

# NRC INSPECTION MANUAL

IRIB

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INSPECTION MANUAL CHAPTER 0309

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REACTIVE INSPECTION DECISION BASIS FOR POWER REACTORS

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## 0309-01 PURPOSE

- 01.01 To provide **amplifying direction and** guidance to the Office of Nuclear Reactor Regulation (NRR) and the **regional** staff for implementing the requirements prescribed in Management Directive (MD) 8.3, "NRC Incident Investigation Program."
- 01.02 To provide a detailed list of deterministic criteria that can be used on their own or in conjunction with a probabilistic risk assessment as a decision basis for implementing Incident Investigation Teams (IITs), Augmented Inspection Teams (AITs), and Special Inspections (SIs).
- 01.03 To provide guidance on the use of risk metrics and probabilistic risk assessment to **inform** the need for a reactive inspection.
- 01.04 To discuss the availability of various tools to communicate with internal and external stakeholders on event response and assessment.
- 01.05 To provide a sample format to use when documenting reactive inspection decisions.

## 0309-02 BACKGROUND

It is the policy of the U.S. Nuclear Regulatory Commission (NRC) to ensure that significant events involving reactor and materials facilities licensed by the NRC are investigated in a timely, objective, systematic, and technically sound manner; that the information pertaining to each event is documented; and that the cause or causes of each event are ascertained. MD 8.3 is the **agency-level** governing document for this Inspection Manual Chapter (IMC). MD 8.3 includes deterministic and risk criteria for determining the agency's appropriate event response and delineates **office-level** responsibilities for **significant event** responses. A significant event is any radiological, safeguards, or other safety-related event at an NRC-licensed facility that poses an actual or **significant** potential hazard to public health and safety, property, or the environment. This IMC also refers to a significant event as an "event" or "incident." **Significant events include initiating events (e.g., complicated reactor trips) and significant degraded conditions.** This IMC provides specific roles and responsibilities for the staff involved in the event response process as well as guidance for developing cooperative staff-level relationships among the participating offices. Inspection Procedure (IP) 71153, "**Follow Up of Events and Notices of Enforcement Discretion,**" is used to gather the information needed to evaluate events and to assess their significance. This information and the directions in this IMC are then used to make reactive inspection decisions. IP 93812, "Special Inspection," and 93800, "Augmented Inspection Team," provide implementing **directions for reactive inspection** responses. NUREG-1303, "Incident Investigation Manual," details the procedures involved in conducting an IIT.

## 0309-03 RESPONSIBILITIES

### 03.01 Operating Experience Branch (IOEB)

**IOEB** is responsible for the initial NRR follow-up of significant events at power reactors and is the initial NRR point of contact to coordinate event evaluation. **IOEB** works with the **regional offices** and inspectors to develop event details. **IOEB** contacts appropriate technical branches and the project manager (**PM**) for support to address relevant technical and regulatory issues, including safety significance determinations. If an event

or condition warrants headquarters involvement in the reactive inspection decision, IOEB participates in the decision-making process (see section 04.05).

#### 03.02 Probabilistic Risk Assessment Operational Support and Maintenance Branch (APOB)

At the request of IOEB or the **regional office**, APOB evaluates the risk associated with significant events at power reactors. The APOB risk analyst should seek a consensus with the regional Senior Risk Analysts (SRAs) on the event's risk significance so that regional and headquarters **managers** receive consistent risk insights. **Differences between headquarters and regional risk assessments, that could affect the response decision, should be explained to the decision makers.** APOB provides the risk input to NRR management through IOEB. If an event or condition warrants headquarters involvement in the reactive inspection decision, APOB participates in the decision-making process (see section 04.05).

#### 03.03 Other Technical Branches/NRR

At the request of IOEB, the Division of Operating Reactor Licensing (DORL), or the **regional offices**, NRR technical branches provide technical support for resolving issues identified during follow-up of significant events.

#### 03.04 Division of Operating Reactor Licensing (DORL)

The DORL PM keeps abreast of significant events at **assigned** power reactor plant(s) and provides logistical support for **regional offices** and other NRR staff during the short-term event response. The PM promptly alerts IOEB to potentially significant events. If an event or condition warrants **consideration of an AIT or IIT**, the PM provides logistical support by setting up a conference between headquarters and the **regional office** (see section 04.05).

#### 03.05 Regional Staff

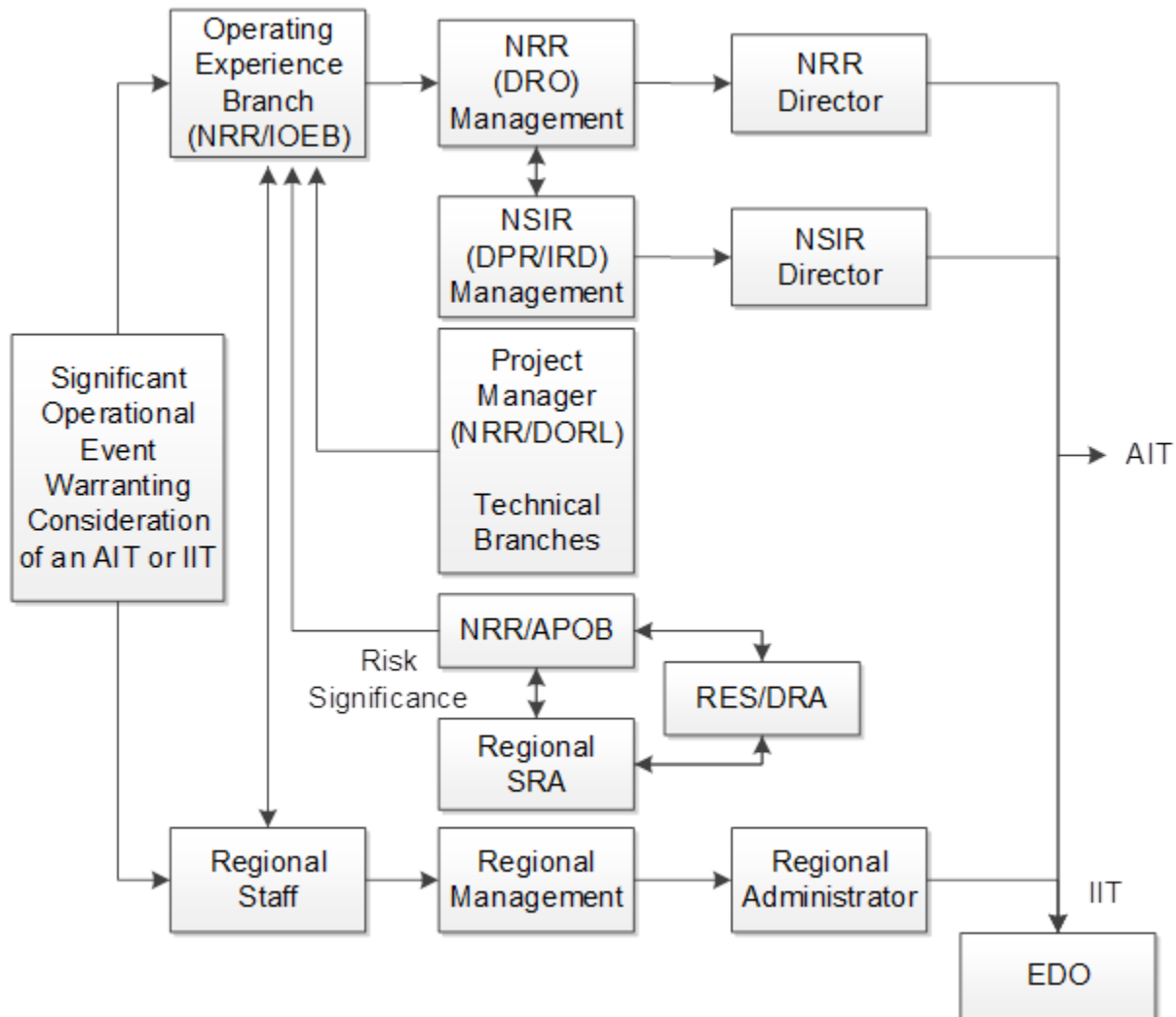
**The regional staff formulates recommendations to their respective Regional Administrator (RA) regarding appropriate event response and places a completed MD 8.3 determination in the Agencywide Documents Access and Management System (ADAMS) once a decision is finalized. If an event or condition warrants consideration of an AIT or IIT, staff will participate in the decision-making process (see section 04.05). When the decision is made to launch a reactive inspection, the staff will develop an inspection charter and place it in ADAMS.**

#### 03.06 Division of Preparedness and Response/Incident Response Directorate (DPR/IRD)

DPR/IRD is part of the Office of Nuclear Security and Incident Response (NSIR). If an event or condition warrants **consideration of an AIT or IIT**, IRD will participate in the decision-making process (see section 04.05).

The flow of communication among the participating staff organizations and the **decision-making** points is depicted in figure 1.

Figure 1: Flow Chart for AIT or IIT Decision-Making



## 0309-04 REQUIREMENTS

### 04.01 Initial Event Notification and Follow-up

When NRR is notified of a potentially significant event, or an event with potential generic implications, IOEB will coordinate initial NRR event follow-up activities, working with the regional office to understand the significance and generic implications of the event. The DORL PM is kept informed of the event information and provides logistical support for further appropriate NRR event follow-up activities. IOEB requests assistance from NRR technical staff as needed. Regional staff may request technical support from NRR by contacting IOEB.

### 04.02 Risk Significance

Power reactor events are evaluated for risk significance when one or more of the deterministic criteria listed in table 1 are met. In NRR, APOB in coordination with the

responsible regional office promptly evaluates the risk of events or degraded conditions when the risk estimate conducted by the regional SRA is  $\geq 1\text{E-}5$  conditional core damage probability (CCDP) or  $\geq 1\text{E-}6$  conditional large early release probability (CLERP), or when requested by the regional staff. In such cases, all currently available event or degraded-condition-related risk information will be promptly provided to APOB for risk evaluation. APOB communicates with its regional counterparts (e.g., the regional SRAs) and IOEB to share pertinent risk information to reach a consensus on the risk significance of the event or degraded condition. The regional SRAs inform regional management of the risk significance, and APOB provides the NRR risk input and uncertainty estimates to NRR management, typically through IOEB. Additionally, the Office of Nuclear Regulatory Research can provide risk analysis support upon request.

#### 04.03 Risk Measures and Quantitative Criteria for Reactive Inspections

- a. Deterministic Screening. The purpose of this deterministic screening is to eliminate the need to perform a detailed risk assessment for events that are low risk and well understood. Appropriately managed plant configurations due solely to planned maintenance under applicable rules and regulations (e.g., Title 10 of the *Code of Federal Regulations* (10 CFR) 50.65(a)(4); 10 CFR 50.59, "Changes, tests, and experiments"; and technical specifications) need not be considered.

Table 1: Reactor Safety Deterministic Screening Criteria for Risk Assessment

Criteria	Deterministic Screening Criteria for Risk Assessment
1	Involved operations that exceeded, or were not included in, the design bases of the facility
2	Involved a major deficiency in design, construction, or operation having potential generic safety implications
3	Led to a significant loss of integrity of the fuel, the primary coolant pressure boundary, or the primary containment boundary of a nuclear reactor
4	Led to the loss of a safety function or multiple failures in systems used to mitigate an actual event
5	Involved possible adverse generic implications
6	Involved significant unexpected system interactions
7	Involved repetitive failures or events involving safety-related equipment or deficiencies in operations
8	Involved questions or concerns pertaining to licensee operational performance

- b. **Risk Assessment.** Evaluate the risk of significant events or conditions at power reactors meeting any of the deterministic screening criteria in table 1, as follows: CCDP best reflects loss of defense in depth due to the event, regardless of whether the cause is deficient licensee performance. CCDP accounts for actual plant configuration, including equipment unavailable because of maintenance and testing. IMC 0609, "Significance Determination Process," addresses CCDP determination. Although CCDP represents a fundamentally different concept for events than for degraded conditions that do not initiate an event, the same guidelines may be applied to both in order to assist management in its risk-informed decision-making.

The lack of complete event information at the time of the NRC response decision focuses attention on the uncertainty of influential assumptions and their effect on the risk significance. IP 71153 discusses inspector inputs to risk analyses that are needed to understand the risk significance. In determining risk significance of an event, NRC should assess the potential influence on risk of the following:

- **dominant** core damage sequence(s)
- **level** of confidence in failure/unavailability values assumed for the sequence(s)
- **influence** on the CCDP estimate of contributing factors where the confidence level is low

Table 2 provides recommended event response thresholds as a function of CCDP. The overlap of options relative to CCDP levels provides the opportunity to select different inspection or investigation options on the basis of such factors as uncertainty of the risk estimate coupled with the deterministic insights. Risk insights should also be used in considering the number of inspectors, their expertise, and the areas of focus.

Table 2: Event Response as a Function of CCDP

Estimated CCDP				
CCDP < 1E-6	1E-6 → 1E-5	1E-5 → 1E-4	1E-4 → 1E-3	CCDP > 1E-3
No Additional Inspection				
	SI			
		AIT		
			IIT	

In addition to core damage risk, NRC should assess whether degraded conditions could increase the likelihood of a large early release resulting from containment failure or containment bypass. For events or degraded conditions associated with containment performance or bypass, the risk of a large early release (e.g., the CLERP) is evaluated, if practical, in addition to CCDP. Table 3 lists appropriate reactive inspection thresholds as a function of CLERP.

Table 3: Event Response as a Function of CLERP

Estimated CLERP				
CLERP < 1E-7	1E-7 → 1E-6	1E-6 → 1E-5	1E-5 → 1E-4	CLERP > 1E-4
No Additional Inspection				
	SI			
		AIT		
			IIT	

If the risk assessment is  $\geq 1E-5$  CCDP or  $\geq 1E-6$  CLERP, regional management will promptly contact NRR (IOEB), as coordination with headquarters will be necessary (see figure 1 and section 04.05).

In some cases, the adequacy of risk assessment models, assumptions, and uncertainties may make it difficult to numerically quantify risk. In such cases, recommendations should rely on the deterministic criteria and the NRC's current understanding of the event and its causes.

#### 04.04 Deterministic Factors for Reactive Inspections

In addition to the significant events at power reactors discussed in section 04.03, there are other significant events (related to reactor safety, radiation safety, or safeguards and security) that may occur at an NRC-licensed facility. The factors that cause these other types of incidents are not necessarily part of a licensee's probabilistic risk assessment (PRA) model, and their risk significance **may not be easily** quantified. Therefore, the incidents must be examined **using** deterministic criteria, **considering safety, margin, defense in depth, and additional factors** when deciding on the appropriate level of reactive inspection. **The NRC also considers additional** factors such as openness, public interest, and public safety **as appropriate** when deciding whether to dispatch an IIT, AIT, or SI. These additional deterministic criteria are listed in section 04.05 (and in Enclosure 2). **Tables 4, 5, and 6 list these additional deterministic criteria.** They are organized **by incident** type (reactor safety, radiation safety, safeguards/security) and by **the** reactive inspection warranted.

**For these criteria, no quantitative risk assessment is required, and meeting any one of the deterministic criteria is the basis for considering an IIT, AIT, or SI (as specified) informed by consideration of safety, margin, defense in depth, and additional factors.**

Table 4: Reactor Safety Deterministic Criteria

Reactor Safety—Deterministic Criteria	
Criteria	Consider IIT
1	Led to a site area emergency (MD 8.3)
2	Exceeded a safety limit of the licensee's technical specifications (MD 8.3)
3	Involved circumstances sufficiently complex, unique, or not well enough understood, or involved safeguards concerns, or involved characteristics the investigation of which would best serve the needs and interests of the Commission (MD 8.3)
Criteria	Consider SI
4	Significant failure to implement the emergency preparedness program during an actual event, including the failure to classify, notify, or augment onsite personnel
5	Involved significant deficiencies in operational performance which resulted in degrading, challenging, or disabling a safety system function or resulted in placing the plant in an unanalyzed condition for which available risk assessment methods do not provide an adequate or reasonable estimate of risk

Table 5: Radiation Safety Deterministic Criteria

Radiation Safety Deterministic Criteria	
Criteria	Consider IIT
1	Led to a significant radiological release (levels of radiation or concentrations of radioactive material in excess of 10 times any applicable limit in the license or 10 times the concentrations specified in 10 CFR Part 20, Appendix B, Table 2, when averaged over a year) of byproduct, source, or special nuclear material to unrestricted areas (MD 8.3)
2	Led to a significant occupational exposure or significant exposure to a member of the public. In both cases, “significant” is defined as five times the applicable regulatory limit (except for shallow-dose equivalent to the skin or extremities from discrete radioactive particles) (MD 8.3)
3	Involved the deliberate misuse of byproduct, source, or special nuclear material from its intended or authorized use, which resulted in the exposure of a significant number of individuals (MD 8.3)
4	Involved byproduct, source, or special nuclear material, which may have resulted in a fatality (MD 8.3)

Radiation Safety Deterministic Criteria	
5	Involved circumstances sufficiently complex, unique, or not well enough understood, or involved safeguards concerns, or involved characteristics the investigation of which would best serve the needs and interests of the Commission (MD 8.3)
Criteria	Consider AIT
6	Led to a radiological release of byproduct, source, or special nuclear material to unrestricted areas that resulted in occupational exposure or exposure to a member of the public in excess of the applicable regulatory limit (except for shallow-dose equivalent to the skin or extremities from discrete radioactive particles) (MD 8.3)
7	Involved the deliberate misuse of byproduct, source, or special nuclear material from its intended or authorized use and had the potential to cause an exposure of greater than 5 rem to an individual or 500 mrem to an embryo or fetus (MD 8.3)
8	Involved the failure of radioactive material packaging that resulted in external radiation levels exceeding 10 rads/hr or contamination of the packaging exceeding 1000 times the applicable limits specified in 10 CFR 71.87 (MD 8.3)
9	Involved the failure of the dam for mill tailings with substantial release of tailings material and solution off site (MD 8.3)
Criteria	Consider SI
10	<p>May have led to an exposure in excess of the applicable regulatory limits, other than via the radiological release of byproduct, source, or special nuclear material to the unrestricted area; specifically</p> <ul style="list-style-type: none"> <li>• occupational exposure in excess of the regulatory limits in 10 CFR 20.1201</li> <li>• exposure to an embryo/fetus in excess of the regulatory limits in 10 CFR 20.1208</li> <li>• exposure to a member of the public in excess of the regulatory limits in 10 CFR 20.1301</li> </ul>
10	May have led to an unplanned occupational exposure in excess of 40 percent of the applicable regulatory limit (excluding shallow-dose equivalent to the skin or extremities from discrete radioactive particles)
11	Led to unplanned changes in restricted area dose rates in excess of 20 rem per hour in an area where personnel were present or which is accessible to personnel
12	Led to unplanned changes in restricted area airborne radioactivity levels in excess of 500 derived air concentration (DAC) in an area where personnel were present or which is accessible to personnel and where the airborne radioactivity level was not promptly recognized and/or appropriate actions were not taken in a timely manner

Radiation Safety Deterministic Criteria	
13	<p>Led to an uncontrolled, unplanned, or abnormal release of radioactive material to the unrestricted area</p> <ul style="list-style-type: none"> <li>• for which the extent of the offsite contamination is unknown; or,</li> <li>• that may have resulted in a dose to a member of the public from loss of radioactive material control in excess of 25 mrem (10 CFR 20.1301(e)); or,</li> <li>• that may have resulted in an exposure to a member of the public from effluents in excess of the as low as reasonably achievable (ALARA) guidelines contained in Appendix I to 10 CFR Part 50</li> </ul>
14	<p>Led to a large (typically greater than 100,000 gallons), unplanned release of radioactive liquid inside the restricted area that has the potential for ground-water, or offsite, contamination</p>
15	<p>Involved the failure of radioactive material packaging that resulted in external radiation levels exceeding 5 times the accessible area dose rate limits specified in 10 CFR <b>Part</b> 71, or 50 times the contamination limits specified in 49 CFR Part 173</p>
16	<p>Involved an emergency or non-emergency event or situation, related to the health and safety of the public or on-site personnel or protection of the environment, for which a 10 CFR 50.72 report has been submitted that is expected to cause significant, heightened public or government concern</p>

Table 6: Security Deterministic Criteria

Security Deterministic Criteria	
Criteria	Consider IIT
1	Involved circumstances sufficiently complex, unique, or not well enough understood, or involved safeguards concerns, or involved characteristics the investigation of which would best serve the needs and interests of the Commission (MD 8.3)
2	Failure of licensee significant safety equipment or adverse impact on licensee operations as a result of a safeguards initiated event (e.g., tampering)
3	Actual intrusion into the protected area
Criteria	Consider AIT
4	Involved a significant infraction or repeated instances of safeguards infractions that demonstrate the ineffectiveness of facility security provisions (MD 8.3)
5	Involved repeated instances of inadequate nuclear material control and accounting provisions to protect against theft or diversions of nuclear material (MD 8.3)
6	Confirmed tampering event involving significant safety or security equipment
7	Substantial failure in the licensee's intrusion detection or package/personnel search procedures which results in a significant vulnerability or compromise of plant safety or security
Criteria	Consider SI
8	Involved inadequate nuclear material control and accounting provisions to protect against theft or diversion, as evidenced by inability to locate an item containing special nuclear material (such as an irradiated rod, rod piece, pellet, or instrument)
9	Involved a significant safeguards infraction that demonstrates the ineffectiveness of facility security provisions
10	Confirmation of lost or stolen weapon
11	Unauthorized, actual non-accidental discharge of a weapon within the protected area
12	Substantial failure of the intrusion detection system (not weather related)
13	Failure to the licensee's package/personnel search procedures which results in contraband or an unauthorized individual being introduced into the protected area
14	Potential tampering or vandalism event involving significant safety or security equipment where questions remain regarding licensee performance/response or a need exists to independently assess the licensee's conclusion that tampering or vandalism was not a factor in the condition(s) identified

#### 04.05 Recommendation and Decision

If the review of the event under sections 04.03 and 04.04 yields an SI, the RA will decide whether to initiate the SI. In this case, regional management may consult with NRR and NSIR but is not required to do so.

If the review of the event under section 4.03 and 04.04 yields an AIT recommendation or falls within the SI/AIT overlap region, the regional staff shall promptly contact IOEB and provide event details. IOEB will direct the DORL PM to coordinate a conference with representatives from the regional office, DORL, APOB, IOEB, and NSIR/DPR to discuss whether an SI or AIT is more appropriate. In such cases, the RA, in consultation with the NRR Office Director and NSIR Office Director, makes the final decision on whether to proceed with an SI or AIT.

If the review of the event under section 4.03 and 04.04 yields an IIT recommendation or falls within the AIT/IIT overlap region, the Directors of NRR and NSIR will consult with the RA and provide a recommendation to the Executive Director for Operations (EDO). In such cases, the EDO, in consultation with the RA, will make the ultimate decision on whether to proceed with an AIT or IIT.

The regional office will notify the licensee of its intentions once a final decision is made to launch an SI or AIT.

#### 04.06 Documentation

Enclosure 1 provides a form for regional personnel to use when documenting their decision whether to pursue a reactive inspection based on evaluation of the deterministic and risk criteria in section 04.03. Enclosure 2 provides a form for regional personnel to use when documenting their decision whether to pursue a reactive inspection based on evaluation of the deterministic criteria in section 04.04. To fully document the basis for not performing a reactive inspection, both enclosures 1 and 2 should be completed. As noted in enclosure 2, the regions may customize the form to fit regional protocols, but the deterministic criteria should not be changed. The form, along with specific instructions for its completion by regional staff, should be included in regional office instructions or implementing procedures. Basic guidelines include:

- As appropriate and known, describe the event or degraded conditions, apparent system interactions, operational responses, impacts on safety and safety functions, site conditions, and modes of operation in the Brief Description of the Significant Event or Degraded Condition section. Reference any event notifications received in response to the event or degraded condition.
- If none of the deterministic criteria were met, provide sufficient detail to justify the conclusion in the criteria Remarks section as appropriate. Also, state that no deterministic criteria were met in the Response Decision section of the form.
- If one or more of the deterministic criteria were met, provide sufficient detail to justify the conclusion in the criteria Remarks section. When applicable under section 04.03, request an SRA perform a risk assessment and document results in the Conditional Risk Assessment section of the form.

- Avoid documenting a commitment to perform additional event-related inspection when the MD 8.3 evaluation determines no additional reactive inspection is warranted.
- Additional guidance for when it may be appropriate to not perform an MD 8.3 evaluation as well as examples of completed MD 8.3 evaluations are included in exhibit 1.

*After documenting the agency's reactive inspection decision, its basis, and a sufficient response for each criterion, place the documented decision in ADAMS and profile using template "NRR-123: Management Directive (MD) 8.3, Reactive Inspection Evaluation" (ML18233A547) generally no more than 7 calendar days after the event or discovery of the degraded condition. Submit the document to the Document Processing Center after it is either determined that the document is sensitive or, when non-sensitive, coincident with the publication of the associated inspection report documenting related inspection. [C1]*

#### 04.07 Inspection Charter

The purpose of the charter is to delineate the general scope of the reactive inspection and to facilitate fact gathering and understanding. Available risk insights and apparent causal indications should be used to develop the charter's scope. The charter may reasonably include an examination of the conditions preceding the event, event chronology, system responses, human factors, safety culture, equipment performance, quality assurance, radiological considerations, safeguards considerations, event precursors, event response, operating experience, and safety or security impacts in determining the causes of the significant event and in support of appropriate agency follow-up actions. The charter should assess immediate corrective actions and compensatory measures taken to address immediate safety or security concerns. The charter should be consistent with the risk insights and the event's complexity.

Reactive inspections are focused on fact-gathering and a thorough independent review of events. When the inspection is complete, the inspector should consider providing feedback to headquarters on any suggested changes to prevent or reduce the frequency of the significant events or enhance oversight processes.

The charter should not attempt to assess the adequacy of any longer-term corrective actions used to improve licensee performance and prevent recurrence of significant conditions, as these follow-up activities are addressed using supplemental or baseline inspections. Performing these activities during a reactive inspection may delay prompt dissemination of the facts and circumstances surrounding the significant event and impose an unwarranted regulatory burden on licensees.

For SIs and AITs, the inspection charter is generally communicated as an enclosure to a memorandum from the RA to the leader, with copies provided to the NRR office director, Office of Public Affairs (OPA), Regional Public Affairs Officer, affected licensee, and NSIR office director when related to security or emergency planning. The charter may be modified during a reactive inspection in consultation with management, if the inspection develops significant new information that warrants review.

#### 04.08 Communications

**Communication** tools that are available to enhance the effectiveness and efficiency of the agency's communications with its stakeholders. The NRC has developed the "Event Response and Assessment Communications Plan," **which** is available in the ADAMS Main Library internal folder entitled "Communication Plans."

The communication tools available for event or degraded condition response and assessment include **the following**:

- a communications team
- central tracking of controlled correspondence
- a notification sequence for significant regulatory documents
- formalized questions and answers for common and expected significant events for use by the OPA during initial event response
- a dedicated **web** page for each event

If it is determined that a communications team is warranted, DORL typically plays the key NRR role in developing and coordinating the communications team and subsequent communications activities. Specific communication activity assignments are determined by the communications team. IOEB, the Regional Offices, and other NRR branches support such DORL activities, as needed. Communication activities typically continue beyond the initial phase of investigative response until their goals have been accomplished.

Reactive inspections may generate high public interest. The RA in consultation with the OPA, may elect to open a reactive inspection exit meeting to the public. Alternately, the RA may decide it is more appropriate to have a separate public meeting, press conference, **or both** in lieu of a public meeting with the licensee.

#### 04.09 Allegations

If, during the course of evaluating events using this procedure, the inspector(s) suspect that there might be an element of willfulness or intentional wrongdoing, they will (1) prepare and submit an allegation receipt form to the appropriate regional office with the inspector(s) as the concerned individual(s), (2) inform the appropriate regional manager(s) of the suspicion, and (3) handle the potential willfulness or intentional wrongdoing in accordance with the allegation process. This should be done regardless of whether a reactive inspection is conducted.

#### 0309-05 REFERENCES

"Event Response and Assessment Communications Plan," **October 3**, 2000 (ML003774969)

IMC 0609, "Significance Determination Process"

IP 71153, "**Follow Up of Events and Notices of Enforcement Discretion**"

IP 93800, "Augmented Inspection Team"

IP 93812, "Special Inspection"

MD 8.2, "NRC Incident Response Program"

MD 8.3, "NRC Incident Investigation Program"

NUREG-1303, "Incident Investigation Manual"

END

### Exhibit 1: Additional Guidance and Examples

Below is a list of events and conditions that generally would not warrant an MD 8.3 evaluation unless they are exacerbated by other issues that contributed to those events and conditions or complexities that occurred because of those events and conditions:

1. Uncomplicated reactor trips or scrams (manual or auto).
2. Scaffolding found to have potentially impacted only a single safety related system operation.
3. Safety system instrumentation found out of calibration via periodic testing or surveillance.
4. Inadvertent discharge of Freon, fire water, carbon dioxide or Halon having no adverse impact on plant operations.
5. Tritium leaks found because of scheduled testing or investigation by the licensee.
6. Loss of spent fuel cooling with little or no pool temperature rise (delta of 15°F and highest temp below 140°F).
7. Balance of plant transients that do not result in a plant trip/scram.
8. Short-term losses of shutdown cooling/decay heat removal which were readily recovered (Less than 20 percent of Margin to Time to Boil).
9. Isolated surveillance testing failures (not readily known to be repetitive, generic, or common mode in nature).
10. Loss of secondary containment (BWR).

#### *Examples of MD 8.3 determinations [C2]:*

Search ADAMS for Document Type “MD 8.3 Reactive Inspection Evaluation”

Enclosure 1: Decision Documentation for Reactive Inspection  
(Deterministic and Risk Criteria Analyzed)

<b>Decision Documentation for Reactive Inspection</b> (Deterministic and Risk Criteria Analyzed)		
PLANT:	EVENT DATE:	EVALUATION DATE:
Brief Description of the Significant Event or Degraded Condition:		
<b>Y/N</b>	<b>DETERMINISTIC CRITERIA</b>	
	Involved operations that exceeded, or were not included in, the design bases of the facility	
	Remarks:	
	Involved a major deficiency in design, construction, or operation having potential generic safety implications	
	Remarks:	
	Led to a significant loss of integrity of the fuel, primary coolant pressure boundary, or primary containment boundary of a nuclear reactor	
	Remarks:	
	Led to the loss of a safety function or multiple failures in systems used to mitigate an actual event	
	Remarks:	
	Involved possible adverse generic implications	
	Remarks:	
	Involved significant unexpected system interactions	
	Remarks:	
	Involved repetitive failures or events involving safety-related equipment or deficiencies in operations	
	Remarks:	
	Involved questions or concerns pertaining to licensee operational performance	
	Remarks:	

<b>CONDITIONAL RISK ASSESSMENT</b>	
RISK ANALYSIS BY:	DATE:
Brief Description of the Basis for the Assessment (may include assumptions, calculations, references, peer review, or comparison with licensee's results):	
The estimated conditional core damage probability (CCDP) is _____ and places the risk in the range of a _____ and _____ inspection.	

<b>RESPONSE DECISION</b>	
USING THE ABOVE INFORMATION AND OTHER KEY ELEMENTS OF CONSIDERATION AS APPROPRIATE, DOCUMENT THE RESPONSE DECISION TO THE EVENT OR CONDITION, AND THE BASIS FOR THAT DECISION	
DECISION AND DETAILS OF THE BASIS FOR THE DECISION:	
BRANCH CHIEF REVIEW:	DATE:
DIVISION DIRECTOR REVIEW:	DATE:
ADAMS ACCESSION NUMBER:	
EVENT NOTIFICATION REPORT NUMBER (as applicable):	
<p>Profiled using template NRR-123 (<a href="#">ML18233A547</a>)</p>	

Note: The above tables are provided as examples only. The regions have discretion to modify these tables in their implementing procedures or office instructions.

Enclosure 2: Decision Documentation for Reactive Inspection and Examples  
(Deterministic-only Criteria Analyzed)

Decision Documentation for Reactive Inspection (Deterministic-only Criteria Analyzed)	
PLANT:	EVENT DATE: EVALUATION DATE:
Brief Description of the Significant Event or Degraded Condition:	
<b>REACTOR SAFETY</b>	
<b>Y/N</b>	<b>IIT Deterministic Criteria</b>
	Led to a Site Area Emergency
	Remarks:
	Exceeded a safety limit of the licensee's technical specifications
	Remarks:
	Involved circumstances sufficiently complex, unique, or not well enough understood, or involved safeguards concerns, or involved characteristics the investigation of which would best serve the needs and interests of the Commission
	Remarks:
<b>Y/N</b>	<b>SI Deterministic Criteria</b>
	Significant failure to implement the emergency preparedness program during an actual event, including the failure to classify, notify, or augment onsite personnel
	Remarks:
	Involved significant deficiencies in operational performance which resulted in degrading, challenging, or disabling a safety system function or resulted in placing the plant in an unanalyzed condition for which available risk assessment methods do not provide an adequate or reasonable estimate of risk.
	Remarks:

RADIATION SAFETY	
Y/N	<b>IIT Deterministic Criteria</b>
	Led to a significant radiological release (levels of radiation or concentrations of radioactive material in excess of 10 times any applicable limit in the license or 10 times the concentrations specified in 10 CFR Part 20, Appendix B, Table 2, when averaged over a year) of byproduct, source, or special nuclear material to unrestricted areas
	Remarks:
	Led to a significant occupational exposure or significant exposure to a member of the public. In both cases, "significant" is defined as five times the applicable regulatory limit (except for shallow-dose equivalent to the skin or extremities from discrete radioactive particles)
	Remarks:
	Involved the deliberate misuse of byproduct, source, or special nuclear material from its intended or authorized use, which resulted in the exposure of a significant number of individuals
	Remarks:
	Involved byproduct, source, or special nuclear material, which may have resulted in a fatality
	Remarks:
	Involved circumstances sufficiently complex, unique, or not well enough understood, or involved safeguards concerns, or involved characteristics the investigation of which would best serve the needs and interests of the Commission
	Remarks:
Y/N	<b>AIT Deterministic Criteria</b>
	Led to a radiological release of byproduct, source, or special nuclear material to unrestricted areas that resulted in occupational exposure or exposure to a member of the public in excess of the applicable regulatory limit (except for shallow-dose equivalent to the skin or extremities from discrete radioactive particles)
	Remarks:

	Involved the deliberate misuse of byproduct, source, or special nuclear material from its intended or authorized use and had the potential to cause an exposure of greater than 5 rem to an individual or 500 mrem to an embryo or fetus
	Remarks:
	Involved the failure of radioactive material packaging that resulted in external radiation levels exceeding 10 rads/hr or contamination of the packaging exceeding 1000 times the applicable limits specified in 10 CFR 71.87
	Remarks:
	Involved the failure of the dam for mill tailings with substantial release of tailings material and solution off site
	Remarks:
<b>Y/N</b>	<b>SI Deterministic Criteria</b>
	May have led to an exposure in excess of the applicable regulatory limits, other than via the radiological release of byproduct, source, or special nuclear material to the unrestricted area; specifically <ul style="list-style-type: none"> <li>• occupational exposure in excess of the regulatory limits in 10 CFR 20.1201</li> <li>• exposure to an embryo/fetus in excess of the regulatory limits in 10 CFR 20.1208</li> <li>• exposure to a member of the public in excess of the regulatory limits in 10 CFR 20.1301</li> </ul>
	Remarks:
	May have led to an unplanned occupational exposure in excess of 40 percent of the applicable regulatory limit (excluding shallow-dose equivalent to the skin or extremities from discrete radioactive particles)
	Remarks:
	Led to unplanned changes in restricted area dose rates in excess of 20 rem per hour in an area where personnel were present or which is accessible to personnel
	Remarks:
	Led to unplanned changes in restricted area airborne radioactivity levels in excess of 500 DAC in an area where personnel were present or which is accessible to personnel and where the airborne radioactivity level was not promptly recognized and/or appropriate actions were not taken in a timely manner
	Remarks:

	<p>Led to an uncontrolled, unplanned, or abnormal release of radioactive material to the unrestricted area</p> <ul style="list-style-type: none"> <li>• for which the extent of the offsite contamination is unknown; or,</li> <li>• that may have resulted in a dose to a member of the public from loss of radioactive material control in excess of 25 mrem (10 CFR 20.1301(e)); or,</li> <li>• that may have resulted in an exposure to a member of the public from effluents in excess of the ALARA guidelines contained in Appendix I to 10 CFR Part 50</li> </ul>
	Remarks:
	<p>Led to a large (typically greater than 100,000 gallons), unplanned release of radioactive liquid inside the restricted area that has the potential for ground-water, or offsite, contamination</p>
	Remarks:
	<p>Involved the failure of radioactive material packaging that resulted in external radiation levels exceeding 5 times the accessible area dose rate limits specified in 10 CFR Part 71, or 50 times the contamination limits specified in 49 CFR Part 173</p>
	Remarks:
	<p>Involved an emergency or non-emergency event or situation, related to the health and safety of the public or on-site personnel or protection of the environment, for which a 10 CFR 50.72 report has been submitted that is expected to cause significant, heightened public or government concern</p>
	Remarks:

SAFEGUARDS/SECURITY	
Y/N	<b>IIT Deterministic Criteria</b>
	Involved circumstances sufficiently complex, unique, or not well enough understood, or involved safeguards concerns, or involved characteristics the investigation of which would best serve the needs and interests of the Commission
	Remarks:
	Failure of licensee significant safety equipment or adverse impact on licensee operations as a result of a safeguards initiated event (e.g., tampering).
	Remarks:
	Actual intrusion into the protected area
	Remarks:
Y/N	<b>AIT Deterministic Criteria</b>
	Involved a significant infraction or repeated instances of safeguards infractions that demonstrate the ineffectiveness of facility security provisions
	Remarks:
	Involved repeated instances of inadequate nuclear material control and accounting provisions to protect against theft or diversions of nuclear material
	Remarks:
	Confirmed tampering event involving significant safety or security equipment
	Remarks:
	Substantial failure in the licensee's intrusion detection or package/personnel search procedures which results in a significant vulnerability or compromise of plant safety or security
	Remarks:

Y/N	SI Deterministic Criteria
	Involved inadequate nuclear material control and accounting provisions to protect against theft or diversion, as evidenced by inability to locate an item containing special nuclear material (such as an irradiated rod, rod piece, pellet, or instrument)
	Remarks:
	Involved a significant safeguards infraction that demonstrates the ineffectiveness of facility security provisions
	Remarks:
	Confirmation of lost or stolen weapon
	Remarks:
	Unauthorized, actual non-accidental discharge of a weapon within the protected area
	Remarks:
	Substantial failure of the intrusion detection system (not weather related)
	Remarks:
	Failure to the licensee's package/personnel search procedures which results in contraband or an unauthorized individual being introduced into the protected area
	Remarks:
	Potential tampering or vandalism event involving significant safety or security equipment where questions remain regarding licensee performance/response or a need exists to independently assess the licensee's conclusion that tampering or vandalism was not a factor in the condition(s) identified
	Remarks:

RESPONSE DECISION	
<p>USING THE ABOVE INFORMATION AND OTHER KEY ELEMENTS OF CONSIDERATION AS APPROPRIATE, DOCUMENT THE RESPONSE DECISION TO THE EVENT OR CONDITION, AND THE BASIS FOR THAT DECISION</p>	
<p>DECISION AND DETAILS OF THE BASIS FOR THE DECISION:</p>	
BRANCH CHIEF REVIEW:	DATE:
DIVISION DIRECTOR REVIEW:	DATE:
<p>ADAMS ACCESSION NUMBER:</p> <p>EVENT NOTIFICATION REPORT NUMBER (as applicable):</p> <p>Profiled using template NRR-123 (<a href="#">ML18233A547</a> (non-public))</p>	

Note: The above tables are provided as examples only. The regions have discretion to modify these tables in their implementing procedures or office instructions.

Attachment 1: Revision History for IMC 0309

Commitment Tracking Number	Accession Number Issue Date Change Notice	Description of Change	Description of Training / Knowledge Management Required and Completion Date	Comment Resolution and Closed Feedback Form Accession Number (Pre-Decisional, Non-Public Information)
	ML033230210 11/05/03 CN 03-036	Initial Issue. Provides guidance for implementing Management Directive 8.3, "NRC Incident Investigation Program," at operating power reactors.	N/A	N/A
N/A	09/12/06	Revision history reviewed for the last four years.	N/A	N/A
N/A	ML070860410 04/04/07 CN 07-012	IMC 0309 is revised to provide deterministic criteria for performing reactive inspections in areas such as reactor safety, radiation safety, and safeguards/security. Deterministic and risk-informed decision criteria from MD 8.3 are included in IMC 0309. Enclosures 1 and 2 are added to provide a sample format for documenting reactive inspection decisions.	None	<a href="#">ML070860416</a>
N/A	ML072550088 01/10/08 CN 08-002	Defines the SI/AIT risk overlap region as the basis for region interaction with NRR, and NSIR in determining the level of event response. Provides deterministic criteria for events involving potential tampering with safety or security related equipment.	None	<a href="#">ML073370664</a>
N/A	ML082820075 03/23/09 CN 09-010	Enclosures 1 and 2 when deciding not to perform a reactive inspection. Delete 2 IIT deterministic criteria that are redundant with MD 8.10.	None	<a href="#">ML082820096</a>
N/A	ML092790408 02/02/10 CN 10-004	Added guidance on holding public meetings and established a mailbox for MD 8.3 evaluations and reactive inspection charters.	None	None

Commitment Tracking Number	Accession Number Issue Date Change Notice	Description of Change	Description of Training / Knowledge Management Required and Completion Date	Comment Resolution and Closed Feedback Form Accession Number (Pre-Decisional, Non-Public Information)
N/A	ML111801157 10/28/11 CN 11-023	Added additional deterministic criteria to cover significant operational performance issues where risk assessment tools do not provide reasonable estimates of risk (FF 0309-1650). Added vandalism to the deterministic criteria for security (FF 0309-1414) and expanded the scope of the consideration to events involving safety and security significance for security events (FF 0309-1616).	None	None
C1 & C2	ML23234A176 12/14/23 CN	Added a 7-day time requirement for completing MD 8.3 evaluations. Implemented OIG-23-A-06 audit (ML23130A375) recommendations 1 and 2 as accepted by management in (ML23157A268 non-public) to publicly share non-sensitive reactive inspection decisions [C1] and to provide examples [C2]. Added guidance for charter development and allegations. Reorganized and reformatted.	None	<a href="#">ML23277A255</a>  None