

## Verification and Validation of NRC's Measures and Metrics



Waterford Nuclear Power Plant is located west of New Orleans, LA. It is run by Entergy Operations, Inc.



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## Data Collection Procedures

Most of the data used to measure the U.S. Nuclear Regulatory Commission's (NRC's) performance against its strategic goals related to safety are obtained or derived from the NRC's abnormal occurrence (AO) data and reports submitted by licensees. The agency has amended the AO criteria to ensure that the criteria are consistent with the NRC's Strategic Plan for fiscal years (FY) 2008 2013 and the NRC rulemaking on Title 10 of the *Code of Federal Regulations* (10 CFR) Part 35, "Medical Use of Byproduct Materials."

The NRC developed its AO criteria in order to comply with the legislative intent of Section 208 of the Energy Reorganization Act of 1974, as amended. The Act requires the NRC to inform Congress of unscheduled incidents or events at NRC-licensed facilities that the Commission determines to be significant from the standpoint of public health and safety. Events that meet the AO criteria are included in the annual NUREG 0900, "Report to Congress on Abnormal Occurrences." In addition, in 1997, the Commission determined that events occurring at Agreement State licensed facilities that meet the AO criteria should also be reported in the annual AO report to Congress. Therefore, the AO criteria developed by the NRC are uniformly applied to events that occur at facilities licensed or otherwise regulated by the NRC and the Agreement States.

Data for AOs originate from external sources, such as Agreement States and NRC licensees. The NRC believes these data are credible because (1) regulations require external sources to report the information to the NRC, (2) the NRC maintains an aggressive inspection program that, among other activities, audits licensees and evaluates Agreement State programs to determine whether information is being reported as required by the regulations, and (3) the agency follows procedures for reviewing and evaluating licensees. The NRC database systems that support this process include the Licensee Event Report Search System (LERSearch), the Accident Sequence Precursor (ASP) Database, the Nuclear Material Events Database (NMED), and the Radiation Exposure Information Report System.

The NRC has established procedures for the systematic review and evaluation of events reported by NRC licensees and Agreement State licensees. The objective of this review and evaluation is to identify events that are significant from the standpoint of public health and safety based on criteria that include specific thresholds. The NRC uses a number of sources to determine the reliability and the technical accuracy of event information reported to the NRC. Such sources include (1) NRC licensee reports, (2) NRC inspection reports, (3) Agreement State reports, (4) periodic review of Agreement State regulatory programs, (5) NRC consultant/contractor reports, and (6) U.S. Department of Energy operating experience weekly summaries. In addition, there are daily interactions and exchanges of event information between Headquarters and the regional offices, as well as periodic conference calls between Headquarters, the regions, and Agreement States to discuss event information. Before submission to Congress, applicable NRC headquarters program offices, regional offices, and management validate and verify all identified events that meet the AO criteria.

The annual Agency Action Review Meeting is an integral part of the evaluative process used by the agency to ensure the operational safety performance of nuclear licensees, provides another opportunity for NRC's senior management to discuss significant events, licensee performance issues, trends, and the actions to mitigate recurrences.

The agency's computer security program maintains data protection. The computer security program provides administrative, technical, and physical security measures to protect the agency's information, automated information systems, and information technology infrastructure. These measures include special safeguards to protect classified information, unclassified safeguards information, and sensitive unclassified information that is processed, stored, or produced on designated automated information systems.

The agency has identified the following performance measures for verification and validation.

**STRATEGIC GOAL 1: SAFETY**

Ensure Adequate Protection of Public Health and Safety and the Environment

## Nuclear Reactor Safety

### *Strategic Outcomes:*

- Prevent the occurrence of any nuclear reactor accidents.
- Prevent the occurrence of any inadvertent criticality events.
- Prevent the occurrence of any acute radiation exposures resulting in fatalities.
- Prevent the occurrence of any releases of radioactive materials that result in significant radiation exposures.
- Prevent the occurrence of any releases of radioactive materials that cause significant adverse environmental impacts.

### *Performance Measures:*

- Number of new conditions evaluated as red by the NRC’s reactor oversight process.

**Reactor Safety Target:** Less than or equal to 3

### **Verification:**

The NRC collects the data for this performance measure in two ways as part of the agency’s Reactor Oversight Process (ROP). NRC inspectors collect inspection findings at least quarterly. Inspectors use formal detailed inspection procedures to review plant operations and maintenance. NRC managers review inspection findings to assess their significance as part of the ROP’s significance determination process (SDP). Licensees collect the data for performance indicators and submitted this information to the NRC at least quarterly. The thresholds for each indicator determine the significance of the data. The NRC conducts inspections of licensee processes for collecting and submitting the data to ensure completeness, accuracy, consistency, timeliness, and validity.

The NRC enhances the quality of its inspections through inspector feedback and periodic reviews of results. In addition, the agency trains inspectors through a rigorous qualification program. The agency improves the quality of performance indicators by receiving continuous feedback from licensees and inspectors and incorporating that feedback into guidance documents. The NRC publishes the inspection findings and performance indicators on the agency’s Web site and incorporates feedback received from all stakeholders as appropriate.

### **Validation:**

The inspection findings and performance indicators used by the ROP cover a broad range of plant operations and maintenance. NRC managers review significant issues that are identified and inspectors conduct supplemental inspections of selected aspects of plant operations as appropriate. Annually, senior agency managers review plants that have performance issues and report these results to the Commission.

This measure is the number of new red inspection findings during the fiscal year plus the number of new red performance indicators during the fiscal year. Programmatic issues at multiunit sites that result in red findings for each individual unit are considered separate conditions for purposes of reporting for this measure. A red performance indicator and a red inspection finding that are due to an issue with the same underlying causes are also considered separate conditions for purposes of reporting for this measure. Red inspection findings are included in the fiscal year in which the final significance determination was made. Red performance indicators are included in the fiscal year in which the ROP external Web page was updated to show the red indicator.

- Number of significant accident sequence precursors of a nuclear accident.

**Reactor Safety Target:** 0

### **Verification:**

The NRC has an accident sequence precursor (ASP) program to evaluate U.S. nuclear power plant operating experience systematically to identify, document, and rank those operating events that

were most significant in terms of the potential for inadequate core cooling and core damage (i.e., precursors). The ASP program evaluation process consists of the following five steps:

1. First, the NRC screens operating experience data to identify events and/or conditions that may be potential precursors to a nuclear accident. The data that staff evaluates include licensee event reports (LERs) from a LERSearch database; incident investigation team or augmented inspection team reviews the NRC's daily screening of operational events, and other events that the NRC staff identifies as candidates.
2. Second, the agency conducts an engineering review of these screened events, using specific criteria, to identify those events requiring detailed analyses as candidate precursors.
3. Third, the NRC staff calculates a conditional core damage probability (CCDP) by mapping failures observed during the event to accident sequences in risk models.
4. Fourth, the Office of Research (RES) provides the preliminary potential precursor analyses to the Office of Nuclear Reactor Regulation (NRR), regional staff and the licensee for independent peer review. However, for ASP analyses of noncontroversial, low-risk, precursors in which the ASP results reasonably agree with the SDP results, the licensee may not perform a formal peer review. The NRC staff will continue to perform an in house review process for all analyses.
5. Lastly, the NRC provides findings from the analyses to the licensee and the public.

It must also be noted that there is a time lag in obtaining ASP analysis results since they are often based on LERs (submitted up to 60 days after an event) and most analyses take approximately 6 months to complete. Final data will be reported in the year in which the event occurred.

### Validation:

The ASP program identifies significant precursors as those events that have a 1/1000 (10<sup>-3</sup>) or greater probability of leading to a nuclear reactor accident.

Significant accident sequence precursor events have a conditional core damage probability (CCDP) or  $\Delta$ CCDP of  $> 1 \times 10^{-3}$ .

- Number of operating reactors whose integrated performance entered the Manual Chapter 0350 process, the multiple/repetitive degraded cornerstone column, or the unacceptable performance column of the ROP action matrix.

**Reactor Safety Target:** Less than or equal to 3

### Verification:

The NRC ROP continuously collects the data for this performance measure and publishes the information at least quarterly. NRC inspectors use detailed formal procedures to conduct inspections of licensee performance, and NRC managers review the results to ensure the completeness, accuracy, consistency, timeliness, and validity of the data.

The NRC enhances the quality of its inspections through inspector feedback and periodic reviews of results; the agency also trains inspectors through a rigorous qualification program. The quality is also improved through continuous feedback from licensees and inspectors that is incorporated into guidance documents. The NRC publishes the data on the agency's Web site and incorporates feedback received from all stakeholders as appropriate.

### Validation:

The information collected by the ROP covers a broad range of plant operations and maintenance. NRC managers review significant issues and inspectors conduct supplemental inspections of selected aspects of plant operations as appropriate. Annually, senior managers review plants that are having performance issues and report the results to the Commission. The same is true of the agency's self assessment of the ROP.

This measure is the number of plants that have entered the Manual Chapter 0350 process, the multiple/repetitive degraded cornerstone column, or the unacceptable performance column during the fiscal year (i.e., were not in these columns or process the previous fiscal year). Data for this measure are obtained from the NRC external Web action matrix summary page that provides a matrix of the five columns with the plants listed within their applicable

column and notes the plants in the Manual Chapter 0350 process. For reporting purposes, plants that are the subject of an approved deviation from the action matrix are included in the column or process in which they appear on the Web page.

- Number of significant adverse trends in industry safety performance.

**Reactor Safety Target:** Less than or equal to 1

**Verification:**

The NRC derives data for this performance measure from data supplied by all power plant licensees in LERs, in monthly operating reports, and for the ROP. These data are required by 10 CFR 50.73, “License Event Report System,” and/or plant specific technical specifications, or are submitted by all plants. Detailed NRC guidelines and procedures are in place to control each of these reporting processes. The NRC periodically reviews these procedures for appropriateness and also in response to licensee feedback. The NRC also conducts periodic inspections of licensees’ processes for collecting and submitting the data to ensure completeness, accuracy, consistency, timeliness, and validity.

All licensees report the data at least quarterly. The NRC staff reviews all of the data and conducts inspections to verify safety significant information. The NRC also employs a contractor to review the data submitted by licensees, input the data into a database, and compile the data into various indicators. The agency has established quality assurance processes and included these in the statement of work for the contract. The experience and training of key personnel are controlled through administration of the contract. The contractor identifies discrepancies to both licensees and the NRC for resolution. The NRC reviews the indicators and publishes them on the agency’s Web site on a quarterly basis. The agency also incorporates feedback from licensees and the public, where appropriate.

The target value is set based on the expected addition of several indicators and a change in the long-term trending methodology.

**Validation:**

The data and indicators that support reporting against

this performance measure provide a broad range of information on nuclear power plant performance. The NRC staff tracks indicators and applies statistical techniques to provide an indication of whether industry performance is improving, steady, or degrading over time. If the staff identifies any adverse trends, the NRC addresses the problem through its processes for addressing generic safety issues and issuing generic communications to licensees. The NRC is developing additional, risk-informed indicators to enhance the current set of indicators. In doing so, the staff considers the costs and benefits of collecting the data through ongoing, extensive interactions with industry regarding the indicators. Senior agency managers review the industry trends program annually and report the results to the Commission.

- Number of events with radiation exposures to the public and occupational workers from nuclear reactors that exceed Abnormal Occurrence Criteria I.A.

**Reactor Safety Target:** 0

**Verification:**

Licensees report all overexposures to NRC and NRC forwards the reports to Oak Ridge National Laboratory. The laboratory codes and enters these reports into a searchable database called the Sequence Coding and Search System (SCSS) Licensing Event Report (LER) database. The SCSS database is used to identify those LERs that report overexposures. NRC resident inspectors stationed at each nuclear power plant provide a high degree of assurance that licensees report all events meeting reporting criteria to the NRC. In addition, the NRC conducts inspections if there is any indication that an exposure exceeded, or could have exceeded, a regulatory limit. Finally, areas of the facility that may be subject to radiation contamination have monitors that record radiation levels. These monitors would immediately reveal any instances in which high levels of radiation exposure occurred.

**Validation:**

Given the nature of using radioactive materials to generate power, overexposure to radiation is a potential danger from the operation of nuclear power

plants. Such exposure to radiation in excess of the applicable regulatory limits may potentially occur through either a nuclear accident or other malfunction at the plant. Consequently, tracking the number of overexposures that occur at nuclear reactors is an important indicator of the degree to which safety is being maintained.

- Number of radiological releases to the environment from nuclear reactors that exceed applicable regulatory limits.

**Reactor Safety Target: 0**

**Verification:**

As with worker overexposures, licensees report environmental releases of radioactive materials that are in excess of regulations or license conditions through the SCSS LER database maintained at the Oak Ridge National Laboratory. The SCSS database will be utilized to identify those LERs reporting releases and the number of reported releases is then applied to this measure. The NRC also conducts periodic inspections of licensees to ensure that they properly monitor and control releases to the environment through effluent pathways. In addition, onsite monitors record any instances in which the plant releases radiation into the environment. If the inspections or the monitors reveal any indication that an accident or inadvertent release has occurred, the NRC conducts followup inspections.

**Validation:**

The generation of nuclear power creates radioactive materials that are released into the environment in a controlled manner. These radioactive discharges are subject to regulatory controls that limit the amount discharged and the resultant dose to members of the public. Consequently, the NRC tracks all releases of radioactive materials in excess of regulatory limits as a performance measure because large releases in excess of regulatory limits have the potential to endanger public safety or harm the environment. The NRC inspects every nuclear power plant for compliance with regulatory requirements and specific license conditions related to radiological effluent releases. The inspection program includes enforcement actions in response to violations of the regulations or license conditions, based on the severity of the event.

This performance measure includes dose values that are classified as being as low as reasonably achievable (ALARA), contained in Appendix I, "Numerical Guides for Design Objectives and Limiting Conditions for Operation to Meet the Criterion 'As Low as is Reasonably Achievable' for Radioactive Material in Light-Water-Cooled Nuclear Power Reactor Effluents," to 10 CFR Part 50 as well as the public dose limits contained in 10 CFR Part 20. The performance measure is set to 2 because it includes ALARA values, which are not safety limits, and because 10 CFR Part 50, Appendix I, allows licensees to temporarily exceed the ALARA dose values, for good reason.

**STRATEGIC GOAL 1: SAFETY**

Ensure Adequate Protection of Public Health and Safety and the Environment

## Nuclear Material and Waste Safety

*Strategic Outcomes:*

- Prevent the occurrence of any inadvertent criticality events.
- Prevent the occurrence of any acute radiation exposures resulting in fatalities.
- Prevent the occurrence of any releases of radioactive materials that result in significant radiation exposures.
- Prevent the occurrence of any releases of radioactive materials that cause significant adverse environmental impacts.

*Performance Measures:*

- Number of events with radiation exposures to the public or occupational workers from radioactive material that exceed Abnormal Occurrence Criteria I.A.

**Materials Safety Target:** Less than or equal to 2

**Waste Safety Target:** 0

**Verification:**

This performance measure includes any event

involving licensed radioactive materials that results in significant radiation exposures (as defined by dose limits in the AO reporting criteria) to members of the public or occupational workers. Due to the extremely high doses employed during medical applications of radioactive materials, it is also appropriate to use as a criterion for this measure a radiation exposure that results in unintended permanent functional damage to an organ or a physiological system as determined by a physician. The agency uses AO Criterion I.A as the basis for this measure.

Should events meeting this threshold occur, the NRC and/or Agreement States would receive reports through a number of sources, primarily required licensee notifications. NRC summarizes these events into event notifications and preliminary notifications which are then widely disseminated to internal and external stakeholders.

The fuel facilities, materials, high level waste repository, decommissioning, and spent fuel storage and transportation programs are key elements in verifying the completeness and accuracy of licensee reports. The Integrated Materials Performance Evaluation Program (IMPEP) which is a performance-based evaluations of Agreement states and NRC regulatory programs also provides a mechanism to verify that Agreement States and NRC regions are consistently collecting and reporting such events as received from the licensees and entering them into Nuclear Material Events Database (NMED).

The NRC has taken a number of steps to improve the timeliness and completeness of materials event data. These steps include assessment of the NMED data during monthly staff reviews; emphasis and analysis during the IMPEP reviews; NMED training in headquarters, the regions, and in Agreement States; and discussions at all Agreement State and Conference of Radiation Control Program Directors (CRCPD) meetings.

### **Validation:**

There is a logical basis for using events involving radiation exposures to the public and occupational workers from radioactive material that exceed

Abnormal Occurrence Criterion I.A., as a performance measure for ensuring the protection of public health and safety. An event is considered an AO if it is determined to be significant from the standpoint of public health or safety. The NRC's regulatory process, including licensing, inspection, guidance, regulations, and enforcement activities, is designed to mitigate the likelihood of an event that would exceed Abnormal Occurrence Criterion I.A.

Events of this magnitude are rare. In the unlikely event that an AO should occur, the NRC or Agreement State technical specialists will confirm whether the criteria were met, with input provided by expert consultants, as necessary.

The NRC does not use statistical sampling of data to determine results. Rather, all event data are reviewed to determine if the performance measure has been met. There are two important data limitations in determining this performance measure. These include delay time for receiving information or the failure of NRC to become aware of an event that causes significant radiation exposures to the public or occupational workers. Although the Office of Nuclear Materials Safety and Safeguards (NMSS) and Office of Federal and State Materials and Environmental Management Programs (FSME) procedures and NRC regulations associated with event reporting include specific requirements for timely notifications, there is a lag time separating the occurrence of an event and the known consequences of an event.

The NRC believes the probability of not being aware of an event that causes significant radiation exposures to the public or occupational workers is very small. Periodic licensee inspections and regulatory reporting requirements are sufficient to ensure that an event of this magnitude would become known. If such an event occurred, it would result in prompt and thorough investigation of the event, its consequences, its root causes, and the necessary actions by the licensee and the NRC to mitigate the situation and prevent recurrence. In addition to these immediate actions, the NRC holds periodic meetings, where staff and management validate the occurrence of these events.



- Number of radiological releases to the environment that exceed applicable regulatory limits.

**Materials Safety Target:** Less than or equal to 2

**Waste Safety Target:** 0

**Verification:**

The NRC defines this performance measure as any release to the environment from the following activities: fuel facilities, materials, high-level waste repository, decommissioning, and spent fuel storage and transportation activities that exceed applicable regulations as defined in 10 CFR 20.2203(a)(3). In the event of such a release, the agency requires written report within 30 days. The nuclear materials safety performance measure target is less than or equal to five releases a year that meet this reporting criteria. The nuclear waste safety target is to have no releases that meet the reporting criteria.

Should an event meeting this threshold occur, the NRC and/or Agreement States would receive a report through a number of possible sources, primarily required licensee notifications. The NRC summarizes these events into event notifications and preliminary notifications, which are then widely disseminated to internal and external stakeholders.

The fuel facilities, materials, high level waste repository, decommissioning, and spent fuel storage and transportation programs are key elements in verifying the completeness and accuracy of licensee reports. The IMPEP also provides a mechanism to verify that Agreement States and NRC regions are consistently collecting and reporting such events, as received from the licensees, and entering them into NMED.

The NRC has taken a number of steps to improve the timeliness and completeness of materials event data. These steps include assessment of the NMED data during monthly staff reviews; emphasis and analysis during the IMPEP review; NMED training in headquarters, the regions, and in Agreement States; and discussions at all Agreement State and CRCPD meetings.

**Validation:**

The regulations in 10 CFR Part 20 provide standards for protection against radiation. There is a logical basis for tracking releases subject to the 30 day reporting requirement under 10 CFR 20.2203(a)(3)(ii) as a performance measure for ensuring the protection of the environment. The NRC's regulatory process, including licensing, inspection, guidance, regulations, and enforcement activities, is sufficient to ensure that releases of radioactive materials that exceed regulatory limits are infrequent.

In the unlikely event that a release to the environment exceeds regulatory limits, the NRC or Agreement State technical specialists or our consultants will confirm whether the criteria were met, with input provided by expert consultants, as necessary.

The NRC does not look at statistical sampling of data to determine results. Rather, all event data are reviewed to determine if the performance measure has been met. There are two important data limitations in determining this performance measure. These include delay time for receiving information or the failure of NRC to become aware of an event that causes environmental impacts. Although NMSS and FSME procedures and NRC regulations associated with event reporting include specific requirements for timely notifications, there is a lag time separating the occurrence of an event and the known consequences of an event.

The NRC believes the probability of not being aware of an event that causes a radiological release to the environment that exceeds applicable regulations is very small. Periodic licensee inspections and regulatory reporting requirements are sufficient to ensure that the NRC would know of an event of this magnitude.

If such an event occurred, it would result in a prompt and thorough investigation of the event, its consequences, its root causes, and the necessary actions by the licensee and the NRC to mitigate the situation and prevent recurrence. In addition to these immediate actions, the NRC holds periodic meetings, where staff and management validate the occurrence of these events.

**STRATEGIC GOAL 2: SECURITY**

Ensure Adequate Protection in the Secure Use and Management of Radioactive Materials

## Nuclear Reactor and Nuclear Materials and Waste Security

### *Strategic Outcome*

Prevent any instances where licensed radioactive materials are used domestically in a manner hostile to the security of the United States

### *Performance Measures*

- Unrecovered losses or thefts of risk significant radioactive sources is 0.

Under Abnormal Occurrence Criterion I.C.1, the agency counts any unrecovered lost, stolen, or abandoned sources that exceed the values listed in Appendix P, “Category 1 and 2 Radioactive Material,” to 10 CFR Part 110, “Export and Import of Nuclear Equipment and Material.” Excluded from reporting under this criterion are those events involving sources that are lost, stolen, or abandoned under certain conditions. Such excluded sources include the following:

1. Sources abandoned in accordance with the requirements of 10 CFR 39.77(c).
2. Sealed sources contained in labeled, rugged source housings.
3. Recovered sources with sufficient indication that doses in excess of the reporting thresholds specified in Abnormal Occurrence Criteria I.A.1 and I.A.2 did not occur during the time the source was missing.
4. Unrecoverable sources lost under such conditions that doses in excess of the reporting thresholds specified in Abnormal Occurrence Criteria I.A.1 and I.A.2 were not known to have occurred.
5. Other sources that are lost or abandoned and declared unrecoverable, for which the agency has determined that the risk significance of the source

is low based on the location (e.g., water depth) or physical characteristics (e.g., half life, housing) of the source and its surroundings where all reasonable efforts have been made to recover the source, and where it has been determined that the source is not recoverable and would not be considered a realistic safety or security risk under this measure.

### **Verification:**

Losses or thefts of radioactive material greater than or equal to 1000 times the quantity specified in Appendix C, “Quantities of Licensed Material Requiring Labeling,” to 10 CFR Part 20 must be reported (per 10 CFR 20.2201(a)) by telephone to the NRC Headquarters Operations Center or Agreement State immediately (interpreted as within 4 hours) if the licensee believes that an exposure could result to persons in unrestricted areas. If an event meeting the thresholds described above occurs, it would be reported through a number of sources, but primarily through this required licensee notification. Events that are publicly available are then entered and tracked in NMED, which is an essential system used to collect and store information on such events. Separate methods are used to track events that are not publicly available. Additionally, licensees must meet the reporting and accounting requirements in 10 CFR Part 73, “Physical Protection of Plants and Materials,” and 10 CFR Part 74, “Material Control and Accounting of Special Nuclear Material.”

The NRC’s inspection programs are key elements in verifying the completeness and accuracy of licensee reports. The IMPEP also provides a mechanism to verify that Agreement States and the NRC regions are consistently collecting and reporting such events as received from the licensees and are entering these events in NMED. In some cases, upon receiving a report, the NRC or Agreement State initiates an independent investigation that verifies the reliability of the reported information. When performed, these investigations enable the NRC or Agreement State to verify the accuracy of the reported data.

The regulation in 10 CFR 20.2201(b) requires a written report within 30 days for lost or stolen sources that are greater than or equal to 10 times the quantity specified in Appendix C to 10 CFR Part 20 if the source is still missing at that time. In addition, 10 CFR 20.2201(d)

requires an additional written report within 30 days of a licensee learning any additional substantive information. The NRC interprets this requirement as including reporting recovery of sources.

The NRC issued guidance in the form of a Regulatory Information Summary (RIS) 2005 21, "Clarification of the Reporting Requirements in 10 CFR 20.2201," to clarify the current 10 CFR 20.2201(d) requirement for reporting recovery of a risk-significant source. FSME asked the Agreement States to send copies of RIS 2005 21 (or equivalent document) to their licensees. The NRC issued the National Source Tracking System final rule in November 2006. On January 31, 2009, NRC licensees and Agreement State licensees were required to begin reporting information on source transactions to the National Source Tracking System. Implementation of this system creates an inventory of risk-significant sources. This rulemaking established reporting requirements for risk-significant sources (including reporting timeframes) by adding specific requirements to 10 CFR 20.2201, "Reports of Theft or Loss of Licensed Material," for risk significant sources, including a requirement for licensees to report the recovery of a risk significant source within 30 days of recovery.

**Validation:**

Events collected under this performance measure are actual losses, thefts, or diversions of materials described above. Such events could compromise public health and safety, the environment, and the common defense and security. Events of this magnitude are rare. The information reported under 10 CFR Part 73 and 10 CFR Part 74 is required so that the NRC is aware of events that could endanger public health and safety or national security. Any failures at the level of the strategic plan would result in immediate investigation and followup.

If an event subject to the reporting requirements described above occurs, it would result in a prompt and thorough investigation of the event, its consequences, its root causes, and the necessary actions by the licensee, the NRC, and/or an Agreement State to mitigate the situation and prevent recurrence.

- Number of substantiated cases of actual theft or diversion of licensed risk significant radioactive

sources or a formula quantity of special nuclear material or act that results in radiological sabotage is 0.

**Verification:**

In Abnormal Occurrence Criterion I.C.2, "substantiated" means a situation that requires additional action by the agency or other proper authorities because of an indication of loss, theft, or unlawful diversion that cannot be refuted following an investigation. Such a substantiated situation may include an allegation of diversion, report of lost or stolen material, statistical processing difference, or other indication of loss of material control or accountability. The regulations of 10 CFR 70.4, "Definitions," define a formula quantity of special nuclear material; the regulations of 10 CFR 73.2, "Definitions," define radiological sabotage. Licensees subject to the requirements of 10 CFR Part 73 must call the NRC within 1 hour of an occurrence to report any breaches of security or other event that may potentially lead to theft or diversion of material or to sabotage at a nuclear facility. The NRC's safeguards requirements are described in 10 CFR 73.71, "Reporting of Safeguards Events"; Appendix G, "Reportable Safeguards Events," to 10 CFR Part 73; and 10 CFR 74.11, "Reports of Loss or Theft or Attempted Theft or Unauthorized Production of Special Nuclear Material." The information assessment team composed of NRC headquarters and regional staff members would conduct an immediate assessment for any significant events to determine any further actions that are needed, including coordination with the intelligence community and law enforcement. In accordance with 10 CFR 73.71(d), the licensee must also file a written report within 60 days of the incident describing the event and the steps that the licensee took to protect the nuclear facility. This information will enable the NRC to adequately assess whether radiological sabotage has occurred.

**Validation:**

Events subject to reporting requirements are those that endanger the public health and safety and the environment through deliberate acts of theft or diversion of material or through sabotage directed against the nuclear facilities that the agency licenses. Events of this type are extremely rare. If such an event

occurs, it would result in a prompt and thorough investigation of the event, its consequences, its root causes, and the necessary actions by the licensee or the NRC to mitigate the situation and prevent recurrence. The investigation ensures the validity of the information and assesses the significance of the event.

- Number of substantiated losses of a formula quantity of special nuclear material or substantiated inventory discrepancies of a formula quantity of special nuclear material that are judged to be caused by theft or diversion or substantial breakdown of the accountability system is 0.

### Verification:

Licensees must record events associated with Abnormal Occurrence Criterion I.C.3 within 24 hours of the identified event in a safeguards log maintained by the licensee. The licensee must retain the log as a record for 3 years after the last entry is made or until termination of the license. The NRC relies on its safeguards inspection program to ensure the reliability of recorded data. The NRC makes a determination of whether a substantiated breakdown has resulted in a vulnerability to radiological sabotage, theft, diversion, or unauthorized enrichment of special nuclear material. When making substantiated breakdown determinations, the NRC evaluates the materials event data to ensure that licensees are reporting and collecting the proper event data.

### Validation:

“Substantiated” means a situation that requires additional action by the agency or other proper authorities because of an indication of loss, theft, or unlawful diversion that cannot be refuted following an investigation. Examples of such a substantiated situation may include an allegation of diversion, report of lost or stolen material, statistical processing difference, other system breakdown closely related to the material control and accounting program (such as an item control system associated with the licensee’s facility information technology system), or other indication of loss of material control or accountability. The regulations of 10 CFR 70.4, “Definitions,” define a formula quantity of special nuclear material. Events collected under this performance measure may

indicate a vulnerability to radiological sabotage, theft, diversion, or loss of special nuclear materials. Such events could compromise public health and safety, the environment, and the common defense and security. The NRC relies on its safeguards inspection program to help validate the reliability of recorded data and determine whether a breakdown of a physical protection or material control and accounting system has actually resulted in vulnerability.

- Number of substantial breakdowns of physical security or material control (i.e., access control containment or accountability systems) that significantly weaken the protection against theft, diversion, or sabotage is 0.

### Verification:

The Abnormal Occurrence Criterion I.C.4, defines a “substantial breakdown” as any of the following:

- A red finding in the security inspection program;
- Any plant or facility determined to have overall unacceptable performance; and
- Any plant or facility in a shutdown condition (inimical to the effective functioning of the nation’s critical infrastructure) as a result of significant performance problems and/or operational events.

Radiological sabotage is defined in 10 CFR 73.2, “Definitions.” Based on the requirements in 10 CFR 73.71, “Reporting of Safeguards Events” and 10 CFR Part 73, Appendix G, “Reportable Safeguards Events,” the NRC requires licensees to report, immediately after the occurrence becomes known, any known breakdowns of physical security. If a licensee reports such an event, the headquarters operations officer prepares an official record of the initial event report. The NRC begins responding to such an event immediately upon notification by activating its information assessment team. A licensee must follow its initial telephone notification with a written report submitted to the NRC within 30 days.

Within 24 hours, the licensee must record in a safeguards log breakdowns of physical protection resulting in a vulnerability to radiological sabotage, theft, diversion, or loss of special nuclear materials

or radioactive waste. The licensee must maintain and retain the log as a record for 3 years after the last entry is made or until termination of the license. Licensees subject to 10 CFR Part 73 must also meet the reporting requirements detailed in 10 CFR 73.71. The NRC evaluates all of the reported events based on the criteria in 10 CFR 73.71 and Appendix G to 10 CFR Part 73. The NRC also maintains and relies on its safeguards inspection program to ensure the reliability of recorded and reported data.

### Validation:

Events assessed under this performance measure are those that threaten nuclear activities by deliberate acts, such as radiological sabotage, directed against facilities. If a licensee reports such an event, the information assessment team evaluates and validates the initial report and determines any further actions that may be necessary. Tracking breakdowns of physical security indicates whether the licensee is taking the necessary security precautions to protect the public, given the potential consequences of a nuclear accident attributable to sabotage or the inappropriate use of nuclear material either in this country or abroad.

Events collected under this performance measure may indicate a vulnerability to radiological sabotage, theft, diversion, or loss of special nuclear materials or radioactive waste. Such events could compromise public health and safety, the environment, and the common defense and security. The NRC relies on its safeguards inspection program to help validate the reliability of recorded data and determine whether a breakdown of a physical protection or material control and accounting system has actually resulted in a vulnerability.

- Number of significant unauthorized disclosures of classified or safeguards information is 0.

### Verification:

With regard to Abnormal Occurrence Criterion I.C.5, any alleged or suspected violations by NRC licensees of the Atomic Energy Act, Espionage Act, or other Federal statutes related to classified or safeguards information must be reported to the NRC under the requirements of 10 CFR 95.57(a) (for classified

information); 10 CFR Part 73, "Physical Protection of Plants and Materials" (for safeguards information); and NRC orders (for safeguards information subject to modified handling requirements). However, for performance reporting, the NRC would only count those disclosures or compromises that actually cause damage to the national security or to public health and safety. Such events would be reported to the cognizant security agency (i.e., the security agency with jurisdiction) and the regional administrator of the appropriate NRC regional office, as listed in Appendix A, "U.S. Nuclear Regulatory Commission Offices and Classified Mailing Addresses," to 10 CFR Part 73. The regional administrator would then contact the division of security operations at NRC headquarters, which would assess the violation and notify other NRC offices and other Government agencies, as appropriate. The agency would make a determination as to whether the compromise damaged the national security or public health and safety. Any unauthorized disclosures or compromises of classified or safeguards information that damaged the national security or public health and safety would result in immediate investigation and followup by the NRC. In addition, NRC inspections will verify that licensees' routine handling of classified and safeguards information (including safeguards information subject to modified handling requirements) conforms to established security information management requirements.

Any alleged or suspected violations of this performance measure by NRC employees, contractors, or other personnel would be reported in accordance with NRC procedures to the Director of Division of Facilities and Security at NRC headquarters. The NRC maintains a strong system of controls over national security and safeguards information, including (1) annual required training for all employees, (2) safe and secure document storage, and (3) physical access control in the form of guards and badged access.

### Validation:

Events collected under this performance measure are unauthorized disclosures of classified or safeguards information that damage the national security or public health and safety. Events of this magnitude are rare. If such an event occurs, it would result in a prompt and thorough investigation,

including consequences, root causes, and necessary actions by the licensees and the NRC to mitigate the consequences and prevent recurrence. NRC

investigation teams also validate the materials event data to ensure that licensees are reporting and collecting the proper event data.