Handbook on Nuclear Material Event Reporting for the Agreement States

Final Report

Month 2022

Office of Nuclear Material Safety and Safeguards

U.S. Nuclear Regulatory Commission

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AVAILABILITY OF REFERENCE MATERIAL
NRC documents: Event Notifications, Inspection Manuals and Procedures, NUREG Series technical reports, Regulatory Guides, etc. are available at the NRC Public Web site under NRC Library at: http://www.nrc.gov/reading-rm/doc-collections/. The Office of Nuclear Material Safety and Safeguards (NMSS) State Agreement procedures are available at: https://scp.nrc.gov/procedures.html. This Handbook corresponds with NMSS Procedure SA–300, "Reporting Material Events." This document can be obtained from the Agencywide Documents Access and Management System (ADAMS) using ADAMS Accession No. ML21165A162 at: https://www.nrc.gov/reading-rm/adams.html.

Paperwork Reduction Act Statement

This handbook provides voluntary guidance for implementing the mandatory collection of Nuclear Material Event Notifications that are subject to the Paperwork Reduction Act of 1995 (44 U.S.C. 3501 et. seq.). The burden to the Agreement States is estimated to average 1.5 hours for events of routine significance and 3 hours for events of higher significance. These information collections were approved by the Office of Management and Budget (OMB), approval number 3150-0178. Send comments regarding this information collection to the FOIA, Library, and Information Collections Branch (T6-A10M), U.S. Nuclear Regulatory Commission, Washington, DC 20555 0001, or by e mail to Infocollects.Resource@nrc.gov, and to the OMB reviewer at: OMB Office of Information and Regulatory Affairs (3150 0178), Attn: Desk Officer for the Nuclear Regulatory Commission, 725 17th Street, NW Washington, DC 20503; e mail: oira_submission@omb.eop.gov.

Public Protection Notification

If a document does not display a currently valid OMB control number, the NRC may not conduct or sponsor, and a person is not required to respond to, the information collection.

Abstract

The handbook describes the procedures to be followed in reporting material events to the NRC. The handbook includes information that should be reported, the level of detail, and how to report. Information is also provided on obtaining Federal assistance for radiological emergencies and identifying and reporting abnormal occurrences.

The review and analysis of operational event information increases the effectiveness of the U.S. Nuclear Regulatory Commission (NRC) and Agreement State regulatory programs by identifying safety- and security-significant events, and their causes. The information from reports of medical events, overexposures, equipment failures, and other events that have occurred involving the use of radioactive materials licensed by either the NRC or the Agreement States is invaluable in assessing trends or patterns and identifying possible inadequacies or unreliability of specific equipment or procedures. The reported information will aid in understanding why the events occurred and identify any actions necessary to prevent recurrence, improve the effectiveness of the NRC and Agreement States' regulatory programs, and ensure public health and safety. The information is also used in preparation of the NRC's performance report to Congress, the annual report to Congress on abnormal occurrences, and to support the United States' commitment to report to the International Atomic Energy Agency's international database of significant events.

This handbook, which supersedes the previous March 2013 version, has been developed to provide information to the staff of the Agreement States that are responsible for the preparation of reports for incidents and events involving the use of radioactive materials that occurred in their State. Reporting of Agreement State events to the NRC are mandatory for purposes of compatibility. For the purposes of this handbook, the terms "event" and "incident" may be used interchangeably.

Table of Contents

1. Introduction

This handbook contains guidance for Agreement States on reporting radioactive material events that occurred in their State to the U. S. Nuclear Regulatory Commission (NRC). The objectives of this handbook are to improve technical information, standardize format, ensure consistency, and facilitate information retrieval.

1.1. *Why do we collect event information?*

The NRC collects information on Agreement State events to:

- Assess the events against the Abnormal Occurrence (AO) criteria and report to the U.S. Congress as required by the Energy Reorganization Act of 1974.
- Assess the events (except medical events) against the International Atomic Energy Agency (IAEA) International Nuclear Event Scale (INES) to participate in international reporting.
- Perform operating experience assessments and evaluate for generic applicability, including generic issues, to ensure that any safety-significant issues are shared with the National Materials Program.

1.2. *Regulatory Authority*

The Atomic Energy Act of 1954 (Public Law (P.L.) 83–703) (AEA), Section 274, "Cooperation with States," allows States to assume regulatory authority over byproduct, source and/or certain quantities of special nuclear materials.

The criteria used by the U.S. Atomic Energy Commission (AEC) and NRC to evaluate State programs prior to entering into an Agreement recognized the importance of sharing information and the reporting of incidents. Criterion 26, *Relations with Federal Government and Other States,* in "Criteria for Guidance of States and AEC in Discontinuance of AEC Regulatory Authority and Assumption Thereof by States Through Agreement" (26 FR 2536; March 24, 1961) states:

> There should be an interchange of federal and state information and assistance in connection with the issuance of regulations and licenses or authorizations, inspection of licenses, reporting of incidents and violations, and training and education problems.

Although the 1961 criteria were revised in 1981 – 1983, Criterion 26 did not change. It is still used today by the NRC in its evaluation of applications for new Agreements.

The Energy Reorganization Act of 1974 (P.L. 93–438) (ERA), Section 208, “Abnormal Occurrence Reports,” requires the NRC to provide information on events that meet the AO criteria to Congress on an annual basis.

Under the Government Performance and Results Act Modernization Act of 2010 (P.L. 111–352), federal agencies are required to compare actual performance achieved with the performance goals established in the agency strategic plan. The NRC maintains NUREG–1614, “Strategic Plan,” and NUREG–1100, “Performance Budget/ Congressional Budget Justification.” Event coordination is used to demonstrate the ability to ensure the safe and secure use of radioactive materials.

Due to the importance of nationwide operating experience as an element in the regulatory process for ensuring that licensed activities are conducted safely, the Commission directed the staff to make Agreement State reporting of events to NRC an item of compatibility in SECY-97-1997, *Final Recommendations on Policy Statements and Implementing Procedures For: "Statement of Principles and Policy for the Agreement State Program" and "Policy Statement on Adequacy and Compatibility of Agreement State Programs,"* dated June 30, 1997. On May 7, 1998, NRC’s Office of State Programs transmitted the All-Agreement State Letter SP–98–040, *Guidance for Reporting Material Events,* which included the first final version of SA–300 and the Handbook. SP–98–040 also indicated that the reporting of incidents and events is now required for compatibility and would be evaluated under IMPEP.

On October 18, 2017, the NRC reissued the revised “Agreement State Program Policy Statement (82 FR 48535).” Section E, *Adequacy and Compatibility*, states that “In accordance with Section 274 of the AEA, any State that chooses to establish an Agreement State program must provide for an acceptable level of protection of public health and safety.

Section E(1)(v), *Incident and Allegations*, states that:

> The Agreement State shall respond to and conduct timely inspections or investigations of incidents, reported events, and allegations involving agreement material within the State’s jurisdiction to provide reasonable assurance of protection of public health and safety.

Licensees are required to report nuclear material events in accordance with 10 CFR Parts 20, 30, 31, 34, 35, 36, 37, 39, 40, 70, and 71 or equivalent state regulations.

2. Reporting Material Events

Agreement State licensees are required by regulation to report events to their respective Agreement State regulatory agency. As an item of compatibility, the Agreement States provide reports of incidents and events involving radioactive materials by Agreement State licensees to the NRC.

a. ***Timeliness***

Agreement States should report events to the NRC on the same timeframe that licensees report to the Agreement State. For example, if a report is due from the licensee to the Agreement State in 24 hours, the Agreement State report is due to the NRC within 24 hours of receiving the event report from the licensee. This timeliness metric is reviewed during IMPEPs.

If the Agreement State receives an allegation that also meets the regulatory reporting requirements, the Agreement State should first assess the concern in their allegation program before reporting. The timeliness clock does not start until after the allegation is confirmed.

b. ***What Should Be Reported***

Agreement States should consult the actual reporting requirements provided in Title 10 of the *U.S. Code of Federal Regulations* (10 CFR) to determine if an event is reportable or consult with their Regional State Agreements Officer. These reporting requirements form the basis for the compatible reporting requirements in Agreement State regulations.

Appendix A, "NRC Regulatory Reporting Requirements," lists reporting requirements for the most common radioactive material events. Appendix A provides the specific regulatory requirement, a brief description of the reporting requirement, and the periodicity for reporting. It should be noted that the information in Appendix A is only to be used as a reference and does not contain all reporting requirements.

Appendix B, "Examples of Reportable Events," provides examples of reportable radioactive material events or occurrences that are required to be reported by both the NRC and Agreement State licensees. Appendix C, "Reporting Methods," contains a summary of the methods available for contacting the NRC, National Response Center, and other regulatory agencies.

c. ***Assign Event Report Identification Number***

The Agreement State's Event Report Identification Number should appear on all event reports, including initial and follow-up reports. The Event Report Identification Number should consist of the two letter State agency ID, two-digit year corresponding to the reporting year, and a sequentially assigned four-digit ID number. The Event Report Identification Number should be referenced by the Agreement State for all reports made to the HOC and all written reports.

2.1. *Reports to the NRC Headquarters Operations Center*

For immediate reports and 24-hour reports, the Agreement States should report events to the NRC's Headquarters Operations Center (HOC). The Agreement States should e-mail the reports to the HOC with a follow-up telephone call, however any of the following communication types are acceptable:

- Telephone: (301)-816-5100
- E-mail: HOO.HOC@nrc.gov
- Fax number: (301)-816-5151

When submitting an initial event report, provide as much information as is known at the time the report is prepared. It is understood that the initial report may be incomplete. Agreement States should report follow-up event information as it becomes available. Agreement States should assign and provide an Event Report Identification Number for each reported event.

Appendix D, "Sample Fax Sheet to the HOC," includes an example on how to report events using fax.

The HOC staff will promptly notify NMSS and the appropriate Region. A record is created in NMED for each event reported to the HOC.

2.2. *Written Reports*

Agreement States should submit written reports to the NRC.

a. ***Basic Event Information***

When submitting a written report, Agreement States should provide as much information as is known at the time the report is prepared. These reports should be comprehensive and contain all currently available information. Appendix E, "Minimum Required Event Information," provides a listing of the minimum event information that should be provided. It is understood that initial information may be incomplete, and Agreement States will provide follow-up reports later, as appropriate.

b. ***Sensitive Information***

Personal or sensitive information should **not** be included in event descriptions (e.g., names, personal addresses, or social security-numbers).

Agreement States should refrain from providing information that is considered sensitive (e.g., personal privacy, proprietary, and/or security related information). Do not include controlled unclassified information. If such information is required to

describe the event, the Agreement State should provide a bracketed copy of the information that identifies the information that should be protected and a redacted copy of the information that deletes such information.

c. ***Units***

All event reports should include the international system of units (SI system) as well as conventional units. Include the SI units first with the conventional unit equivalent following in parentheses (e.g., 730 megabecquerel (MBq) (20.4 mCi)).

Spell out the dose unit the first time it appears and then continue with an abbreviation. For example, a dose should be described as 1,000 centiGray (cGy) (1,000 rad) the first time and continue with 1,000 cGy (1,000 rad).

d. ***Create a File***

The NMED Agreement State software allows users to create a file (report) to either upload or e-mail.

An electronic copy of the NMED users guide has been included in the NMED Agreement State software. If additional assistance is needed, contact information is provided on the NMED Web site under "contact us."

e. ***Submission Methods***

Agreement States may provide written reports using NMED, e-mail, or the mail. Submitting written reports electronically is the most time-efficient option.

Upload to NMED

Submit the written reports electronically using the document "Upload" function in NMED.

Send through E-mail

E-mail an attached file to NMED@inl.gov.

Submission through the Mail

Mail to the attention of the Chief, Medical Safety & Events Assessment Branch (MSEB). Written reports submitted through the mail should be in an optical character recognition format.

Include a cover page with mail sent to the NRC. Appendix F, "Event Report Cover Page," provides an example. The cover page helps ensure that the written report is handled appropriately by the Document Control Desk staff.

Director
Division of Materials Safety, Security, State,
and Tribal Programs
Office of Nuclear Material Safety and
Safeguards
U.S. Nuclear Regulatory Commission
11545 Rockville Pike

Rockville, MD 20852-2738
Attention: Chief, Medical Safety & Events Assessment Branch, Mail Stop T5B60

2.3. *Reporting Follow-up Information*

The Agreement States should submit a follow-up event report to provide additional information, including:

a. The results of investigations as to what, where, when and how the event or conditions occurred.

b. The root cause(s) and/or the corrective actions made to prevent recurrence, if applicable.

c. All investigative information obtained through closeout of the event.

d. The document(s) or clear reference to documents on file that the Agreement State used to generate the NMED record (e.g., a licensee inspection report dated mm/dd/yy), if applicable and appropriate.

e. Any follow-up information that revises earlier information or provides additional information on a given event to ensure a complete historical record.

2.4. *Voluntary Reporting*

The Agreement States may voluntarily report an occurrence that they believe might be of safety significance, generic interest, or involves media interest. The Agreement State should identify the situation and provide any explanation of why they are reporting. Most non-reportable reports are not recorded in NMED; however, the HOC shares the information with NMSS with a Logbook Entry.

2.5. *Reporting Theft or Terrorist Activities*

The Agreement States should contact the U.S. Federal Bureau of Investigation (FBI) or their local law enforcement if an event involves the possibility of *terrorist activities or the theft of radioactive material*. Afterwards, the Agreement State should provide a concurrent report to the HOC. If it is not clear whether an event should be categorized as a possible theft or terrorist activity, the Agreement State should contact the HOC for assistance in determining if the event should be reported.

10 CFR Part 37, “Physical Protection of Category 1 and Category 2 Quantities of Radioactive Material” contains reporting requirements. Agreement States are required to immediately notify their appropriate local law enforcement agency and/or the FBI in cases involving actual or attempted theft, sabotage, or diversion of radioactive material containing

quantities greater than or equal to the quantities of concern of radioactive material in accordance with 10 CFR 37.57, “Reporting of Events.” The Agreement States should compare the type and quantity of radionuclides involved against the Category 1 and Category 2 columns in Table 1 of 10 CFR Part 37, “Appendix A, “Category 1 and Category 2 Radioactive Materials,” to determine if reporting thresholds were exceeded. For the purposes of reporting events for these quantities of radioactive material, the Agreement States should have compatible or more restrictive regulations (10 CFR 37.57 is a Compatibility Category C).

Agreement States should consider notifying the FBI or their local law enforcement in all cases of actual theft, sabotage, diversions, and possible terrorism of radioactive material, regardless of the quantity of radioactive material involved. Additionally, they should coordinate their communications with other local, Federal and State Agencies (including the HOC) to ensure that shared information is accurate and consistent. The Agreement State should consider issuance of a press release, based on the health and safety significance of the event.

The U.S. Code assigns lead responsibility for material events involving theft or terrorist activities to the FBI. The All-Agreement State Letter SP–98–038, dated May 5, 1998, addressed the revision to the U.S. Code regarding the expansion of the FBI criminal investigative jurisdiction to include byproduct material.

3. Government Collaboration

3.1. *Assistance from the NRC*

Agreement States perform the event follow-up and investigation for events within their jurisdiction. For events with significant safety or security concerns, the Agreement State may request assistance from the NRC. The Agreement State should contact the HOC if activation of the NRC Incident Response Program may be likely to occur. If the Agreement State needs assistance in assessing the scale and/or safety impact of an event or assistance in calculating the dose, the Agreement State should contact their Regional State Agreement Officer (RSAO).

See NRC Inspection Manual Chapter (IMC) 1330, "Response to Transportation Accidents Involving Radioactive Materials," and IMC 1360, "Use of Physicians and Scientific Consultants in the Medical Consultant Program."

3.2. *Radiological Emergency Response Assistance Available to the States*

Agreement States may request radiological emergency response assistance by contacting the HOC. The Federal government, upon request, has the capability to assist States in responding to radiological emergencies. Under the National Response Framework, the NRC is the coordinating agency for domestic incident management for incidents involving radioactive materials or facilities licensed by the NRC or Agreement States. As the coordinating agency, the NRC may request assistance from other federal agencies (e.g., Department of Homeland Security, Department of Energy, etc.) or from other States.

See IMC 1303, "Requesting Emergency Acceptance of Radioactive Material by the U.S. Department of Energy (DOE)."

3.3. *Congressional Inquiries*

The Agreement State has the lead in investigating events within their jurisdiction, however any inquiries from the U.S. Congress pertaining to these actions will be received by the NRC. The RSAO should contact the Agreement State to raise awareness of the inquiry and to obtain an answer as soon as possible, if appropriate. If the congressional inquiry is in depth, NMSS and/or Office of Congressional Affairs staff will issue a letter to the Agreement State and include a due date for the response.

3.4. *Emergency Suspension of State Agreement*

In the instance that the NRC or the State's Governor determines an emergency may threaten safety or security, then the SA–112, "Emergency Suspension of Section 274b. Agreement," should be referenced. A temporary suspension of the Agreement would only remain in effect for such time as the emergency exists and shall authorize the NRC to exercise its authority only to the extent necessary to contain or eliminate the danger.

The procedure describes the temporary suspension of an agreement with the State without notice or hearing if, in the judgement of the NRC an emergency situation exists with respect to any material covered by such an agreement creating danger which requires immediate action to protect the health or safety of persons either within or outside of the State, and the State has failed to take steps necessary to contain or eliminate the cause of the danger within a reasonable time after the situation arose.

3.5. *Evaluation of Program Implementation*

Event response is reviewed during the IMPEP in accordance with State Agreements procedure SA–105, "Reviewing the Common Performance Indicator, Technical Quality of Incident and Allegation Activities." The overall finding of the State's performance will be made in accordance with NRC Management Directive (MD) 5.6, "Integrated Materials Performance Evaluation Program (IMPEP)."

4. Nuclear Materials Events Database (NMED)

4.1. *What is NMED?*

NMED is a database that contains records of events involving radioactive material that were reported by NRC's licensees, Agreement States, and non-licensees. This database supports the collection, storage, and assessment of events. The data may be accessed by the NRC staff, Agreement State staff, and other users authorized by the NRC.

NMED contains a historical collection of information on the occurrence, description, and resolution of events involving the use of radioactive material in the United States. The data includes information on material events from January 1990 through the present.

The database is maintained by NMSS through a contractor. NMSS will notify the Agreement States of any changes made to NMED.

4.2. *Access to NMED*

The NMED Web site is at https://nmed.inl.gov/Home/frmLogin. NMED is not publicly available. To gain Log In credentials, contact the NRC NMED Project Manager by e-mail at NMEDNRC@nrc.gov. Access to NMED is only provided to the NRC, Agreement States, other federal government agencies, and/or federal government contractors who have the need to use the information in NMED.

4.3. *Download Software*

The NMED Agreement State software is available to download under the "Downloads" section of the menu. Users may download the software or use the web-based interface.

4.4. *Data Entry*

For guidance on data entry, Agreement States should reference the NMED Users' Guide. An electronic copy of the NMED Users' Guide is included with the NMED Agreement State software and can also be found on the NMED Web site under "Help."

4.5. *Events Reported to the HOC*

When events are reported to the HOC, they are entered into NMED. The NMED contractor uses the initial event information, as reported to the NRC, to establish a record in the NMED database. The Agreement State's Event Report Identification Number is included in the "Reference" field of the NMED record. This ensures that any subsequent updates are correctly associated with the initial event record. Each event entered into NMED is assigned a unique NMED item number.

4.6. *Searching NMED*

A search of the nationally collected event data is available on the NMED Web site with several drop-down, point-and-click menus available. Guidance on basic, advanced, and IMPEP-related searches can be found on the NMED website under "Help."

4.7. *Retracted Events*

The Agreement State may retract an event if it does not meet the threshold of the reporting regulation. A retracted event will be marked as "not reportable" in NMED, which excludes it from most searches. The NMED record will remain.

4.8. *Record Complete in NMED*

An NMED record is complete when the event information recorded within NMED meets the minimum set of information criteria established in Appendix E, "Minimum Required Event Information." This information may also be found on the NMED Web site under "Help." After the NMED contractor reviewed the event information and determined that it included the minimum set of information required for a complete event, the NMED contractor marks the NMED record as complete. Some NMED records are unable to ever be marked as complete.

4.9. *Records Closed in NMED*

A *complete* record remains open in NMED until the Agreement State has indicated the NMED record should be *closed*. Agreement States should notify the NMED contractor when the NMED record should be officially closed (i.e., no further follow-up planned and/or no additional information expected). The regulatory agency should ensure that the NMED record contains all pertinent technical information, including follow-up information, before

requesting the event be closed via e-mail or by including it in their event report update. An NMED record can be closed but not complete. In this instance, the NMED record is not complete, but no further action is planned.

Agreement States should follow-up and review material events through the closure of the event, which includes checking to see that the final report information was entered into NMED.

Search for NMED records that have been closed by the applicable regulatory agency under the field, "Event Closed by Region/State."

4.10. *Voluntary Reports and Non-reportable Records*

a. *History of*

Voluntary reporting was a joint national effort of the NRC and the Conference of Radiation Control Program Directors (CRCPD) to track unlicensed material, materials not subject to the AEA, or lost and found licensed radioactive material without an associated reporting requirement. The NMED database was expanded in 1998 to include voluntary reports of orphan discrete sources not subject to the AEA. This pertained to sources that were found, but the owner could not be identified. NMED was expanded again in 2002 to capture voluntary reports of lost or stolen discrete sources not subject to the AEA. This was done at the request of the CRCPD to support their national effort to track lost, stolen and recovered radioactive material of all types found in both Agreement and non-Agreement States. NMED captured all lost/stolen source events and marked them as either reportable or non-reportable per 10 CFR 20.2201, "Reports of theft or loss of material." However, commencing on April 1, 2019, NMED ceased capturing non-reportable events. Non-reportable records that were already in NMED will continue to be updated as new information is received. New non-reportable events are no longer entered.

b. *Current Practice*

NMED only captures reportable events and events where the reportability is currently unknown that may develop into reportable events when further information is received. Situations that cannot be tied to any reporting requirement (i.e., materials contaminated with radioactive material) are no longer tracked.

c. *Orphan Source*

For events where the owner of the radioactive source was not identified, the keyword, Orphan Source, is added to the NMED record. Orphan sources with quantities of licensed material *less than* the 10 CFR Part 20 Appendix C, "Quantities of Licensed Materials Requiring Labeling," are no longer tracked.

d. *Found Source*

A found source that is associated with a reporting requirement and a licensee is required to be reported. If it was not previously reported, then it should be reported. A found source with a quantity less than the reporting requirements (i.e. 10 CFR 20.2201, "Reports of theft

or loss of material'), can be voluntarily reported but it will not be tracked in NMED.

e. ***Landfill Radiation Monitor Alarms***

Records of landfill radiation monitor alarms are added into NMED, unless the calculated/estimated activity is provided to conclude that it is non-reportable. A record of the landfill radiation monitor alarms (with incomplete information) is marked as reportable or uncertain reportability in NMED, depending on the radionuclide and the NMED Coding Manual.

If the radionuclide that sets off landfill radiation monitor alarms is not provided, the reportability will be listed as uncertain. If the regulating agency assumes that a particular radionuclide was involved, that assumption will be listed in the NMED record.

A landfill radiation monitor alarm with incomplete information is treated as non-reportable if the waste came from a residence.

4.11. *NMED Annual Reports*

The NMED contractor provides an annual report to the NRC that presents information on the results of statistical analysis of event data and any safety significant concerns. The NMED Annual Reports are available in electronic form on the NMED Web site under "Publications."

5. NRC Publication of Event Notifications

Events reported to the HOC are entered into an Event Notification (EN) database on the NRC public Web site (https://www.nrc.gov/reading-rm/doc-collections/event-status/index.html). These events are publicly available and are added after a 5 business day hold. This hold includes the day of notification. For example, a report to the HOC made on a Wednesday is released on the following Wednesday. As a result of public access to this information, Agreement States may be contacted by the public or media regarding events. Retracted events are not added or are removed after retraction.

6. Abnormal Occurrence

6.1. *AO Policy Information*

Section 208 of the Energy Reorganization Act of 1974 (ERA) (Public Law 93-438, 42 USC 5848) identifies an Abnormal Occurrence (AO) as an unscheduled incident or event that the NRC determines to be significant from the standpoint of public health or safety.

Section 208 of the Act requires that the NRC inform Congress of these types of events. It indicates that each report to Congress shall contain:

(1) The date and place of each occurrence;

(2) The nature and probable consequence of each occurrence;

(3) The cause or causes of each; and

(4) Any action taken to prevent recurrence.

The NRC is required by Section 208 of the ERA to widely disseminate AO information to the public within 15 days of receiving information on each individual AO. The Federal Reports Elimination and Sunset Act of 1995 requires that AOs be reported to Congress on an annual basis.

6.2. *AO Criteria*

The AO criteria is included in NUREG–0090, "Report to Congress on Abnormal Occurrences," Appendix A, "Abnormal Occurrence Criteria," at http://www.nrc.gov/reading-rm/doc-collections/nuregs/staff/sr0090/. The NRC will notify the Agreement States of any changes to the AO criteria.

6.3. *AO Evaluation*

The NRC is responsible for determining if events reported by Agreement States meet the criteria of an AO. NMSS will perform an initial screening of all Agreement State events against the AO criteria in accordance with MD 8.1, "AO Reporting." The RSAO will contact the Agreement State if a potential AO is identified. The Agreement States should support the NRC in the effort to keep Congress apprised of any significant events that may directly affect public health or safety by providing information to the NRC on potential AOs that have occurred in their State.

6.4. *Guidelines for AO Write-ups*

The RSAO will provide the Agreement State with a draft AO write-up obtained from the NRC's Office of Research. AO write-ups should be written in a manner that is understandable to non-technical readers. The draft AO write-up will be in the following format:

First paragraph - State the AO criteria applicable to the event by citing the appropriate section of Appendix A of NUREG-0090.

Date and Place - Provide the date the event occurred, the licensee's name, and the City and State of the licensee.

Nature and Probable Consequences - Briefly explain the event and the circumstances surrounding the occurrence. Describe the consequences. Provide the specific details of the event to include the: exposure (where applicable), source, specific radionuclide(s), quantity, dose (where applicable), treatment plan (where applicable), equipment/devices with the manufacturer and model number. Describe any immediate actions taken by the licensee and the State (e.g., decontaminated the facility, evacuated the staff, special inspection performed, enforcement action(s) taken, etc.). The write-up should answer who, what, where, when, how, why, and efforts to prevent recurrence.

Include the dual system of units, both SI and conventional.

Refrain from providing confidential, personal privacy, and/or security related information unless the information is required to describe the AO. If necessary, mark accordingly.

For occupational or public overexposures identify whether the person was notified.

For medical events, include the intended and actual treatment plan. For example, as applicable; state the prescribed dose and the actual delivered dose to the intended treatment site; state any doses to unintended sites (include the dose and the site); state the prescribed radioisotope and/or radiopharmaceutical and the radioisotope/radiopharmaceutical actually administered; and describe the prescribed mode of treatment and the actual mode of treatment delivered. Indicate whether the patient and referring physician were notified of the event. Also, state the medical significance of the event to the patient (e.g., The licensee concluded that the medical event would not have a significant medical effect on the patient).

Cause(s) - Describe what the root causes of the event were determined or estimated to be, including any contributing factors leading up to the event.

Actions taken to prevent recurrence - Briefly explain what corrective actions (e.g., developed new procedures, hired more staff, etc.) were taken to prevent recurrence by the licensee. Also, the Agreement State should indicate the actions they took to prevent recurrence (e.g., any enforcement actions or penalties given to the licensee and/or individual(s)).

Last paragraph - If the minimum required event information was met for the AO event, then a statement such as "This event is closed for the purpose of this report" should be included

in the last paragraph to indicate that the event has been closed. However, the AO will be kept open if there is a reasonable expectation that currently unavailable information will be obtained shortly. Also, if significant new information becomes available for a closed AO at a later date, the AO will be reopened, the new information will be reported under "Updates of Previously Reported Abnormal Occurrences" (NUREG–0090, Appendix B), and the AO will again be closed.

For examples of AO write-ups see NRC's NUREG–0090 at http://www.nrc.gov/reading-rm/doc-collections/nuregs/staff/sr0090/.

6.5. *Reviewing AO Write-ups*

The Agreement State staff should review the draft AO write-ups to verify that the details are correct and provide corrections to their assigned RSAO. A list of RSAOs is included on the NRC NMSS Office Directory at https://scp.nrc.gov/stpdirectr.html.

6.6. *Report to Congress on AOs*

The NRC annually publishes NUREG-0090, "Report to Congress on Abnormal Occurrences." It is publicly available and can be accessed at http://www.nrc.gov/reading-rm/doc-collections/nuregs/staff/sr0090/.

6.7. *Public Meeting*

The NRC staff present the final AOs at the Annual Agency Review Meeting. The NRC staff include AOs pertaining to Agreement State and NRC licensees. The target audience for the meeting is the NRC Commission and it is open to the public.

NRC's MD and Handbook 8.14, "Agency Action Review Meeting," describes NMSS's participation in this meeting. The NRC has the lead for the discussion on Agreement State licensees, as necessary.

7. Evaluation of Event Reports

7.1. *Initial Review of Agreement State Events*

NRC staff review all new and updated reports to the HOC.

a. ***RSAO Event Reviews***

RSAOs review the events to ensure that they are abreast of the issues impacting the Agreement States. The RSAOs are responsible for serving as a point of contact for NMSS staff and management, if any questions arise.

b. ***Requests for Additional Information***

1. The RSAO or HOC staff may contact Agreement States for additional information on events that pose, or could pose, risks to public health and safety, security and/or the environment.

2. The RSAO may contact Agreement States for additional information for events not considered to pose risks to public health and safety, security and/or the environment. Standard practice is to allow at least 30 days before making such requests to provide reasonable time for the Agreement State to review and evaluate and submit follow-up information.

3. The NMED contractor will request follow-up information for an event when the NMED record is incomplete after 60 days from the date reported to the regulatory agency.

c. ***Actions NRC May Take after Review of Significant Events***

If an event is identified as a potential AO; and/or is reportable to the INES; or if an event indicates the possible presence of a generic issue, NMSS should notify the appropriate RSAO. Conversely, the RSAO will notify NMSS if they identify such an event. Events identified as having a significant potential risk to public health and safety, security, and/or the environment may receive additional NRC management review.

7.2. *International Nuclear Event Scale (INES)*

The IAEA maintains a scale used for rating the safety significance of events associated with the use of radioactive materials. Since 2004, the NRC has used the INES and shared

event information with the international community for nuclear, transportation and radiation source events.

INES events involve events occurring in areas regulated by the NRC or the Agreement States. The NRC is responsible for classifying events using the criteria outlined in the scale and will notify the IAEA for any events with a rating of level 2 or higher. On rare occasions, events classified as levels 0 and 1 will be reported if the events attract international media attention.

The NRC will notify the IAEA within two business days when it has been determined that an event has an INES rating of Level 2 or higher. For events that occur in an Agreement State, the RSAO will provide the Agreement State with the draft INES Event Rating Form within 24 hours of its generation. The Agreement States are asked to concur that the information in the report is factual. If the State cannot review the draft INES Event Rating Form in time to meet the two-business day reporting deadline, the NRC will provide the report to INES and mark the event as 'Provisional.'

A 'Provisional' rating is also recommended in situations where not all the details of the event are known. The rating is issued based on the information that is available and the judgement of those understanding the nature of the event. If a 'Provisional' rating is issued, a final rating will need to be issued with any differences explained.

For further information on INES reporting procedures and rating criteria, see MD 5.12, "International Nuclear Event Scale Participation," which may be found at http://www.nrc.gov/reading-rm/doc-collections/management-directives/volumes/vol-5.html.

7.3. *Identifying Generic Issues*

The NRC evaluates issues using the criteria listed in MD 6.4, "Generic Issues," to formally identify and process the generic issue. Agreement State may process generic issues under their jurisdiction through State processes or may request NRC assistance.

7.4. *Operating Experience Assessments*

The objective of the review is to identify any events that may involve generic applicability or could have significant impact on public health and safety, security, and/or the environment.

The NRC assessment of incidents and events should identify deficiencies and ensure that corrective actions are taken to prevent recurrence. The assessment may result in the identification of actions that could lead to improvements in the effectiveness of the NRC and Agreement State regulatory programs.

An event may have generic applicability if the condition could impact other licensees of the

same type or is part of an ongoing safety concern with one or more licensees. The concern should be evaluated for safety-significance and resolved, if appropriate. The concern should be managed within the generic issue program if it meets the generic issue criteria.

Based on potential risks identified, the NRC may take actions to reduce potential risks by issuing safety-related notifications to licensees, (e.g., Information Notices, Regulatory Issue Summaries, etc.) Further research and analysis of events may also result in regulatory or programmatic changes.

See section 4.11, "NMED Annual Reports," for more information.

7.5. *Generic Communications*

The NRC issues Generic Communications in response to identified trends, safety-significant issues, or concerns with generic applicability. The Agreement States may reference the following:

f. NRC Information Notice 1993-18, "Portable Moisture-Density Gauge User Responsibilities During Field Operations," was written to remind licensees of their responsibility to maintain constant surveillance and security of portable moisture-density gauges during field operations.

g. HPPOS-322 PDR-9308020160, "Reporting of Damaged Portable Moisture-Density Gauges," clarifies the reporting requirements for damaged moisture-density gauges that contain up to 10 millicuries of cesium-137 (Cs-137).

h. NRC Information Notice 2001-03, "Incident Reporting Requirements for Radiography Licensees," provides updated guidance on reporting requirements for all industrial radiography licensees.

i. NRC Regulatory Issue Summary 2005-06, "Reporting Requirements for Gauges Damaged at Temporary Job Sites," was issued to inform licensees who use portable gauges, containing byproduct material, of the reporting requirement associated with gauges damaged at temporary job sites.

j. NRC Information Notice XX (TBD), "Reporting Clarification when a Fixed Gauge Shutter is Stuck in the Closed Position," clarifies the reporting requirements for licensees who use fixed gauges, containing byproduct material when a shutter is stuck in the closed position. A fixed gauge with a stuck shutter in the closed (safe) position is a low-risk and low-dose situation and is not a reportable event.

7.6. *Agreement State Review of Material Events*

Agreement States should assess events occurring within their jurisdiction or related to

products registered or licensed in their jurisdiction. The assessment should identify any events that may involve generic applicability or could have significant impact on public health and safety, security, and/or the environment.

Agreement States may voluntarily share Operating Experience assessments or trending studies with the NRC. Agreement States should e-mail the assessments or studies to the NRC NMED Project Manager (NMEDNRC@nrc.gov) to have the information posted on the NMED Web site. The NRC can also distribute Agreement State assessments or trending studies in a letter to all Agreement States.

Appendix A. NRC Regulatory Reporting Requirements

The following provides a listing of the most encountered reporting requirements for which Agreement States should have compatible regulations. This table does not contain all the NRC's regulatory reporting requirements. See NRC Regulations, Title 10 *Code of Federal Regulations* (10 CFR) for reporting requirements.

The telephone icon is included in the chart when a report to the HOC is required. Agreement States may choose to contact the HOC by telephone, e-mail, and/or fax.

The keyboard icon is included in the chart when the regulatory requirement specifies a written report.

Table 1. 10 CFR Part 20, "Standards for Protection Against Radiation," applies to all licensees.

Regulatory Requirement	Brief Summary of Reporting Requirement	Notification	Additional Reporting Requirements
10 CFR Part 20, "Standards for Protection Against Radiation."			
20.1906(d)(1)	Receiving and Opening Packages: Removable radioactive surface contamination on package > limits in 10 CFR 71.87(i).	Immediate ☎	
20.1906(d)(2)	Receiving and Opening Packages: External radiation levels from the package > limits in 10 CFR 71.47.	Immediate ☎	
20.2201(a)(1)(i)	Lost, stolen or missing licensed material ≥ 1000 X Appendix C value, when it appears to the licensee that individual(s) in unrestricted areas could receive an exposure.	Immediate ☎	30 days after initial notification  20.2201(b)
20.2201(a)(1)(ii)	Lost, stolen or missing licensed material > 10 X Appendix C value and is still missing.	30 days ☎	30 days after initial notification  20.2201(b)
20.2202(a)(1)(i)	Overexposure. Event involving byproduct, source, or special nuclear material possessed by the licensee that may have caused or threatens to cause an individual to receive a total effective dose equivalent ≥ 25 rems (0.25 Sv).	Immediate ☎	30 days  20.2203(a)(1)
20.2202(a)(1)(ii)	Overexposure. Event involving byproduct, source, or special nuclear material possessed by the licensee that may have caused or threatens to cause an individual to receive a lens dose equivalent ≥ 75 rems (0.75 Sv).	Immediate ☎	30 days  20.2203(a)(1)

20.2202(a)(1)(iii)	Overexposure. Event involving byproduct, source, or special nuclear material possessed by the licensee that may have caused or threatens to cause an individual to receive a shallow-dose equivalent to the skin or extremities ≥ 250 rads (2.5 Gy).	Immediate 	30 days  20.2203(a)(1)
20.2202(a)(2)	Overexposure. The release of radioactive material, inside or outside of a restricted area, so that, had an individual been present for 24 hours, the individual could have received an intake ≥ 5 X ALI.	Immediate 	30 days  20.2203(a)(1)
20.2202(b)(1)	Overexposure. Event involving loss of control of licensed material that may have caused, or threatens to cause, an individual to receive, in a period of 24 hours— (i) A total effective dose equivalent > 5 rems (0.05 Sv); or (ii) A lens dose equivalent > 15 rems (0.15 Sv); or (iii) A shallow-dose equivalent to the skin or extremities > 50 rems (0.5 Sv).	24 hours 	30 days  20.2203(a)(1)
20.2202(b)(2)	Overexposure. Release where individual could have intake > 1 X ALI over 24 hours.	24 hours 	30 days  20.2203(a)(1)
20.2203(a)(2)(i)	Overexposure. Doses > the occupational dose limits for adults in § 20.1201.	30 days 	
20.2203(a)(2)(ii)	Overexposure. Doses > the occupational dose limits for a minor in § 20.1207.	30 days 	
20.2203(a)(2)(iii)	Doses > the limits for an embryo/fetus of a declared pregnant woman in § 20.1208.	30 days 	
20.2203(a)(2)(iv)	Doses > the limits for an individual member of the public in § 20.1301.	30 days 	

20.2203(a)(2)(v)	Doses > any applicable limit in the license.	30 days 	
20.2203(a)(2)(vi)	Doses > the ALARA constraints for air emissions established under § 20.1101(d).	30 days 	
20.2203(a)(3)	Levels of radiation or concentrations of radioactive material in— (i) A restricted area in excess of any applicable limit in the license; or (ii) An unrestricted area in excess of 10 times any applicable limit set forth in this part or in the license (whether or not involving exposure of any individual in excess of the limits in § 20.1301).	30 days 	
20.2203(a)(4)	For licensees subject to the provisions of EPA's generally applicable environmental radiation standards in 40 CFR part 190, levels of radiation or releases of radioactive material in excess of those standards, or of license conditions related to those standards.	30 days 	

Table 2. Regulatory reporting requirements that may be applicable depending on the type of license and radioactive material.

Regulatory Requirement	Brief Summary of Reporting Requirement	Notification	Additional Reporting Requirements
10 CFR Part 30, "Rules of General Applicability to Domestic Licensing of Byproduct Material."			
30.50(a)	Events involving prevention of immediate protective actions, necessary to avoid exposures to radiation, radioactive materials or releases of radioactive material that could exceed regulatory limits.	ASAP but not later than 4 hours after the discovery of an event ☎	30 days 🖮 30.50(c)(2)
30.50(b)(1)	An unplanned contamination event that: (i) Requires access to the contaminated area, by workers or the public, to be restricted for more than 24 hours by imposing additional radiological controls or by prohibiting entry into the area; (ii) Involves a quantity of material greater than five times the lowest annual limit on intake specified in Part 20 Appendix B for the material; and (iii) Has access to the area restricted for a reason other than to allow isotopes with a half-life of less than 24 hours to decay prior to decontamination.	24 hours ☎	30 days 🖮 30.50(c)(2)

30.50(b)(2)	An event in which equipment is disabled or fails to function as designed when: (i) The equipment is required by regulation or license condition to prevent releases exceeding regulatory limits, to prevent exposures to radiation and radioactive materials exceeding regulatory limits, or to mitigate the consequences of an accident; (ii) The equipment is required to be available and operable when it is disabled or fails to function; and (iii) No redundant equipment is available and operable to perform the required safety function.	24 hours ☎	30 days  30.50(c)(2)
30.50(b)(3)	An event that requires unplanned medical treatment at a medical facility of an individual with spreadable radioactive contamination on the individual's clothing or body.	24 hours ☎	30 days  30.50(c)(2)
30.50(b)(4)	An unplanned fire or explosion damaging any licensed material or any device, container, or equipment containing licensed material when: (i) The quantity of material involved is greater than five times the lowest annual limit on intake specified in Part 20 Appendix B for the material; and (ii) The damage affects the integrity of the licensed material or its container.	24 hours ☎	30 days  30.50(c)(2)
10 CFR Part 31, "General Domestic Licenses for Byproduct Material."			

31.5(c)(5)	Shall immediately suspend operation of a device if there is a failure of or damage to the shielding or an indication of a failure of or damage to the shielding, or the on-off mechanism or indicator, or upon detection of 185 bequerel (0.005 microcurie) or more of removable radioactive material, and submit a written report within 30 days. (See the rest of Paragraph (c)(5) for other conditions and restrictions that apply). (See also 10 CFR 30.50 requirements and other sections of the regulations (e.g., 10 CFR 21.21)).	30 days 	
10 CFR Part 34, "Licenses for Radiography and Radiation Safety Requirements for Radiographic Operations."			
34.27(d)	Reporting of leaking sources, leak test results ≥ 0.005 microcurie (185 Bq).	5 days 	
34.101(a)	Incidents involving radiographic equipment: (1) Unintentional disconnection of the source assembly from the control cable; (2) Inability to retract the source assembly to its fully shielded position and secure it in this position; or (3) Failure of any component (critical to safe operation of the device) to properly perform its intended function.	24- hour  30.50(b)(2) also applies.	30 days 
10 CFR Part 35, "Medical Use of Byproduct Material."			
35.3045	Notifications and reports of medical events involving administration and use of byproduct materials, with the exception of patient intervention events.	Next calendar day 	15 days  35.3045(d)
35.3067	Reports of leak test results that demonstrate the presence of 185 becquerel (0.005 microcurie) or more of removable contamination.	5 days 	

35.3047	Events involving an unauthorized dose of 50 mSv (5 rem) to an embryo/fetus or a nursing child, or an unintended functional damage to an organ or a physiological system of the child.	Next calendar day ☎	15 days  35.3047(d)
10 CFR Part 36, "Licenses and Radiation Safety Requirements for Irradiators."			
36.83	The following events are reportable under 36.83 if not reported under other NRC reporting requirements: stuck sources, fire/explosions, damage to source racks, cable or drive mechanism failure, access control system failure, detection of source by the product exit monitor, contamination from licensed material, etc. (See items (a)(1) through (10) under 36.83 for specific descriptions of reportable events.	24 hours ☎	30 days  36.83(b)
10 CFR Part 37, "Physical Protection of Category 1 and 2 Quantities of Radioactive Material."			
37.57(a)	Notify the Local Law Enforcement Agency after determining that an unauthorized entry resulted in an actual or attempted theft, sabotage, or diversion of a category 1 or category 2 quantity of radioactive material. ASAP after initiating a response, but not at the expense of causing delay or interfering with the Local Law Enforcement Agency response to the event, the licensee shall notify the NRC. In no case shall the notification to the NRC be later than 4 hours after the discovery of any attempted or actual theft, sabotage, or diversion. See Table 1, "Category 1 and Category 2 Threshold," in Appendix A to Part 37.	Immediate or not later than 4 hours after discovery ☎	30 days  37.57(c)
37.57(b)	Notify the Local Law Enforcement Agency of any suspicious activity related to possible theft, sabotage, or diversion of category 1 or category 2 quantities of radioactive material. See Table 1, "Category 1 and Category 2 Threshold," in Appendix A to Part 37.	ASAP, but not later than 4 hours after notifying LLEA ☎	

37.81(a)	In transit: Notify the appropriate Local Law Enforcement Agency and the NRC's Operations Center that a shipment of category 1 quantities of radioactive material is lost or missing. See Table 1, "Category 1 and Category 2 Threshold," in Appendix A to Part 37.	Within 1 hour ☎	Provide updates 37.81(a) 30 days  37.81(g)
37.81(b)	In transit: A shipment of category 2 quantities of radioactive material is lost or missing. See Table 1, "Category 1 and Category 2 Threshold," in Appendix A to Part 37.	Within 4 hours ☎	After 24 hours ☎ 30 days  37.81(g)
37.81(c)	In transit: Notify the designated Local Law Enforcement Agency along the shipment route ASAP upon discovery of any actual or attempted theft or diversion of a shipment or suspicious activities related to the theft or diversion of a shipment of a category 1 quantity of radioactive material. ASAP after notifying the Local Law Enforcement Agency, the licensee shall notify the NRC upon discovery of any actual or attempted theft or diversion of a shipment, or any suspicious activity related to the shipment of category 1 radioactive material. See Table 1, "Category 1 and Category 2 Threshold," in Appendix A to Part 37.	ASAP ☎	30 days  37.81(g)
37.81(d)	In transit: Notify the NRC ASAP upon discovery of any actual or attempted theft or diversion of a shipment, or any suspicious activity related to the shipment, of a category 2 quantity of radioactive material. See Table 1, "Category 1 and Category 2 Threshold," in Appendix A to Part 37.	ASAP ☎	30 days  37.81(g)

37.81(e) and (f)	In transit: Notify the NRC and the Local Law Enforcement Agency ASAP upon recovery of any lost or missing category 1 or 2 quantities of radioactive material. See Table 1, "Category 1 and Category 2 Threshold," in Appendix A to Part 37.	ASAP ☎	
10 CFR Part 39, "Licenses & Radiation Safety Requirements for Well-Logging."			
39.35(d)(2)	Report of leak test results (of sources leak tested at intervals not greater than every 6 months) when the presence of 185 becquerel (0.005 microcurie) or more of contamination is detected. (See remaining paragraphs under 39.35 for other conditions, including exemptions, that apply.)	5 days	
39.77(a)	Well logging source rupture.	Immediate ☎	30 days 
39.77(b)	Theft or loss of radioactive materials, radiation overexposures, excessive levels and concentrations of radiation, and certain other accidents as required by §§ 20.2201 - 20.2202, § 20.2203 and § 30.50.	See methods in referenced regulations.	
39.77(c) and (d)	Classification that a source is irretrievable.	After it's apparent the source is irretrievable ☎	30 days 
10 CFR Part 40, "Domestic Licensing of Source Material."			
40.60(a)	Event that prevents immediate protective actions necessary to avoid exposures to radiation or radioactive materials that could exceed regulatory limits or releases of licensed material that could exceed regulatory limits.	ASAP and within 4 hours of discovery ☎	30 days  40.60(c)(2)

40.60(b)(1)	An unplanned contamination event that: (i) Requires access to the contaminated area, by workers or the public, to be restricted for more than 24 hours by imposing additional radiological controls or by prohibiting entry into the area; (ii) Involves a quantity of material greater than five times the lowest annual limit on intake specified in Appendix B of §§ 20.1001-20.2401 of 10 CFR part 20 for the material; and (iii) Has access to the area restricted for a reason other than to allow isotopes with a half-life of less than 24 hours to decay prior to decontamination.	24 hours 	30 days  40.60(c)(2)
40.60(b)(2)	An event in which equipment is disabled or fails to function as designed when: (i) The equipment is required by regulation or license condition to prevent releases exceeding regulatory limits, to prevent exposures to radiation and radioactive materials exceeding regulatory limits, or to mitigate the consequences of an accident; (ii) The equipment is required to be available and operable when it is disabled or fails to function; and (iii) No redundant equipment is available and operable to perform the required safety function.	24 hours 	30 days  40.60(c)(2)
40.60(b)(3)	An event that requires unplanned medical treatment at a medical facility of an individual with spreadable radioactive contamination on the individual's clothing or body.	24 hours 	30 days  40.60(c)(2)

40.60(b)(4)	An unplanned fire or explosion damaging any licensed material or any device, container, or equipment containing licensed material when: (i) The quantity of material involved is greater than five times the lowest annual limit on intake specified in Appendix B of §§ 20.1001-20.2401 of 10 CFR part 20 for the material; and (ii) The damage affects the integrity of the licensed material or its container.	24 hours ☎	30 days  40.60(c)(2)
10 CFR Part 70, "Domestic Licensing of Special Nuclear Material."			
70.50(a)	Event that prevents immediate protective actions necessary to avoid exposures to radiation or radioactive materials that could exceed regulatory limits or releases of licensed material that could exceed regulatory limits.	ASAP and within 4 hours of discovery ☎	
70.50(b)(1)	An unplanned contamination event that: (i) Requires access to the contaminated area, by workers or the public, to be restricted for more than 24 hours by imposing additional radiological controls or by prohibiting entry into the area; (ii) Involves a quantity of material greater than five times the lowest annual limit on intake specified in Appendix B of §§ 20.1001-20.2401 of 10 CFR part 20 for the material; and (iii) Has access to the area restricted for a reason other than to allow isotopes with a half-life of less than 24 hours to decay prior to decontamination.	24 hours ☎	30 days  70.50(c)(2)

70.50(b)(2)	An event in which equipment is disabled or fails to function as designed when: (i) The equipment is required by regulation or licensee condition to prevent releases exceeding regulatory limits, to prevent exposures to radiation and radioactive materials exceeding regulatory limits, or to mitigate the consequences of an accident; (ii) The equipment is required to be available and operable when it is disabled or fails to function; and (iii) No redundant equipment is available and operable to perform the required safety function.	24 hours ☎	30 days  70.50(c)(2)
70.50(b)(3)	An event that requires unplanned medical treatment at a medical facility of an individual with spreadable radioactive contamination on the individual's clothing or body.	24 hours ☎	30 days  70.50(c)(2)
70.50(b)(4)	An unplanned fire or explosion damaging any licensed material or any device, container, or equipment containing licensed material when: (i) The quantity of material involved is greater than five times the lowest annual limit on intake specified in Appendix B of §§ 20.1001-20.2401 of 10 CFR part 20 for the material; and (ii) The damage affects the integrity of the licensed material or its container.	24 hours ☎	30 days  70.50(c)(2)
10 CFR Part 71, "Packaging and Transportation of Radioactive Material."			

71.5	10 CFR 71.5 provides that licensees shall comply with the applicable requirements of the Department of Transportation regulations in 49 CFR.		
49 CFR 171.15(b)(1)	Any of the following occurs during the course of transportation in commerce (including loading, unloading, and temporary storage) as a direct result of a hazardous material - (i) A person is killed; (ii) A person receives an injury requiring admittance to a hospital; (iii) The general public is evacuated for one hour or more; (iv) A major transportation artery or facility is closed or shut down for one hour or more; or (v) The operational flight pattern or routine of an aircraft is altered.	ASAP but no later than 12 hours ☎ National Response Center	Within 30 days from discovery  49 CFR 171.16
49 CFR 171.15(b)(2)	Fire, breakage, spillage, or suspected radioactive contamination occurs involving the shipment of radioactive material.	ASAP but no later than 12 hours ☎ National Response Center	Within 30 days from discovery  49 CFR 171.16

Appendix B. Examples of Reportable Events

Stolen Portable Moisture Density Gauge

Immediately reportable under 10 CFR 20.2201(a)(1)(i)

Licensee [Name] [License Number] reported that a [Manufacturer] [Model #] [serial #] portable gauge containing 10 millicuries of cesium-137 and 50 millicuries of americium-241: beryllium was stolen from the licensee's vehicle parked at the licensee's facility [Address]. The gauge was padlocked in its original carrying case. The State is following the incident and working with local authorities to develop a press release. Local law enforcement and the FBI have been notified. Follow-up information will be provided to the NRC on the recovery of the stolen gauge and entered into NMED.

Lost, Stolen, or Missing Licensed Material

Lost, stolen or missing licensed material > 10 X Appendix C value and is still missing.

Report within 30 days per 10 CFR 20.2201(a)(1)(ii)

[Licensee Name] [License Number] reported that [Quantity] of [Radionuclide] is missing from [Location.] The material was discovered missing when [circumstance.] The State is following the incident and working with local authorities to develop a press release. Local law enforcement and the FBI have been notified.

Shipment of Brachytherapy Sources Received with Radiation Levels Exceeding Regulatory Limits

Immediately reportable under 20.1906(d)(2)

A medical licensee [Name] [License Number] reported receiving a shipment of two packages containing cesium-137 brachytherapy sources. Radiation surveys of the packages found radiation levels of 250 millirem per hour on one package, which exceeds the State and Federal limit at the external surface of a package of 200 millirem per hour. The third and final package was received two days later with radiation levels of 400 millirem per hour at the surface of the package. The shipper has retained a consultant to determine the cause of the elevated radiation levels. The State will keep the NRC informed of the results of the consultant's review of the event.

Exposure to Non-radiation Worker at a Licensed Facility

Reportable within 24 hours under 10 CFR 20.2202 (b)(1)(i)

A licensee [Name] [License Number] reported to the State that a non-radiation worker had received an exposure as a result of picking up a 5 curie americium-241:beryllium neutron source used for well logging and placed it in his pocket. The worker, a temporary contractor employee, was cleaning a well logging tool at the licensee's facility. (The licensee was under the assumption that all of the source material had been removed from the equipment.) While cleaning the tool, the source fell out, and the worker picked it up and placed it his pocket. The worker was not a radiation worker and had no knowledge of what the object was. Preliminary calculations performed by [identify Consultant/Contractor] indicate that the individual may have received a dose of 4-6 Rem. The licensee's RSO is investigating the incident. The State plans to keep the NRC informed of the ongoing results of the investigation.

Loss of Control and Damage to Portable Gauge

Reportable within 24 hours under 10 CFR 30.50(b)(2)

Licensee [Name] [License Number] reported that a [Manufacturer] [Model #] [serial #] moisture density gauge had been damaged on [Date]. The gauge contained 7.9 millicuries of cesium-137 and 40 millicuries of americium-241. A technician left the gauge unattended for a brief time and upon returning found that a construction vehicle had run over the gauge. The source rod was broken, but the source was not damaged. However, the source was in an unshielded position. Wipe tests and instrument survey verified leakage. The gauge was returned to the manufacturer for repair. The licensee was cited for not keeping licensed material under constant surveillance in an unrestricted area. Follow-up information will be provided to the NRC.

Radiography Camera Source unable to Retract

Reportable within 24 hours under
10 CFR 30.50.(b)(2) and reportable within 30 days under 10 CFR 34.101(a)(2)

A licensee [Name] [License Number] reported the inability to retract a 2.072 TBq (56 Ci) Ir-192 source ([Source Model #], [Serial #]) into the radiography exposure device ([Manufacturer] [Model#] [Serial #]) on [Date]. The radiographers had used a double gear control assembly throughout the day without a problem. Later, the radiographers cranked out the source to conduct an exposure and were unable to retract the source. The radiographers removed the cover plate on the control assembly and pulled the drive cables in order to retract the source into the exposure device. The device was locked, and the drive cable was disconnected from the source pigtail. The radiation area was repositioned and maintained throughout the incident. The source had been extended for approximately three minutes. The exposure device was physically inspected and determined to be in good working condition. The double gear control assembly was returned to the manufacturer. The manufacturer stated that they were unable to replicate the failure. However, they did note that the gears offered a large amount of resistance, had impurities, and that the drive cable was out of tolerance.

Medical Event involving a Gamma Knife Malfunction

Reportable by next calendar day under 10 CFR Parts 35.3045(a)(1)(i) and within 24 hours under 30.50(b)(2)

A licensee [Name] [License Number] reported that a patient only received 5% of the prescribed dose during a gamma knife procedure performed on [Date]. The RSO stated that while conducting a single fraction exposure to the patient, the computer screen froze. The patient was immediately removed from the gamma knife unit ([Manufacturer] [Model#] [Serial #]), which contained Co-60 sources ([Source Model #], [Serial #]) with a total activity of 102.34 TBq (2,766 Ci). The patient was prescribed to receive 2,000 cGy (rad) to one location and 1,500 cGy (rad) to a second location, both to be delivered simultaneously. The referring physician and patient were notified of the event. The service provider for the gamma knife responded and replaced the control unit. The manufacturer stated that the event occurred due to a computer programming problem. The timer that froze is used to display the total run time of the treatment and does not control any part of the treatment. They also stated that the treatment would have run normally had the technician not stopped it and the patient would have received the prescribed dose. The manufacturer is resolving the problem in their latest upgrade to the system.

Medical Event involving Prostate Brachytherapy

Reportable by next calendar day under 10 CFR Part 35.3045

Note: May be classified as a potential AO.

A licensee [Name] [License Number] reported a medical event involving a patient treated for prostate cancer. The treatment included implanting 65 I-125 brachytherapy seeds ([Manufacturer] [Model #]), containing a total activity of 0.814 GBq (22 mCi), in the patient's prostate for a prescribed therapeutic radiation dose of 14,500 cGy (rad). The prostate gland only received approximately 500 cGy (rad). The seeds were implanted on [Date] using real time dosimetry under ultrasonic guidance. On [Date], the patient returned to the facility for a 30-day post implant CT scan. The scan showed that the implanted seeds, although in an appropriate pattern, were placed outside the intended target. The Licensee's Radiation Oncology group determined that an additional quality assurance review was warranted. The State performed a reactive inspection during the week of [Date]. Initially, a malfunction of the ultrasound unit was suspected. That unit was re-evaluated and was determined to be working properly. The cause was determined to be human error. An unintended dose to the penile bulb of approximately 16,100 cGy (rad) was received, where no dose was anticipated. The Radiation Oncology Department suspended prostate brachytherapy treatments. Corrective actions included changes to the prostate brachytherapy protocol to incorporate an additional step to ensure the urologist and radiation oncologist clearly identifies the prostate gland and the surrounding anatomy. The treatment will be cancelled if the prostate gland and surrounding anatomy cannot be visualized adequately.

A Leaking Source from a General Licensed Device

Written report within 30 days under 10 CFR Part 31.5(c)(5)

On [Date], a licensee [Name] [License Number] reported that a 555 MBq (15 mCi) Ni-63 source was leaking. The source was part of a Hewlett Packard electron capture detector ([Manufacturer] [Model#] [Serial #]). A routine wipe test of a gas chromatograph ([Manufacturer] [Model#] [Serial #]) containing two ECDs was performed on [Date] after receiving the gas chromatograph from another licensee. On [Date], the wipe test results indicated that the ECD had 222 Bq (0.006 uCi) of removable contamination wiped from the outlet port. The result of a second wipe of the same port was approximately 1.85 Bq (0.00005 uCi). The ECD was secured and stored pending disposal. The ECD was sent to the manufacturer for disposal on [Date].

Possible Loss of Water or Leakage from Source Water Pool at Irradiator Facility

Reportable within 24 hours under 10 CFR Parts 36.83(a)(9), 30.50(b)(2)

(Note: since water level was later verified to be normal, this is no longer a 36.83 issue)

Licensee [Name] [License Number] notified the State that the controls at a Co-60 irradiator facility were indicating that the water level was low, circulating pump off, and fill valves were open. The pool water level gauge indicated pool water level of 93 inches, well below the normal level of 137 inches. Previous incidents indicated that a loss of compressed air pressure to the water level gauge could result in an erroneously low water level gauge reading, causing the automatic pool fill valves to open, and the pool water circulating pump to turn off. The compressed air system pressure was found to be in the normal range, but the operator found water and congealed oil in the air line supplying the pool water level gauge, and the air line supplying the elevator control valve. Further investigation found that the compressed air line water traps were full of water. A past similar incident resulted in a failure to raise the elevator. The operator then verified that the pool water level was in fact normal. The licensee requested the building maintenance personnel to diagnose and repair the compressed air supply immediately, to prevent the conductivity in the pool water from reaching abnormal levels as a result of the resin filter circulating pump being automatically turned off by the false low pool water level meter reading. Maintenance personnel responded and replaced a failed compressed air dryer, and monitored the open air lines to clear the lines of water. A float activated automatic water drain was installed in the air line to prevent a possible recurrence by allowing any water to automatically drain from the air line.

Appendix C. Reporting Methods and Contact Information

Table 1. Reporting methods and contact information for the NRC.

Report	Contact Information
 Report to the NRC Headquarters Operations Center using one of the following methods.	**NRC Headquarters Operations Center** E-mail: HOO.HOC@nrc.gov Telephone: (301)-816-5100 Fax: (301)-816-5151
 The Agreement States should submit a written report by using one of the following methods. Follow-up event information and voluntary reports may also be submitted.	NMED Web site: http://nmed.inl.gov/ NMED Local Agreement State Software E-mail: NMED@inl.gov By mail: Director Division of Materials Safety, Security, State, and Tribal Programs Office of Nuclear Material Safety and Safeguards U.S. Nuclear Regulatory Commission 11545 Rockville Pike Rockville, MD 20852-2738 Attention: Chief, Medical Safety & Events Assessment Branch, Mail Stop T5B60

Table 2. Reporting to other entities as required by the NRC.

Reason to Report	Reporting Methods and Contact Information
Events involving theft or terrorist activities should be reported to the Federal Bureau of Investigation (FBI) or local law enforcement. Share a concurrent report with the NRC Headquarters Operations Center after the event has been reported to law enforcement.	Step 1: Local Law Enforcement 911 FBI Telephone (202)-324-3000
	Step 2: Concurrent Report NRC Headquarters Operations Center (301)-816-5100
Transportation events	National Response Center (800)-424-8802 (toll free) (202)-267-2675 (toll call) Online at http://www.nrc.uscg.mil The National Response Center will subsequently contact the HOC.

Appendix D. Sample Fax Sheet to the HOC

FAX TO:	**NRC HEADQUARTERS OPERATIONS CENTER** **(301)-816-5151**
Agreement State Agency:	[**State**] Dept. of Health, Division of Radiation Protection
Event Report Identification No.:	State ID, YY, No., e.g. TN-20-0001
Licensee Name:	County Inspection Inc.
Licensee Number:	CL-Z00X-1
Event date and time:	Month XX, YYYY, between 4:00 and 5:00 am
Event location:	City, State
Event type:	Stolen Radiography Device
Event description:	[**State**] Dept. of Health was notified on [**date**], by a representative from [**licensee**], of the theft of a radiography exposure device [camera] from a locked equipment trailer on Thursday morning, April 6, 2006. The locked camera and the keys to the camera were stolen. The radiography camera is identified as XYZ Company, Model 160B, serial No. B-3333, containing [radionuclide] [**activity, when known**] 88.3 curies of iridium-192. The device cables were not stolen. The Agreement State has an inspector on site and will continue to keep the NRC informed of the status of our investigation.
Transport vehicle description:	N/A
Notifications:	[**State**] Dept. of Health has notified local law enforcement, and the FBI due to possibility of unlawful criminal activity. Press release has not been issued at this time. [**State**] Dept. of Health has received inquiries from the media regarding this incident.
Point of contact:	Minnie C. Gauges, (301)-415-0001

Appendix E. Minimum Required Event Information

The event reports should include the minimum event information.

Essential Details

- Narrative event description (e.g., Event circumstances and details including source radionuclide and activity)
- Report identification number
- Event date and notification date
- Licensee/reporting party information (i.e., name license number, and address)
- Whether the event is NRC reportable and the applicable reporting requirement
- Cause and corrective actions (Agreement State and licensees' actions)
- Cause and corrective actions (Agreement State and licensees' actions)
- Notifications: local law enforcement, FBI, and other States, as needed
- Indicate if there are any generic implications (i.e., generic issues or concerns).

Source/Radioactive Material

- Isotope and activity
- Manufacturer
- Model and serial number
- Leak test results, if applicable

Device/Associate Equipment

- For equipment/device involved indicate the manufacturer, model, and serial number
- Provide clear description of any equipment problems.

Release of Licensed Material or Contamination

- Release type (air or water)
- contamination (person or surface)
- isotope and activity released

Medical Event

- Procedure administered, dose intended, and actual dose administered
- Isotope and activity administered, target organ
- Patient and Referring Physician notified?

Overexposure

- Radiation source and activity
- Exposure dose and exposure type (e.g., whole body, extremity, etc.)

Transportation

- Type of transport
- Identity of shipper
- Package type and ID number (if available)

Appendix F. Event Report Cover Page

The Event Report Cover Page should be used when submitting a written report in the mail.

AGREEMENT STATE

EVENT REPORT ID NO. __ - __ - ___

(State\YY\No.)

DATE:

TO: **Branch Chief**
Medical Safety & Events Assessment Branch

SUBJECT:

STATE:

Signature and Title:_____

_____

_____

_____

Public Availability of Event Information: Any event information that is considered preliminary pre-decisional information by the State should be clearly identified on the cover page as follows: **"Preliminary, Not for Public Disclosure."** For event information in the NRC's possession, the final determination on whether to withhold from public disclosure will be made by the NRC on a case-by-case basis in accordance with the requirements of 10 CFR Part 9.

Appendix G. Glossary

ADAMS	Agencywide Documents Access and Management System (ADAMS) is the NRC's official record electronic recordkeeping system.
AEA	The Atomic Energy Act of 1954 (AEA) is the fundamental U.S. law on both the civilian and the military uses of nuclear materials.
AEC	The U.S. Atomic Energy Commission (AEC) was the predecessor to the NRC.
AO	Section 208 of the Energy Reorganization Act of 1974 defines an Abnormal Occurrence (AO) as an unscheduled incident or event which the NRC determines to be significant from the standpoint of public health or safety.
Conventional Units	Conventional units include curie, rad, and rem.
CRCPD	The Conference of Radiation Control Program Directors (CRCPD) is a non-profit entity representing the radiation control programs of each State (not limited to Agreement States).
DOE	The U.S. Department of Energy
EN	The Event Notification (EN) database is an internal NRC automated event tracking system used by the HOC to track information on reports made to the HOC.
ERA	Section 208 of the Energy Reorganization Act of 1974 (ERA) (Public Law 93-438, 42 USC 5848) establishes the NRC's AO responsibilities.
FBI	The U.S. Federal Bureau of Investigation (FBI) is a federal law enforcement agency.
FR	The *Federal Register* (FR) is the official daily publication for rules, proposed rules, and notices of Federal agencies and organizations.
Gray	Gray (Gy) is the SI unit of absorbed dose. One Gray is equal to an absorbed dose of 1 joule/kilogram (100 rads).
Generic Applicability	A condition that could impact other licensees of the same type or an ongoing safety concern with one or

	more licensees. The concern should be managed within the generic issue program if it meets the generic issue criteria. If not, the concern should be evaluated for safety-significance and resolved, if appropriate.
Generic Issues	Generic issues are complex safety or security issues that require extensive NRC staff and industry involvement to resolve. The defined criteria in Management Directive 6.4, “Generic Issues Program,” must be met for an event to be identified as a generic issue.
HOC	The Headquarters Operations Center (HOC) is located in Rockville, MD and is staffed 24 hours a day by employees trained to receive and evaluate event reports and coordinate incident response activities.
HOO	The Headquarters Operations Officers (HOO) staff the HOC. The HOO are trained to receive, evaluate, and respond to events.
IAEA	The International Atomic Energy Agency (IAEA) is the world's center for cooperation in the nuclear field and seeks to promote the safe, secure, and peaceful use of nuclear technologies.
IMPEP	The NRC performs periodic evaluations of Agreement State programs as part of the Integrated Materials Performance Evaluation Program (IMPEP).
INES	The IAEA’s International Nuclear Event Scale (INES) is a scale that is used for rating safety significance of events associated with the use of nuclear or radioactive materials.
LLEA	A Local Law Enforcement Agency (LLEA) represents different law enforcement agencies operating in different layers of the government. The local police department is one example. The FBI represents federal law enforcement.
MSEB	Medical Safety and Events Assessment Branch (MSEB) manages the Events Coordination program for NMSS.
MSST	NMSS’s Division of Material Safety, Security, State, and Tribal Programs (MSST) works with the Agreement States, non-Agreement States, NRC

	Regional Offices, NRC licensees, and the public to provide structure and implement the national materials program to enable the safe and secure use of radioactive materials in medical, industrial, and academic applications for beneficial civilian purposes.
National Response Center	The National Response Center is a part of the federally established National Response System and is staffed 24 hours a day by the U.S. Coast Guard. It is the designated federal point of contact for reporting all oil, chemical, radiological, biological, and etiological discharges into the environment, anywhere in the United States and its territories.
NMED	The Nuclear Material Events Database (NMED), maintained by the NRC, is a historical collection of incidents and events that have occurred throughout the United States involving the use of radioactive material covered under the Atomic Energy Act. This excludes events occurring at nuclear power plants.
NMSS	The Office of Nuclear Material Safety and Safeguards (NMSS) is responsible for the licensing and regulation of facilities and materials associated with the processing, transport, and handling of nuclear materials, including uranium recovery activities and the fuel used in commercial nuclear reactors.
RSAO	The Regional State Agreements Officer (RSAO) is a designated staff member, in an NRC regional office, who serves as the point of contact for the region and NMSS regarding Agreement State radiation control programs, and who participates in technical reviews of Agreement State radiation control programs.
Rad	Rad is the special unit of absorbed dose. One rad is equal to an absorbed dose of 100 ergs/gram or 0.01 joule/kilogram (0.01 gray).
Rem	Rem is the special unit of any of the quantities expressed as dose equivalent. (1 rem = 0.01 sievert).
SI Units	International System of Units (SI) include becquerel, gray, and sievert.
Sievert	Sievert (Sv) is the SI unit of dose equivalent. The dose equivalent (Sv) is equal to the absorbed dose (Gy) multiplied by the quality factor (1 Sv = 100 rem).

Appendix H. References

The following is a list of NRC documents, manuals and procedures that contain additional information on event response and AOs.

SECY-97-1997, *Final Recommendations on Policy Statements and Implementing Procedures For: "Statement of Principles and Policy for the Agreement State Program" and "Policy Statement on Adequacy and Compatibility of Agreement State Programs,"* dated June 30, 1997 (ADAMS Accession No. ML051610710).

NUREG Reports

NUREG Reports are available at: https://www.nrc.gov/reading-rm/doc-collections/nuregs/index.html.

NUREG–0090, “Report to Congress on Abnormal Occurrences.”

NUREG–1100, “Performance Budget/ Congressional Budget Justification.”

NUREG–1614, “Strategic Plan.”

NRC Management Directives (MD)

MDs are available at: https://scp.nrc.gov/ASDir_Program_Basis_Docs.html.

MD 5.6, “Integrated Material Performance Evaluation Program (IMPEP).”

MD 5.9, “Adequacy and Compatibility of Agreement State Programs”

MD 5.12, “International Nuclear and Radiological Event Scale (INES) Participation”

MD 6.4, “Generic Issues Program”

MD 8.1, “Abnormal Occurrence Reporting Procedure”

MD 8.10, “NRC Assessment Program for an Event Occurring at a Medical Facility”

MD 8.14, “Agency Action Review Meeting, AARM”

NRC Inspection Manual Chapters (IMC)

IMCs are available at:https://www.nrc.gov/reading-rm/doc-collections/insp-manual/manual-chapter/index.html.

IMC 1301, “Response to Radioactive Material Incidents That Do Not Require Activation of the NRC Incident Response Plan.”

IMC 1302, “Follow-up Actions and Action Levels for Radiation Exposures Associated with Material Incidents Involving Members of the Public.”

IMC 1303, “Requesting Emergency Acceptance of Radioactive Material by the

U.S. Department of Energy (DOE)."

IMC 1330, "Response to Transportation Accidents Involving Radioactive Materials."

IMC 1360, "Use of Physician and Scientific Consultants in the Medical Consultant Program."

IMC 2800, "Materials Inspection Program."

Generic Communications

The NRC Generic Communication Index is available at: https://www.nrc.gov/reading-rm/doc-collections/index.html#gen.

NRC Information Notice 1993-18, "Portable Moisture-Density Gauge User Responsibilities During Field Operations," March 10, 1993.

NRC Information Notice 2001-03, "Incident Reporting Requirements for Radiography Licensees," April 6, 2001.

NRC Regulatory Issue Summary 2005-06, "Reporting Requirements for Gauges Damaged at Temporary Job Sites," April 18, 2005.

NRC Information Notice XX (TBD), "Reporting Clarification when a Fixed Gauge Shutter is Stuck in the Closed Position."

"Reporting of Damaged Portable Moisture-Density Gauges," HPPOS-322 PDR-9308020160; Memorandum from R. E. Cunningham to R. W. Cooper (and others) dated July 1, 1993.
https://www.nrc.gov/about-nrc/radiation/protects-you/hppos/hppos322.htm

State and Tribal Communications Letters

State and Tribal Communications Letters are available at: https://scp.nrc.gov/asletters/.

All-Agreement State Letter SP–98–018, dated March 17, 1998, "Use of the Nuclear Material Events Database (NMED) as a Central Listing of Lost or Stolen Sealed Sources and Devices."

All-Agreement State Letter SP–98–038, dated May 5, 1998, "Expansion of Federal Bureau of Investigation (FBI) Criminal Investigative Jurisdiction to Include Byproduct Materials."

All-Agreement State Letter SP–98–040, dated May 7, 1998, "Guidance for Reporting Material Events."

All-Agreement State Letter STP–00–081, dated November 29, 2000, "Strategic Plan and Nuclear Material Safety Performance Plan Data Goals."

State Agreements (SA) Procedures

SA Procedures are available at: https://scp.nrc.gov/procedures.html#stateagree

SA–100, “Implementation of the Integrated Materials Performance Evaluation Program.”

SA–105, “Reviewing the Common Performance Indicator, Technical Quality of Incident and Allegation Activities.”

SA–112, “Emergency Suspension of Section 274b. Agreement.”

SA–200, “Compatibility Categories and Health and Safety Identification for NRC Regulations and Other Program Elements.”

Event Notification (EN) Reports

EN Reports are available at: https://www.nrc.gov/reading-rm/doc-collections/event-status/event/index.html

Regulations

Title 10, “Energy,” regulations are available at: https://www.nrc.gov/reading-rm/doc-collections/cfr/index.html

Title 49, “Transportation,” Chapter 1, “Pipeline and Hazardous Materials Safety Administration, Department of Transportation,” Part 171, “General Information, Regulations, and Definitions,” are available at: https://www.ecfr.gov/current/title-49/subtitle-B/chapter-I/subchapter-C/part-171?toc=1.

NRC Policy

The *Federal Register* (FR) is available at:

https://www.federalregister.gov/documents/search#advanced.

82 FR 45907, “Abnormal Occurrence Reports; Policy revision; issuance,” dated October 2, 2017.

82 FR 46840, “Agreement State Program Policy Statement; Revision to policy statement,” dated October 6, 2017.

82 FR 48535, “Agreement State Program Policy Statement; Correction,” dated October 18, 2017.

26 FR 2536, “Criteria for Guidance of States and AEC in Discontinuance of AEC Regulatory Authority and Assumption Thereof by States Through Agreement,” dated March 24, 1961.