total. Resource estimate for Vogtle Unit 3 & Unit 4 is 770 hours total. These yearly resource expenditures include **time spent on routine PI&R review plus** 24 hours per year (**~2 hours per month**) for resident inspector observations of security-related activities. Time expended conducting these activities should be charged to code PS (plant status).

2515D-08 REFERENCES

IMC 0620, "Inspection Documents and Records"

IMC 0327, "Steam Generator Tube Primary-to-Secondary Leakage"

IMC 2201, Appendix D, "Facility Status Reviews for Security and Safeguards Inspection Program"

IMC 2515, "Light-Water Reactor Inspection Program - Operations Phase"

IP 71111.04, "Equipment Alignment"

IP 71111.12, "Maintenance Effectiveness"

IP 71111.15, "Operability Determinations and Functionality Assessments"

IP 71111.18, "Plant Modifications"

IP 71111.20, "Refueling and Other Outage Activities"

IP 71111.24, "Testing and Maintenance of Equipment Important to Risk"

IP 71151, "Performance Indicator Verification"

IP 71152, "Problem Identification and Resolution"

IP 71153, "Follow-up of Events and Notices of Enforcement Discretion"

NUREG-0612, "Control of Heavy Loads at Nuclear Power Plants: Resolution of Generic Technical Activity A 36," July 1980 (ML070250180)

Operating Experience Smart Sample FY2007 03, Revision 3, "Crane and Heavy Lift Inspection, Supplemental Guidance for IP 71111.20 and IP 71111.13," September 1, 2018 (ML18151A450)

Regulatory Issue Summary (RIS) 2007-21, "Adherence to Licensed Power Limits," Revision 1 (ML090220365)

END

Attachment 1: Reactor Coolant System (RCS) Pressure Boundary Leakage Monitoring

- 1-01. To ensure that the licensee properly monitors for RCS pressure boundary leakage or potential unidentified leakage exceeding TS limit, the inspector should routinely determine if the licensee:
- a. Monitors leak detection systems such as the containment atmosphere particulate radioactivity instruments, the containment sump flow/level instruments, the containment atmosphere gaseous radioactivity instruments, the containment humidity instruments, and/or any plant-specific instrumentation to indicate potential RCS leakage. Also, trends these parameters for potential adverse trends.¹
 - b. Takes appropriate actions for degraded or inoperable leak detection instrumentation or alarms in accordance with TS and responds to alarms in accordance with alarm response procedures. Also, periodically verifies that the alarm response procedure actions are consistent with plant licensing documents.
 - c. Periodically performs the inventory balance check (PWR only) and attempts to confirm RCS unidentified leakage with alternate and diverse means, such as, changes in containment sump level or sump pumping frequency and volume.
 - d. Takes appropriate actions in accordance with plant-specific leak rate impact or leakage investigation procedures (leakage source identification, quantification, classification, etc.) when RCS leakages are suspected. Also, considers unidentified leakage as identified leakage only when the leak rate has been actually measured and identified.
 - e. Conducts activities to identify sources of RCS unidentified leakage. Documents actions taken to identify sources of unidentified RCS leakage in the control room logs or in the PI&R program, as specified in plant administrative procedures. The licensee's leak identification plan includes actions such as system walkdowns; system surveillance and re-alignment; containment entry (PWR only) and visual inspections for boric acid deposits (PWR only); verification of pumps and valves for possible seal and packing leakages; inspection of pipe flanges and major welds, including instrument lines and connections; and sampling/ performing isotopic analysis of atmospheres, filter elements, and sumps.
 - f. Trends unidentified leak rates, pays particular attention to changes in unidentified leakages, and takes appropriate corrective action for adverse trends. Also, trends other containment parameters such as containment sump in-leakage rates, the containment air/gaseous radiation monitor indication, the containment particulate radiation monitor indication, and the containment humidity indication to validate potential RCS unidentified or pressure boundary leakages.

If the inspector observes significant adverse trends, the inspector should engage licensee and regional management and the appropriate Office of Nuclear Reactor Regulation (NRR) technical branches as outlined later in attachment 1. As applicable, the inspectors should also determine if the licensee enters the appropriate procedure for responding to adverse RCS leakage trends. Review licensee procedures for action

¹ Licensee action levels may not be the same as those defined in this attachment, inspectors should be aware of the differences between NRC inspection guidance and licensee standards.

steps, as unidentified leakage approaches licensee administrative limits or technical specifications allowed values. The inspector should use IP 71111.24, "Testing and Maintenance of Equipment Important to Risk," to verify licensee's surveillance activities and IP 71111.04, "Equipment Alignment," to conduct any plant walkdown. Review any operational and technical decision-making activities and pursue any operability concerns using IP 71111.15, "Operability Evaluations and Functionality Assessments." In addition, this attachment provides a technique to aid inspectors in independently determining whether an adverse trend exists with licensees' RCS unidentified leakage rate data obtained during steady state power operation.

1-02 Assessing Reactor Coolant System (RCS) Unidentified Leakage Rate Trend

This guidance provides action level criteria to assess the significance of the trend and licensee's actions in response to increasing levels of unidentified RCS leakage that could indicate Reactor Coolant System pressure boundary (RCPB) degradation. This guidance is provided in response to Davis-Besse Lessons Learned Task Force Report recommendation 3.2.1(2) (ML022760414).

In order to track and assess the unidentified leak rate trend, the inspector should utilize licensee's RCS leakage rate data. Once each month, RIs should obtain the mean value (μ) and the standard deviation (σ) of RCS unidentified leakage rate for the past three months, representing a 3-month rolling data set, using the Excel spreadsheet (see section titled, "Forms, Templates, Sample Reports & More," on **non-public** Reactor Oversight Process Digital City Web link: <https://usnrc.sharepoint.com/sites/NRR-DRO/SitePages/ROP-Digital-City.aspx>). During the ensuing month, the inspector should use the resulting μ and σ to establish action thresholds as described below.

Note: For licensees who calculate the leak rate more than once per day, ensure that the leak rate value for calculating the mean value is the average for that day. When starting a new operating cycle after refueling, a weekly rolling data set (i.e., most recent 7-day average) of leakage values will be analyzed to determine if the licensee has identified and corrected all potential leakage source(s). Once 3 months of data have been collected, the mean, standard deviation and action levels should be calculated using the Excel spreadsheets listed above.

The mean value (μ) and the standard deviation (σ) are defined by the following equations:

$$\mu = (x_1 + x_2 + \dots + x_n)/n; \sigma = \sqrt{\sum(x_i - \mu)^2/n}$$

assuming the unidentified leakage rate, x , is a random variable which has a mean value, μ and a known standard deviation, σ .

Once a month, the inspector should use the mean value (μ) and the standard deviation (σ) from the previous three months to calculate the three action level triggers (μ , $\mu + 2\sigma$, $\mu + 3\sigma$). The action levels were determined by statistical analysis:

Action Level I: Nine (9) consecutive leakage measurements above the μ

Action Level II: Three (3) consecutive measurements exceed the $\mu + 2\sigma$

Action Level III: Two (2) consecutive measurements exceed the $\mu + 3\sigma$

During the daily plant status review, the inspector should compare the licensee calculated RCS unidentified leakage rate data to the three action level triggers identified below to determine if there is a potential adverse trend and take appropriate actions, if necessary. If the licensee performs the RCS leakage rate calculations several times a day, the inspector should only compare the average positive value per day to the action level triggers. If the licensee, in following its TS, only performs an RCS leakage rate calculation once per 72 hours, then the inspector should perform this comparison once per 72 hours. For BWRs, if the drywell floor sump is pumped less frequently than daily, then average positive value should only be entered for those days that the sump is actually pumped. Zero or negative values should be entered into the spreadsheet as "zero."

Upon exceeding one of the action level triggers, the inspector should consider the licensee in the appropriate action level until the licensee is able to identify, isolate, or repair the leak.

Action Level I - Nine (9) consecutive leakage measurements above the μ

Actions:

1. Assess licensee's actions to ensure containment parameters are appropriately being monitored in accordance with established site-specific procedures.
2. Discuss licensee's initial actions with regional branch chief.

Action Level II - Three (3) consecutive measurements exceed the $\mu + 2\sigma$

Actions:

1. Take the steps in Action Level I, if not already done.
2. Review containment data such as sump chemistry samples, pump seal pressures and temperatures (recirculation pumps (BWRs), reactor coolant pumps (PWRs), control rod drive temperature (BWRs), containment atmosphere temperature, pressure, radioactivity, humidity levels, etc.) to determine if source can be attributed to actual RCS leakage.
3. If RCS leakage is confirmed, review licensee's plans for identifying source of unidentified leakage and proposed corrective actions.
4. Discuss licensee's actions with regional branch chief and engage licensee as necessary.

Action Level III - Two (2) consecutive measurements exceed the $\mu + 3\sigma$

Actions:

1. Take the steps in Action Level II, if not already done.
2. Discuss increasing trend with licensee management and continue to monitor licensee's actions.
3. Ensure regional management at the Director level is informed via the branch chief of the status of licensee's actions.
4. If RCS leakage has been confirmed, the appropriate NRR technical branches are notified by the branch chief via the NRR project manager.
5. The resident inspector provides periodic updates on the RCS leak rate and on the status of licensee's actions to regional management, and NRR technical branches via the NRR project manager.

END

Attachment 2: Revision History for IMC 2515 Appendix D

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	04/03/00 CN 00-003	Reactivated	N/A	N/A
N/A	ML020380441 01/17/02 CN 02-001	Revised	N/A	N/A
N/A	ML031980014 7/10/03 CN 03-024	Revised to add a statement to remind resident inspectors to periodically check Part 9900 of the inspection manual to keep current on reporting requirements.	N/A	N/A
N/A	ML032660080 9/09/03 CN 03-033	Revised to provide improved guidance to an inspector on the requirement to inform the Materials and Chemical Engineering Branch, NRR, of steam generator tube leaks of greater than three gallons per day.	N/A	N/A
N/A	ML041340196 5/11/04 CN 04-013	Added guidance for reviewing RCS leakage monitoring. Also, requirement to monitor licensee actions when in multiple TS action statements. New requirement to review licensee corrective action summary reports.	N/A	N/A
N/A	ML050410038 1/26/05 CN 05-003	Added more detail to requirement for RCS leakage monitoring.	N/A	N/A
N/A	ML053330037 12/2/05 CN 05-032	Additional clarification to guidance on RCS unidentified leakage trending. Resource estimate for Plant Status has been increased.	N/A	N/A

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	ML0616403980 1/26/07 CN 07-004	Included reference to IP 61706 for evaluating reactor power fluctuations (FF 2515D-945). Revised Plant Status resource estimate. Added guidance to inspectors on being sensitive to licensee's actions taken to address security concerns do not adversely affect reactor safety and emergency preparedness. Likewise, licensee's actions taken to address reactor safety concerns do not adversely affect plant security (FF 2515-D-998).	N/A	ML063460228
N/A	ML070740557 04/04/07 CN 07-012	This IMC has been revised to update the RCS unidentified leakage rate spreadsheet web page links. Spreadsheets were updated and converted from Quattro Pro to Excel.	N/A	N/A
N/A	ML080310091 05/01/08 CN 08-014	Revised to include checking for online maintenance activities that could interfere with SSCs and added leakage trending for the first 3 months after the start of a refueling cycle. This revision addresses feedback forms 2515-D-1157 and 2515-D-1178.	N/A	N/A
N/A	ML082110297 09/03/08 CN 08-025	Revised to address lessons learned from severe corrosion of essential service water piping risers at Byron plant (see Operating Experience posting of 10/23/2007) as documented in FF 2515D-1214. Also, incorporated recommendations from FFs 2515D-1156 and 1258 to clarify how to charge for inspection resources used to support facility status reviews for the Security and Safeguards Inspection Program (SSIP) and to make inspectors aware of Plant Status procedure for SSIP (IMC 2201 Appendix D).	N/A	ML082410742

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	ML0921802911 1/09/09 CN 09-026	Revised to add guidance for inspectors to look for indications of fatigue when performing plant status reviews. The guidance also provides a reference to new inspection guidance in IP 93002.	Yes 6/17/2009	N/A
N/A	ML093220843 02/02/10 CN 10-004	Added requirement to have resident inspectors conduct quarterly tours of security-related areas as recommended by CY 2009 ROP realignment process (ML092090312). Increased inspection resources allocated to Plant Status procedure by 16 hours per year to conduct these additional tours of security-related areas by resident inspectors.	N/A	ML100070084
N/A	ML11279A083 02/24/12 CN 12-003	Provided guidance to be sensitive to deficient equipment conditions which may have resulted from tampering by personnel. Also, made changes to address regional comments associated with feedback forms 1308; 1423; and 1624.	N/A	ML12027A113
N/A	ML15128A229 09/04/15 CN 15-016	Changes include revisions to (1) power limit reference guidance, (2) RCS unidentified leakage action levels, and (3) ensure awareness of installation of temporary services. Feedback forms incorporated into this revision: 2078, and 2141. Feedback forms reviewed but not incorporated: 2122 and 2131.	N/A	ML15187A245 2515D-2078 ML15246A008 2515D-2141 ML15246A009

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	ML16111B120 04/27/16 CN 16-011	The Action Level “triggers” described in Attachment 1 were updated to incorporate Regional feedback and the changes recommended in Feedback Form 2141 (and previously adopted through CN 15-016) have been rescinded. [NOTE: The version of this IMC issued on 9/4/15 with an effective date of July 1, 2016 was not implemented and has been superseded by this version].	N/A	ML16112A026
N/A	ML17152A186 08/25/17 CN 17-016	Revised to indicate that control room walkdown includes review of any compensatory measures in place. Feedback forms incorporated into this revision: 2230. Feedback forms reviewed but not incorporated: 2222.	N/A	ML17156A218 2515D-2230 ML17178A039
N/A	ML17264A782 10/03/17 CN 17-020	Revised to address issues identified IMC 307 peer review (ML16260A079 & ML17047A602). This proposed revision was agreed upon by all members present at the Fall 2017 Reactor Oversight Process Branch Chief Counterpart Meeting. All members also indicated that there is no need for a comment period and the proposed revision can be issued as final.	N/A	N/A

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	ML18134A177 11/19/18 CN 18-039	Revised to address: (1) comments provided by NRR/DMLR related to the period of extended operation, (2) Feedback Forms 9900-2273 and 71111.08-2275 which resulted in creation of new IMC 0327, "Steam Generator Tube Primary-To-Secondary Leakage," (3) use of mandatory and discretionary language with regards to steam generator tube primary-to-secondary leakage reports to NRR, and (4) a recommendation from the working group established to update the ROP for regulatory actions taken following the Fukushima Dai-ichi accident (ML17164A285).	N/A	ML18179A040
N/A	ML20238B970 10/05/20 CN 20-046	Revisions are made to reflect resources specifically for Vogtle 3 & 4 as identified in SECY-20-0050, "Planned Revisions To The Baseline Inspection Program For The AP1000 Reactor Design," (ML20058F491).	None	ML20239A734
N/A	ML20323A037 01/13/21 CN 21-004	Consolidated IMC 2515, Appendix F, "Reactor Construction Activities Near Operating Unit(s)," into this IMC. Incorporated FF 2515D-2412 to add Nuclear Safety Culture Monitoring Panels as a meeting that should be attended. Incorporated guidance regarding Open Phase Condition monitoring.	None	ML20325A208 2515D-2412 ML20325A226

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)
[C1] [C2]	ML21241A180 12/14/21 CN 21-040	<p>Transferred daily problem identification and resolution review from IP 71152 to this appendix. Commitment tracking brought over with revision. Specifically, incorporated recommendations made by the PI&R focus group to address several items from the Davis-Besse Lessons Learned Task Force (Commitment C1); and added guidance to ensure that potential Part 21 issues are evaluated on a continual basis (Commitment C2).</p> <p>Additionally, added additional awareness considerations for inspector control room tour.</p>	None	ML21281A183
	ML22251A314 11/07/22 CN 22-024	<p>Moved guidance items from 2515D-01 to 2515D-06 IAW IMC 0040 "Preparing, Revising and Issuing Documents for the NRC Inspection Manual." Editorial changes to comply with revised NUREG-1379 "NRC Editorial Style Guide" standards. Edited section 06.06 to broaden the guidance to include any construction occurring onsite. Clarified wording in section 06.07 to suggest inspectors transition to IP 71111.12 for detailed follow-up of inspection concern. Moved all RCS leakage guidance to attachment 1, nothing was removed.</p>	None	<p>ML22256A181</p> <p>2515D-2449 ML22033A212</p>