

### PERFORMANCE INDICATOR VERIFICATION

PROGRAM APPLICABILITY: 2515

#### 71151-01 INSPECTION OBJECTIVE

01.01 To perform a periodic review of performance indicator (PI) data to determine their accuracy and completeness.

#### 71151-02 INSPECTION REQUIREMENTS AND GUIDANCE

##### 02.01 Background

Inspection Manual Chapter (IMC) 0308, Attachment 1, “Technical Basis for Performance Indicators,” describes the PIs and their objectives, thresholds, and bases and Reactor Oversight Process (ROP) cornerstone attributes covered by the PIs. The current revision of the Nuclear Energy Institute (NEI) document, NEI 99-02, “Regulatory Assessment Performance Indicator Guideline,” that has been accepted by the NRC for use in reporting PI data, describes the PIs, how they are calculated, and how and when to report PIs to the U.S. Nuclear Regulatory Commission (NRC). NRC Regulatory Issue Summary (RIS) 2000-08, “Voluntary Submission of Performance Indicator Data,” Revision 1, informs stakeholders that the NRC accepts NEI 99-02 for use in reporting PI data.

PI data are voluntarily submitted by licensees to the NRC; however, information provided to the Commission by a licensee shall be complete and accurate in all material respects. The assessment of plant performance relies on information provided by PIs. Appendix B of NEI 99-02 and Attachment 1 of this inspection procedure (IP) describe the PI data elements that are reported to the NRC. The purpose of this procedure is to periodically review PI data to determine their accuracy and completeness. Each PI for every unit will be verified annually. The PI verifications will be planned inspections during which an inspector will review a sample of plant records and data against the reported PIs.

##### 02.02 Inspection Planning

Resident inspectors or project engineers typically verify PIs for the Initiating Events, Mitigating Systems, and Barrier Integrity Cornerstones and aspects of PIs for the Emergency Preparedness, Occupational Radiation Safety, and Public Radiation Safety Cornerstones as described in this IP. These inspectors should verify two or three PIs

per unit each calendar quarter so that every PI is reviewed annually; however, minimum quarterly sample sizes are not required. A regional specialist inspector will annually verify PIs for the Emergency Preparedness, Occupational Radiation Safety, Public Radiation Safety, and Security Cornerstones. Inspectors may perform verification inspections during a site visit in any calendar quarter. Inspectors may inform the selection and timing of PI verification inspection samples by using the information on NRC's PI Web sites (e.g., inspectors may want to verify PI data for PIs that are approaching thresholds). Section 71151-05 of this IP has guidance for planning PI verification inspections in NRC's Reactor Programs System (RPS).

### 02.03 PI Verification Requirements

- a. When conducting the first PI verification inspection (e.g., for a new PI or for a new site for which the PIs are applicable), the inspector shall verify the accuracy of all reported data that are used to calculate the value of each PI. When conducting subsequent inspections, the inspector may verify only the additional data reported since the last PI verification inspection was performed. Credit may be given for completion of a temporary instruction, as appropriate.
- b. Inspectors shall review PI data reported to the NRC since the last verification inspection and confirm the accuracy and completeness of PI data by comparing them to a sample of confirmatory plant records (e.g., data available in plant operating logs). Inspectors may refer to Attachment 1 for guidance on possible sources of plant records and data to review for each PI. Section 02.04 of this IP provides additional guidance for how to inspect each PI. Inspectors should review the approved and applicable frequently asked questions (FAQs) on the NRC's public Web site to be familiar with new and/or clarified NEI 99-02 guidance.

Annual inspection intervals should not exceed 15 months. Review of licensee self-assessments shall not be substituted for independent inspector verification of PIs.

- c. Inspectors shall review the licensee's corrective action program (CAP) records to determine if any problems with the collection of PI data have occurred and if the resolutions were satisfactory. NEI 99-02 provides guidance on submitting change reports for PI data errors. Inspectors shall determine if PI data were corrected or updated as a result of any data collection problems. Inspectors should verify that the licensee takes appropriate and timely action to identify and report any errors in PI data.

If a licensee had difficulty interpreting NEI 99-02 such that it is not sure whether it should have reported certain information in a PI, then the inspector should verify that the licensee made conservative decisions and took appropriate and timely actions to seek clarification of NEI 99-02.

- d. When conducting PI verifications, inspectors should be alert to licensees taking actions (e.g., changes to normal or routine practices or behavior) that result in data being erroneously excluded from the PI.

- e. As necessary and when possible, in addition to the review of various plant records, the inspector should observe the plant activity that generates the PI data using the most applicable IP. For some PIs, it may be appropriate to observe the collection of PI data during the inspection to ensure that data collection techniques will produce accurate results and therefore accurate PI data. The inspector shall charge time spent on these observation activities to the other procedures.

The following examples demonstrate how the inspector may use other IPs in conjunction with PI verification inspections.

- During the verification inspection of the Mitigating Systems Performance Index (MSPI), the inspector may also use IP 71111.13, "Maintenance Risk Assessments and Emergent Work Control," to determine the hours that the monitored trains were unavailable because of planned or unplanned maintenance. For assessing unavailability of the cooling water support system, the inspector should be familiar with how the licensee's probabilistic risk assessment (PRA) models the risk-important functions. The way the plant PRA models these functions will aid in the determination of train functionality and availability. Further guidance can be found in Appendices F and G of NEI 99-02.
- During the planned verification inspection of the Reactor Coolant System (RCS) Specific Activity PI, the inspector may observe chemistry sampling and analysis using IP 71111.22, "Surveillance Testing."
- During the planned verification inspection of Alert and Notification System (ANS) Reliability PI, the inspector may observe siren testing using IP 71114.02, "Alert and Notification System Testing."

#### 02.04 PI Verification Guidance.

Each PI is briefly described below with guidance on how to verify each PI. IMC 0308.1 and NEI 99-02 have complete definitions of the PIs and how they are calculated and reported. Attachment 1 of this IP provides additional verification guidance by listing the reported elements of each PI and suggesting records for the inspector to review.

a. IE01: Unplanned Scrams per 7000 Critical Hours

Description: This PI calculates the number of unplanned automatic and manual scrams during the previous four quarters while critical. The number of scrams is weighted by the ratio of 7000 hours to the total number of hours of critical operation in the past four quarters.

Verification: Inspectors shall review licensee event reports (LERs) to determine the number of scrams that occurred. Inspectors shall compare the number of

scrams reported in LERs to the number reported as a PI. As necessary, review monthly operating reports or operating logs to determine whether the accuracy of the number of critical hours could affect the indicator value. **The inspector should verify that the licensee is correctly considering scrams that occur during low power physics testing.**

Inspection of operator and equipment performance in response to a scram is covered by **other IPs** and is not **prescribed** by this IP.

b. IE03: Unplanned Power Changes per 7000 Critical Hours

Description: This PI calculates the number of unplanned changes and fluctuations in reactor power of greater than 20 percent (%). **This number is weighted by the ratio of 7000 hours to the total number of hours of critical operation in the past four quarters.**

Verification: To determine the accuracy and completeness of reported transients **and critical hours, inspectors shall review applicable information, which may include** operating logs, CAP records, and monthly operating reports. **Inspectors should verify that the licensee is applying the 72-hour period and allowed exclusions in NEI 99-02 correctly.**

c. IE04: Unplanned Scrams with Complications (USwC)

Description: This PI calculates the number of unplanned **automatic and manual** scrams while critical during the previous four quarters that **were complicated because of** additional operator actions **or unavailable equipment**, as **described** in NEI 99-02.

Verification: **It is recommended to** perform this verification at the same time as the Unplanned Scrams per 7000 Critical Hours PI. **Inspectors shall** review the licensee's basis for including or excluding each scram in this PI.

Inspection of operator and equipment performance in response to a scram is covered by **other IPs** and is not **prescribed** by this procedure.

d. MS05: Safety System Functional Failures (SSFFs)

Description: This PI calculates the number of events or conditions in the previous four quarters that prevented or could have prevented the fulfillment of the safety function of structures or systems that are needed to shut down the reactor and maintain it in a safe shutdown condition, remove residual heat, control the release of radioactive material, or mitigate the consequences of an accident.

Verification: NUREG-1022, "Event Reporting Guidelines: 10 CFR 50.72 and 50.73," discusses when an LER is required in accordance with 10 CFR 50.73(a)(2)(v). NEI 99-02 discusses the relationship between reports received in accordance with 50.73(a)(2)(v) and the SSFF PI. To independently determine how many SSFFs occurred, the inspector shall review LERs and other records (e.g., selected maintenance rule records, conditions reports, and/or work orders) that could indicate whether SSFFs occurred. The inspector shall compare this to the number of SSFFs reported in the PI over the past four quarters.

For a multi-unit site, the inspector should verify that the SSFF PI data were reported for all units for which an SSFF was applicable. If the LER mentions other units in the "Other Facilities" field but SSFF PI data were not submitted for the other units, the inspector should determine whether the SSFF was applicable to the other units and should also have been counted in the other units' PI data. The inspector should verify that the licensee reported the applicable LER number associated with the SSFF in the PI data comments.

The inspector should verify that the licensee correctly applied the clarifying notes from NEI 99-02 (especially the "engineering analyses" note). If a licensee checks the 10 CFR 50.73(a)(2)(v) box on the LER but doesn't report the SSFF in the PI data because of an engineering analysis, the inspector should verify whether the licensee appropriately invoked that exclusion and whether the assumptions in the engineering analysis are valid. The inspector should verify that the licensee appropriately considered the definition of an SSFF in the analysis.

If the inspector determines that a licensee failed to report an SSFF in an LER (an issue that has traditional enforcement implications), then the inspector shall screen and disposition that issue in accordance with IMC 0612, Appendix B, "Issue Screening." Additional information on SSFF reporting and operability determinations can be found in:

- Title 10 of the Code of Federal Regulations, part 50, section 73(a)(2)(v), (10 CFR 50.73(a)(2)(v))
- NUREG-1022
- IP 71111.15, "Operability Determinations and Functionality Assessments"

- RIS 2005-20, Revision 1, “Revision to NRC Inspection Manual Part 9900 Technical Guidance, ‘Operability Determinations & Functionality Assessments for Resolution of Degraded or Nonconforming Conditions Adverse to Quality or Safety’” and its attachment

e. MS06-MS10: MSPI

**Description:** MSPI is the sum of changes in a simplified core damage frequency (CDF) evaluation for a monitored system resulting from differences in unavailability (UA) and unreliability (UR) relative to updated industry standard baseline values. MSPI is a twelve-quarter rolling average that uses risk-based performance thresholds of 1E-6, 1E-5, and 1E-4 CDF<sub>index</sub>. Licensees report an unavailability index (UAI) number and an unreliability index (URI) for each of the five monitored systems listed below. These inputs are combined to arrive at a total MSPI index value for the system.

|  |
|--|
| MS06: Emergency AC Power Systems   |
| MS07: High Pressure Injection Systems. For pressurized water reactors (PWRs), the high pressure safety injection system is monitored. For boiling water reactors (BWRs), the high pressure coolant injection system (e.g., high pressure coolant injection, high pressure core spray, and feedwater coolant injection) is monitored. |
| MS08: Heat Removal Systems. For PWRs, the auxiliary feedwater system is monitored. For BWRs, the heat removal systems monitored can include the reactor core isolation cooling system and the isolation condenser.   |
| MS09: Residual Heat Removal Systems  |
| MS10: Cooling Water Systems  |

**Verification:** Inspectors shall review MSPI for each system annually. Inspectors should prepare for the inspection by reviewing the section of the plant’s MSPI basis document pertaining to the MSPI system being verified. Inspectors should review an electronic version of the margin and derivation reports from the licensee’s Consolidated Data Entry (CDE) software system. A printed copy might not display all data. Appendices F and G of NEI 99-02 have additional guidance. Inspectors may seek assistance from a regional senior risk analyst if needed.

*UAI Guidance*

UA is monitored at the train/segment level. If the MSPI system’s trains/segments can accrue a large number of UA hours without those hours having a significant impact on UAI, the inspector should not invest significant resources in verifying the UAI data. The inspector should focus more resources on verifying the URI instead.

The inspector should verify that the system and train/segment boundaries are defined in the plant’s MSPI basis document in accordance with Sections F.1.1.1 and F 1.1.2 of Appendix F of NEI 99-02. If this has been verified in previous

inspections, the inspector should determine whether any changes to these boundaries since the last verification inspection were made in accordance with NEI 99-02.

Section F.1.3 of NEI 99-02 describes the formula for a train/segment's UAI. This formula is:

$$UAI_t = CDF_p [FV_{UA_p} / UA_p]_{max} (UA_t - UA_{BLt})$$

- $UA_t$  is the train's actual unavailability, which is the ratio of the planned and unplanned UA hours during the previous 12 quarters while critical to the number of critical hours during the previous 12 quarters, as determined in Section F.1.2.1.
- $UA_{BLt}$  is the historical baseline UA value for the train, which is the sum of planned UA (determined in NEI 99-02, Section F.1.2.2) and unplanned UA (determined in Section F.1.2.3).
- $CDF_p$  is the plant-specific CDF.
- $FV_{UA_p}$  is the train-specific Fussell-Vesely value for UA.
- $UA_p$  is the plant-specific PRA value of UA for the train.

$UA_t$  and  $UA_{BLt}$ . Inspectors should compare the number of actual planned UA hours to the plant-specific baseline planned UA hours. If the actual number was less than the baseline number, then the baseline UA should have been used in the MSPI calculation. If the actual number was more than the baseline number, then the actual number should have been used in the MSPI calculation. Licensees rarely change the planned UA baseline value. If this does occur, inspectors should review the basis for the change. Section F.1.2.2 of NEI 99-02 has additional information on baseline planned UA. Inspectors should verify whether all unplanned train/segment UA is accounted for in CDE. Using Section F.1.2.1 of NEI 99-02 as a reference, inspectors should determine the validity of the licensee's basis for excluding any hours. Failures of any systems, structures, or components that are outside of the defined system boundary do not affect UAI; however, those failures can result in inoperable or non-functional trains/segments of the MSPI system. The generic industry baseline unplanned unavailability values in Section F.1.2.3 do not change.

To determine the accuracy and completeness of the reported unavailability data, the inspector should compare the reported data to those contained in useful information sources, which may include out-of-service logs, operating logs, and/or the maintenance rule database. In addition to review of records, the inspector should, in conjunction with other IPs, verify planned and unplanned unavailable hours for the system under review. Inspectors can review unavailability determinations using IP 71111.04, "Equipment Alignment," IP 71111.12, "Maintenance Effectiveness," and IP71111.13. Unavailability data and demand failures are accounted for in the MSPI derivation reports. If the unavailability and failure data were not captured in these reports, then those data were not incorporated into the MSPI. Also, a maintenance rule preventable functional failure does not necessarily mean the monitored train was unavailable

for MSPI. The guidance for functional failures under the maintenance rule and MSPI is different.

The inspector should review instances of degraded equipment being taken out of service. The equipment should have been capable of performing its function for the required mission time up to the point when it was removed from service. If not, the unavailability time, after the point of discovery and for the repair of the component, should be logged as unplanned unavailability. **The inspector should determine if** the licensee recorded failures and assessed whether additional unavailability time was warranted. The failure should be one of the types listed in NEI 99-02, Appendix F, Section F 2.2.2.

$CDF_p$ ,  $FV_{UA_p}$ , and  $UA_p$ . If there have been any changes to the PRA model since the last MSPI verification inspection, the inspector should verify that the new PRA data are used correctly in the MSPI calculations. The inspector should verify that the PRA changes have been included in the MSPI basis document and in CDE. The inspector may refer to the clarifying notes in NEI 99-02, Section 2.2.

#### *URI Guidance*

UR is monitored at the component level and calculated at the system level. Inspectors should verify that the MSPI basis document identifies all monitored components within the system boundary and their associated success criteria in accordance with Sections F.2.1, F 2.1.1, and F 2.1.2 of NEI 99-02. If this has been verified in previous inspections, inspectors should verify whether any changes to these components or success criteria since the last verification inspection were made in accordance with NEI 99-02. Inspectors should verify that the component boundaries are defined in accordance with Section F.2.1.3 of NEI 99-02. If this has been verified in previous inspections, inspectors should determine whether any changes to these component boundaries since the last verification inspection meet NEI 99-02.

Section F.2.3 of NEI 99-02 describes the formula for calculating URI. This formula is:

$$URI = \sum(j=1 \text{ to } m) [B_{Dj}(UR_{DBCj} - UR_{DBLj}) + B_{Lj}(UR_{LBCj} - UR_{LBLj}) + B_{Rj}(UR_{RBCj} - UR_{RBLj})]$$

- $B_{Dj}$ ,  $B_{Lj}$ , and  $B_{Rj}$  are the Birnbaum importance measures for the failure modes: fail on demand, fail to load, and fail to run, respectively.
- $UR_{DBC}$ ,  $UR_{LBC}$ , and  $UR_{RBC}$  are Bayesian corrected plant-specific values of UR for the failure modes: fail on demand, fail to load, and fail to run, respectively.
- $UR_{DBL}$ ,  $UR_{LBL}$ , and  $UR_{RBL}$  are baseline values of UR for the failure modes: fail on demand, fail to load, and fail to run, respectively.

The Birnbaum importance for each component failure mode is defined below, and Section F.2.3.5 provides additional guidance.

$$B = CDF_p [FV_{URc} / UR_{pc}]_{max}$$

$UR_{DBC}$ ,  $UR_{LBC}$ , and  $UR_{RBC}$ . Section F.2.3.6 of NEI 99-02 has guidance on how to calculate these values. These values rely on the number of component demands and run-hours. Overestimating the demands and run-hours for a monitored component can affect the projected reliability of the monitored component. Therefore, it is recommended that inspectors verify the licensee is using accurate data for the monitored components' demands and run-hours. Inspectors should verify whether the licensee uses actual data or estimates for demands and run-hours. If the licensee uses actual data, inspectors should verify that the licensee is indeed using actual data rather than estimated quantities. If the licensee uses estimates, inspectors should verify that the estimates are reasonable by comparing these values to those from surveillance test results and operational/alignment actions. The estimated demands from tests should be steady; however, the operational/alignment actions estimate may vary over time. Section F.2.2.1 of NEI 99-02 has additional guidance.

These values also rely on the number of component failures. For all monitored components in the system being verified, inspectors should review the operating history (e.g., operator log entries, CAP documents, and maintenance logs) to verify that all failures, with the appropriate failure mode, were recorded correctly. The failure modes are weighted differently; therefore, it is recommended that inspectors verify this (e.g., a diesel generator failure-to-run is weighted more heavily than its failure-to-start). Section F.2.2.2 of NEI 99-02 has additional guidance.

Inspectors should be familiar with the MSPI meaning of a start demand and a demand failure as described in NEI 99-02, Appendix F. Invalid demands do not have to be included or counted in MSPI. Additionally, failures that occur independent of the post maintenance test need to be counted in URI. Independent, for purposes of the indicator, mean the failure occurs outside of the scope of the maintenance being performed. For the selected systems, based on a review of related maintenance and test history, the inspector **should** confirm the accuracy of the demand failure data (e.g., demand failures, run/load failure, and failures to meet the risk-significant mission time, as applicable) for the identified active components for the most recent 12 quarters. The inspector **should** confirm that valid demands and valid failures on demand for monitored at-power functions that occurred while the reactor was shut down are included in MSPI.

$CDF_p$ ,  $FV_{URc}$ , and  $UR_{pc}$ . Sections F.2.3.2, F.2.3.3, and F.2.3.4 of NEI 99-02 contain guidance for calculating these values. If there have been any changes to the PRA model since the last MSPI verification inspection, inspectors should verify that the new PRA data are used correctly in the MSPI calculations. Inspectors should verify that the PRA changes have been included in the MSPI

basis document and in CDE. Inspectors can refer to the clarifying notes in NEI 99-02, Section 2.2 for MSPI.

The inspector should review any MSPI component risk coefficient (i.e., Fussell-Vesely or Birnbaum value) that has changed since the last review by more than 25 % of its value. NEI 99-02 **specifies** licensees to report any change to these coefficients and note the change in the PI data comment field with their quarterly PI data submittal. Additionally, if estimates were used, an update to the estimated component demands in the MSPI basis document is required if a change to the basis for the estimated demands results in a greater than 25 % change for the component of concern. The inspector should ensure that the licensee notified the NRC in accordance with the guidance contained in NEI 99-02 by placing a comment in the PI data comment field upon submittal of the quarterly PI data. **The inspector should** be alert to risk coefficient changes that could impact the list of components within the system boundary that were exempted from monitoring.

The inspector should review any changes to the success criteria or risk-significant function for any monitored component to ensure that the change was appropriate. **Inspectors may coordinate** any findings or concerns with a senior risk analyst.

f. BI01: RCS Specific Activity

Description: This PI calculates the percentage of the maximum RCS activity in microCuries per gram dose equivalent Iodine-131 to the technical specifications **(TS) limit**.

Verification: **Inspectors shall** review RCS chemistry sample analyses for maximum dose equivalent Iodine-131 and verify that the percentage of the TS limit is the same or lower than the maximum value reported by the licensee for the applicable month. In addition to record reviews and in accordance with **IP 71111.22**, **inspectors should** observe a chemistry technician obtain and analyze an RCS sample.

g. BI02: RCS Leak Rate

Description: This PI calculates the **percentage of the** maximum RCS identified **(or total, if applicable)** leakage in gallons per minute each month to the TS limit.

Verification: **Inspectors shall compare reported PI data to applicable licensee records (e.g., operating logs) of daily measurements of RCS identified (or total, if applicable) leakage. In addition to record reviews, inspectors should observe the surveillance activity that determines RCS identified (or total, if applicable) leakage rate in accordance with IP 71111.22. Inspectors should verify that the TS limit is correctly reported in the PI. Some plants (typically BWRs) have a TS limit for total – rather than identified – RCS leakage. For these plants, inspectors should verify that the total leakage amount is being reported in their PI data.**

h. EP01: Drill/Exercise Performance (DEP)

Description: This PI calculates the percentage of all drill, exercise, **and actual event** opportunities that were performed timely and accurately during the previous eight quarters.

Verification: **Inspectors shall review documentation forms to determine whether the licensee reported the correct number of (1) total opportunities to perform classifications, notifications, and protective action recommendations (PARs) and (2) timely and accurate classifications, notifications, and PARs. Inspectors shall also review the content of a sample of these forms to verify the timeliness and accuracy of classifications, notifications, and PARs. To verify the accuracy of the reported opportunities, inspectors shall review all actual emergency plan implementation events and evaluated exercise opportunities and a sample of drill and training evolution opportunities. Inspectors shall also review a sample of failed opportunities to classify, notify, and develop PARs and verify that the licensee appropriately entered the issues into its CAP.**

Resident and regional inspectors will periodically observe exercises, drills, and training evolutions **in accordance with IP 71114.01, “Exercise Evaluation,” and IP 71114.06, “Drill Evaluation,”** to verify licensee identification of timely and accurate performance. Inspection reports documenting these observations should also discuss the PI verification aspects of the inspection.

i. EP02: Emergency Response Organization (ERO) Readiness

Description: This PI calculates the percentage of key ERO members that have participated in a drill, exercise, or actual event during the previous eight quarters, as measured on the last calendar day of the quarter.

Verification: **Inspectors shall verify that all members of the ERO in the key positions identified have been counted in the reported PI data. Inspectors should review** the licensee’s basis for reporting the percentage of members who

have participated. **Inspectors should** review drill attendance records and verify a sampling of those reported as participating.

j. EP03: ANS Reliability

Description: This PI calculates the percentage of ANS sirens that are capable of performing their function, as measured by periodic siren testing in the previous 12 months.

Verification: **Inspectors shall** review siren test records for the previous reporting period **and compare** the number of failures to the reported PI value. **Inspectors should** observe siren testing in accordance with the IP 71114.02. **Inspectors should be aware of instances of pre-conditioning and an increase in the number of subsequent unscheduled tests performed after a siren failure.**

k. OR01: Occupational Exposure Control Effectiveness

Description: This PI calculates the sum of the following occurrences during the previous four quarters:

- TS high radiation area (HRA) occurrences
- Very high radiation area (VHRA) occurrences
- Unintended exposure occurrences

Verification: **Inspectors should** review CAP records for HRA, VHRA, and unplanned exposure occurrences for the past four quarters. **Inspectors should verify that greater than or equal to one Roentgen per hour (R/hr) HRA TS or 10 CFR 20 non-conformances were properly captured in the PI.** **Inspectors should** review radiologically controlled area (RCA) exit transactions with exposures greater than 100 milli-roentgen equivalent man (mrem) and **review** a sample (ten or more) **of these exposures** to determine whether they were within the radiation work permit **specifications.** **Inspectors should verify** that greater than 100 mrem unplanned exposures were entered in the CAP and **counted in the PI.**

**Because** resident inspectors are required to be in the plant on a daily basis, **they should** periodically verify certain aspects of **this indicator during their plant status tours.** During these plant tours, **resident inspectors should periodically** verify that HRAs and VHRAs are properly secured (**e.g., doors are** maintained locked). **Inspectors should** determine if any deficiencies with control of HRAs (greater than 1 R/hr) **should be or were included in the PI.** **Inspectors should ensure** that the licensee enters any deficiencies into the CAP and appropriately documents the occurrence of PI data input.

I. PR01: RETS/ODCM Radiological Effluent Occurrences

Description: This PI calculates the radiological effluent release occurrences per reactor unit that exceed the values listed below in the previous four quarters.

|                    |             |   |
|--------------------|-------------|---|
| Liquid Effluents:  | Whole Body  | 1.5 mrem/quarter                                  |
|                    | Organ       | 5.0 mrem/quarter                                  |
| Gaseous Effluents: | Gamma Dose  | 5.0 milli-radiation absorbed dose (mrads)/quarter |
|                    | Beta Dose   | 10.0 mrads/quarter                                |
|                    | Organ Doses | 7.5 mrads/quarter                                 |

Verification: Inspectors should review CAP records for liquid or gaseous effluent releases that were reported to the NRC. LERs and annual release reports may also be reviewed. For the past four quarters, inspectors shall verify that all occurrences were counted in the PI. IP 71124.06, "Radioactive Gaseous and Liquid Effluent Treatment," should be used to observe the calibration of equipment used in this program.

Because resident inspectors are required to be in the plant on a daily basis, they should periodically verify certain aspects of this PI during their plant status tours. During these tours, inspectors should note any potentially unmonitored release pathways and determine if they should be counted in the PI. Inspectors should review plant incidents involving pipes that are leaking radioactive liquids or gases that are not bounded by plant collection systems and could be potential unmonitored release paths. Inspectors should ensure that the licensee enters any deficiencies into the CAP and appropriately documents the occurrence of a PI data input.

m. PP01: Protected Area Security Equipment Performance Index

The Commission has decided that certain information related to the Security Cornerstone PI will not be publically available. Inspectors can refer to non-publicly available IMC 0308, Attachment 6, "Basis Document for Security Cornerstone of the Reactor Oversight Process," for additional information on this PI.

02.05 Inspection Results and Documentation

- a. Standards and Requirements. PI data reporting is voluntary for licensees. Licensees may have self-imposed standards or self-established expectations for reporting PI data to the NRC that do not constitute regulatory requirements. Although PI data reporting to the NRC by a licensee is voluntary, it is subject to the requirements of 10 CFR 50.9, "Completeness and accuracy of information."
- b. Discrepant PI. A PI discrepancy is a difference between what was supposed to be reported in accordance with the current version of NEI 99-02 (e.g., the number of occurrences of scrams, unplanned power changes, or

equipment/system unavailability/failures) and what was reported by the licensee in its PI data submittals. PI discrepancies could be caused by licensee errors in data collection or interpretation of NEI 99-02.

- c. Dispositioning Discrepancies. A PI discrepancy can be considered a performance deficiency in accordance with IMC 0612. These deficiencies typically have more than minor significance if the correct values cause the PI to cross a threshold or affect the plant's ROP Action Matrix column designation. Inspectors shall screen and disposition any issues of concern associated with PI reporting in accordance with IMC 0612, Appendix B.

Violations of 10 CFR 50.9 can impact the regulatory process and therefore could have traditional enforcement aspects. Inspectors shall screen a PI discrepancy involving a violation that has traditional enforcement aspects in accordance with IMC 0612, Appendix B. The NRC Enforcement Policy has examples of various severity levels for violations associated with information reporting; however, the examples are not intended to be exhaustive or controlling. The NRC Enforcement Policy also contains guidance for minor violations that the licensee does not correct. The inspector can consult with the regional enforcement coordinator and the enforcement specialist in the NRC headquarters program office for determining the severity level of PI-related traditional enforcement violations.

- d. No PI Discrepancies. If the inspector does not identify any PI discrepancies, the inspector should document the PI verification inspection results in the inspection report (i.e., that no findings or PI discrepancies were identified). The inspector should document which PI was verified, the time period involved, and which records were reviewed.

If no new PI data have been collected since the last verification inspection (e.g., no new siren tests occurred), the inspector should verify that no PI data were required to have been reported and document the lack of new data in the inspection report.

- e. Minor Discrepancies. If the inspector or licensee identifies any minor PI discrepancies, the inspector should discuss the results with the licensee, verify that the licensee submits a change report to correct the PI data in accordance with NEI 99-02, and verify that the licensee enters the discrepancies into the CAP. The inspector should refer to the NRC's Enforcement Policy for minor violations that are not corrected.
- f. More-than-Minor Discrepancies. If more-than-minor PI discrepancies are identified, the inspector should verify that the licensee submits a change report to the NRC with the corrected data and enters the issue into the CAP. The inspector should document the discrepancy in the inspection report in accordance with IMC 0612 and the NRC Enforcement Policy, if applicable.

If the PI discrepancy has not been addressed or if the PI data have not been corrected by the licensee, the region should review the NRC Enforcement Policy guidance (e.g., for issuing a Notice of Violation).

If the PI discrepancy results in the PI exceeding a threshold or affects the ROP Action Matrix column, the inspector should notify regional management to determine if further action is required. The inspector and regional management should also review the entrance criteria in IP 71150, "Discrepant or Unreported Performance Indicator Data." Factors to consider when deciding to perform IP 71150 include whether the licensee is correcting the PI data errors, the effectiveness of those corrective actions, the repetitiveness of the errors, and any trends in the quality of PI data reporting that the inspector may be aware of. The decision to perform IP 71150 should be discussed (and could be made) during the plant performance reviews described in IMC 0305, "Operating Reactor Assessment Program."

- g. Differences in Interpretation of NEI 99-02. It is expected that licensees will make reasonable, good faith efforts to comply with the guidance in NEI 99-02. This includes taking appropriate and timely action to identify and report performance issues captured by the indicators. It may be necessary for inspectors to exercise some judgment on the adequacy of licensee actions to make a reasonable, good faith effort to comply with the guidance.

If the inspector identifies a potential PI discrepancy, and the licensee disagrees with the inspector's assessment because of a difference in interpretation of NEI 99-02, the issue may need to be resolved using the PI FAQ process described in NEI 99-02. NRC inspectors should initiate the process by submitting an ROP Feedback Form (FBF) in accordance with IMC 0801, "Reactor Oversight Process Feedback Program." After receiving feedback from the NRC headquarters program office, the inspector may need to notify the licensee that it intends to consider the PI discrepant. The inspector should expect the licensee to either correct the error or submit an FAQ to be introduced at the next ROP Working Group meeting if the FAQ is accepted for review by the Working Group. The inspector should verify that the licensee captures the inspector's concerns accurately; however, the inspector's concerns will be discussed at the working group meeting. The inspector does not need to provide its concerns to the licensee in writing. If the licensee submits an FAQ, the inspector can open an unresolved item if the FAQ is not resolved by the end of the inspection period. Upon resolution of the interpretation issues and/or the FAQ, the issue should be closed in accordance with the closure guidance in IMC 0608, "Performance Indicator Program."

IMC 0608 contains additional guidance on the PI FAQ process.

- h. Unintended consequences. Inspectors should document instances of unintended consequences (e.g., instances of compliance with PI reporting guidance resulting in less safe actions or PIs possibly not resulting in an appropriate regulatory response) in an ROP FBF. The issues can be

documented as URIs in inspection reports if they involve PI discrepancy determinations that require resolution of the FBF.

### 71151-03 RESOURCE ESTIMATE

This procedure is to be implemented annually. The effort to complete all annual PI verifications is estimated to be:

| Units per Site | One      | Two      | Three    |
|----------------|----------|----------|----------|
| Hours per Year | 39 to 47 | 50 to 62 | 63 to 77 |

### 71151-04 REFERENCES

#### [Code of Federal Regulations](#)

FAQ Web site: <http://nrr10.nrc.gov/rop-digital-city/index.html>

[NEI 99-02, "Regulatory Assessment Performance Guideline"](#)

[NUREG-1022, "Event Reporting Guidelines: 10 CFR 50.72 and 50.73"](#)

[IMC 0305, "Operating Reactor Assessment Program"](#)

[IMC 0308, Attachment 1, "Technical Basis for Performance Indicators"](#)

IMC 0308, Attachment 6, "Basis Document for Security Cornerstone of the Reactor Oversight Process"

[IMC 0608, "Performance Indicator Program"](#)

[IMC 0612, Appendix B, "Issue Screening"](#)

[IMC 0801, "Reactor Oversight Process Feedback Program"](#)

[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 Assessments"](#)

[IP 71111.22, "Surveillance Testing"](#)

[IP 71114.01, "Exercise Evaluation"](#)

[IP 71114.02, "Alert and Notification System Testing"](#)

[IP 71114.06, "Drill Evaluation"](#)

[IP 71124.06, "Radioactive Gaseous and Liquid Effluent Treatment"](#)

[IP 71150, "Discrepant or Unreported Performance Indicator Data"](#)

[NRC Enforcement Policy](#)

[RIS 2000-01, Revision 1, "Voluntary Submission of performance Indicator Data"](#)

[RIS 2005-20, Revision 1, "Revision to NRC Inspection Manual Part 9900 Technical Guidance, 'Operability Determinations & Functionality Assessments for Resolution of Degraded or Nonconforming Conditions Adverse to Quality or Safety'"](#) and its attachment ([ML073531346](#))

#### 71151-05 PROCEDURE COMPLETION

Inspectors should use judgment regarding the selection of the data sample to review. PI verification is intended to be selective sampling in order to verify the accuracy and completeness of the reported data. Inspectors should not attempt to verify all indicator inputs.

Inspection of the minimum sample size will constitute completion of this procedure in RPS. **There are no requirements for quarterly minimum sample sizes.** That minimum sample size consists of the samples defined as follows for single-, dual-, and triple-unit sites, respectively:

| Performance Indicator   | Number of Samples |        |        |
|---|-------------------|--------|--------|
|   | 1-unit            | 2-unit | 3-unit |
| IE01: Unplanned Scrams per 7,000 Critical Hours                               | 1                 | 2      | 3      |
| IE03: Unplanned Power Changes per 7000 Critical Hours                         | 1                 | 2      | 3      |
| IE04: Unplanned Scrams with Complications                                     | 1                 | 2      | 3      |
| MS05: SSFFs   | 1                 | 2      | 3      |
| MS06: MSPI – Emergency AC Power Systems                                       | 1                 | 2      | 3      |
| MS07: MSPI – High Pressure Injection Systems                                  | 1                 | 2      | 3      |
| MS08: MSPI – Heat Removal Systems   | 1                 | 2      | 3      |
| MS09: MSPI – Residual Heat Removal Systems                                    | 1                 | 2      | 3      |
| MS10: MSPI – Cooling Water Systems  | 1                 | 2      | 3      |
| BI01: RCS Specific Activity   | 1                 | 2      | 3      |
| BI02: RCS Leakage   | 1                 | 2      | 3      |
| EP01: Drill/Exercise Performance  | 1                 | 1      | 1      |
| EP02: ERO Drill Participation   | 1                 | 1      | 1      |
| EP03: ANS Reliability   | 1                 | 1      | 1      |
| OR01: Occupational Exposure Control Effectiveness                             | 1                 | 1      | 1      |
| PR01: REST/ODCM Radiological Effluent Occurrence                              | 1                 | 1      | 1      |
| PP01: Protected Area Security Equipment Performance Index: See RPS for sample |                   |        |        |

| Performance Indicator | Number of Samples |        |        |
|-----------------------|-------------------|--------|--------|
|                       | 1-unit            | 2-unit | 3-unit |
| size information.     |                   |        |        |

This IP's samples correspond to all cornerstones, which creates a unique situation for inspection planning and time-charging in RPS and Human Resource Management System (HRMS). Therefore, the following methodology for consistently planning and time-charging PI verification samples is provided.

1. Planning: Inspectors shall plan IP 71151 emergency preparedness (EP) or security (SG) samples in the RPS inspection planning (RPS/IP) module as EP or SG samples so that these samples show up in the inspection plan and in inspectors' HRMS for emergency preparedness or security inspections. Regional staff shall manually change these samples from baseline inspection (BI) to EP or SG in RPS/IP. Regional staff should refer to IMC 0306 or [RPSHelp.Resource@nrc.gov](mailto:RPSHelp.Resource@nrc.gov) for additional guidance.
2. Time-Charging: When inspectors complete EP or SG PI verification inspection samples, the inspectors shall record the task as "EP" or "SG", as applicable, under the "TASK" column in HRMS. Charging these tasks to "BI" would not have an adverse effect on allocation of resources or the IP analysis for ROP realignment purposes because the item of major importance (IMI) code in combination with the report number determines which planned activity (PA) code is charged. The "task" codes of BI, EP, and SG for the same IMI code and report number correspond to the same PA code.

END

Attachments:      1: Performance Indicator Verification Inspection Guidance  
                          2: Revision History

Attachment 1

Performance Indicator Verification Inspection Guidance

| PERFORMANCE INDICATOR                             | DATA ELEMENTS TO BE VERIFIED   | RECORDS TO REVIEW/<br>RELATED INSPECTIONS   |
|---|--|---|
| IE01: Unplanned scrams/7000 critical hours        | number of scrams; <b>number of critical hours</b>  | LERs; monthly operating reports; operating logs; inspection reports   |
| IE03: Unplanned Power Changes/7000 critical hours | number of unplanned power changes; number of critical hours  | monthly operating reports operating logs; CAP documents; maintenance rule records; inspection reports   |
| IE04: Unplanned Scrams with Complications         | number of unplanned scrams with complications  | LERs, monthly operating reports; operating logs; inspection reports   |
| MS05: SSFF  | number of SSFFs  | LERs; operability assessments; control room logs; maintenance rule records; maintenance work orders   |
| MS06-MS10: Mitigating Systems Performance Index   | planned and unplanned unavailable hours; valid demands; valid demand failures (start, run, run/load); hours system required to be available; monitored component risk coefficients if a change greater than 25% occurred; number of trains or segments | MSPI basis document; operating logs; CAP documents; maintenance rule records; maintenance work orders; operability determinations; inspection reports <b>and results from the following areas:</b> equipment alignment, emergent work, maintenance rule implementation, maintenance work prioritization and control, post-maintenance testing); MSPI <b>Margin and</b> Derivation Reports |
| BI01: RCS Activity                                | maximum monthly I-131; RCS specific activity; TS limiting value  | chemistry sample record; TS requirements; inspection in the surveillance test inspectable area  |
| BI02: RCS Leakage                                 | maximum monthly RCS identified ( <b>or total, if applicable</b> ) leakage; TS limiting values  | surveillance records; plant instruments; TS requirements; inspection in the surveillance testing inspectable area   |

| PERFORMANCE INDICATOR                                     | DATA ELEMENTS TO BE VERIFIED   | RECORDS TO REVIEW/<br>RELATED INSPECTIONS  |
|---|--|--|
| EP01: DEP   | number of opportunities for classification, notification, and PAR development; number of opportunities performed in a timely and accurate manner   | formal assessments of actual events, evaluated exercises, drills, and simulator training evolutions; exercise evaluation and drill evaluation inspection results                                     |
| EP02: ERO Drill Participation                             | number of key ERO member; number of key ERO members who have participated in a drill/exercise in last eight quarters   | drill attendance records; drill, exercise, training evolution scenarios; emergency response organization rosters   |
| EP03: ANS Reliability                                     | number of siren tests; number of successful siren tests  | periodic test records, data sheet summing; individual tests; maintenance work orders; inspection in the ANS availability inspectable area  |
| OR01: Occupational Radiological Occurrences               | HRA non-conformances; VHRA non-conformances; unintended exposure occurrences   | HRA radiological occurrences; RCA exit transactions greater than 100 mrem; plant status review of locked HRA doors; inspection in the gaseous and liquid effluent treatment systems inspectable area |
| PR01: RETS/ODCM Radiological Effluent Occurrences         | number of process effluent radiological occurrences in the previous four quarters  | CAP records; LERs; annual release report; plant status review of potential unmonitored release pathways  |
| PP01: Protected Area Security Equipment Performance Index | Although the NRC is actively overseeing the Security Cornerstone, the Commission has decided that the related PI information will not be publically available to ensure that potentially useful information is not provided to a possible adversary. |  |

Attachment 2

Revision History for IP 71151

| Commitment Tracking Number | Issue Date            | Description of Change   | Training Needed | Training Completion Date                | Comment Resolution Accession Number |
|----------------------------|-----------------------|---|-----------------|---|-------------------------------------|
| N/A                        | 04/03/00<br>CN 00-003 | Initial Issuance.   |                 |   |                                     |
| N/A                        | 03/06/01<br>CN 01-006 | Revised to provide improved guidance on how to conduct PI verification inspections and how to document the inspection findings.   |                 |   |                                     |
| N/A                        | 04/16/02<br>CN 02-017 | Added clarification for PI verification inspections at multi-unit sites and guidance for SSU when the time of the failure is unknown. CN 02-017   |                 |   |                                     |
| N/A                        | 12/16/03<br>CN 03-041 | Clarified that each performance indicator for all units will be verified once a year.<br>CN 03-041  |                 |   |                                     |
| N/A                        | 10/06/04<br>CN 04-025 | Deleted security-related information from the procedure; procedure completion section to document the minimum sample size. CN 04-025.   |                 |   |                                     |
| N/A                        | 01/04/07<br>CN 07-001 | Researched commitments back four years - none found as of 12/20/06.<br><br>Added guidance for verification of MSPI and removed references to safety system unavailability indicators. CN 07-001 | Y               | Training was provided 04/2006 for MSPI. | ML063510006                         |

| Commitment Tracking Number | Issue Date                           | Description of Change  | Training Needed | Training Completion Date  | Comment Resolution Accession Number |
|----------------------------|--------------------------------------|--|-----------------|---|-------------------------------------|
| N/A                        | 06/28/07<br>CN 07-021                | Added guidance for verification of USwC and removed references to Scrams with Loss of Heat Removal and other minor edits.  | Y               | Regions informed on 6/14/07 that Web-based USwC training was available. | ML071550335                         |
| N/A                        | 12/23/11<br>CN 11-043<br>ML11346A609 | Modified effort estimate based on ROP realignment results. Reformatted to new IMC 0040 guidance for IPs. Incorporates the resolution to FBFs 71151-1573 and -1665. Modified and added MSPI and SSFF PI guidance. Modified and added inspection results and documentation guidance. | No              | N/A   | ML11346A303                         |