

Attachment 3 of Enclosure 2  
NEI Slide Presentation  
Meeting Summary of the NRC and Stakeholders  
Concerning NUREG-1022, Revision 2  
**Dated June 28, 2010**

# History of Event Reporting

NEI NUREG 1022 Team

June 8, 2010

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## Purpose

- Discuss the basis for reporting and notification rules
- Establish a baseline of what constitutes full compliance with the rules
- Determine where clarification is needed in order to fully meet the rules

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## Pre-Rule Event Reporting Requirements

- Safety Guide 16 – Reporting of Operating Information (October 1971)
  - To determine whether the nuclear power plant is being operated and maintained in a safe manner,
  - To evaluate conditions at the facility having safety or safeguards significance and
  - To assess system reliability as it may affect the safe operation of the facility.
- Regulatory Guide 1.16 [superseded Safety Guide 16] (Rev 4 / August 1975)
  - Abnormal occurrences were distinct in that they were "*significant from the standpoint of public health or safety.*"
  - Abnormal occurrences recognized as a subset of those occurrences which were deemed to be reportable occurrences

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## Reporting Rules Post-TMI 10 CFR 50.72

- February 29, 1980 – NRC issued a final rule implementing 10 CFR 50.72, "*Immediate Reporting of Significant Events at Operating Nuclear Power Reactors.*" The rule was issued as a direct rule with no public comment. (45FR13434)
- 10 CFR 50.72 was initiated because pre-TMI regulations had been ineffective in ensuring that NRC was informed of events in a timely manner
- Immediate notifications were needed in order to serve two distinct purposes
  - Allow NRC to make timely decisions for responding to actual or potential threats to public health and safety
  - Allow NRC to provide accurate and timely information to their stakeholders (e.g., the public) regarding the extent of any potential threat from an unanticipated event or unexpected conditions at a licensed facility

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## Reporting Rules Post-TMI 10 CFR 50.73

- In January 1980, NRC began work on a Licensee Event Reporting (LER) System rule. The Final Rule, 10 CFR 50.73, "Licensee Event Reporting System" became effective on January 1, 1984. (48FR33850)
- 10 CFR 50.73 codified existing LER reporting (RG 1.160 and Tech Specs) requirements.
  - Established a single set of criteria for all operating nuclear power plants.
- Provided detailed information necessary for engineering studies and analysis of industry operating experience

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## Conclusions on Reporting

- Focused on reporting of events with clear tie to public health and safety.
  - Immediate notifications – informed NRC decision-making for event response & informed NRC communication of event impact(s) to public
  - Follow-up written reports for detailed trending and analysis to ensure corrective actions taken where the event occurred and at other stations where applicable.
- Requirements have evolved since they were first imposed. In general, the trend has been toward more specificity in the criteria for reporting.
- Early distinction between "abnormal occurrences" (i.e., events with significance to public health) and "reportable occurrences" (events of interest requiring reporting, but not of actual significance or high potential of significance).

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## Evolution of Safety System Functional Failure

- In Revision 0 of Safety Guide 16 (1971) two reporting criteria appear to be very similar to SSFF.
  - Under "Abnormal Occurrence Report" [notification within 24 hours, followed by a written report within 10 days]

"(d.) Incidents or conditions which prevented or could have prevented the performance of the intended safety function of an engineered safety feature or of the reactor protection system."
  - Under "Reporting of Unusual Events" [written report within 30 days]

"(d.) Any condition involving a possible single failure which, for a system designed against assumed single failures, could result in a loss of the capability of the system to perform its safety function."
- Tied to fulfilling functions required to cope with accidents analyzed in the plants' safety analysis (e.g., ESF and RPS systems specifically named).

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## Regulatory Guide 1.16 Revision

- In Revision 2 of RG 1.16 (superseded SG 16 with Revision 1), the 24-hour notification criteria were expanded as follows:
    - 6) Failure or malfunction of one or more components which prevents or could prevent, by itself, the fulfillment of the functional requirements of systems required to function to cope with accidents analyzed in the SAR. The following are examples:
      - a) Clogged fuel line(s) resulting in failure to supply fuel to the emergency generators.
      - b) Multiple instrument drift resulting in loss of protective function.
    - 7) Personnel error or procedural inadequacy which prevents or could prevent, by itself, the fulfillment of the functional requirements of systems required to function to cope with accidents analyzed in the SAR. The following are examples:
      - a) Failure to restore a safety system to full operability following test or maintenance;
      - b) Improper procedures leading to incorrect valve lineup which resulted in closure of one manual valve in each of two redundant safety injection subsystems and would have prevented injection on demand.
- Note: For items 2.a(6) and 2.a(7), reduced redundancy that does not result in loss of system function need not be reported under this section (but see items 2.b(2) and 2.b(4) below)."
- Tied to fulfilling functions required to cope with accidents analyzed in the plants' safety analysis. (Examples relate to actual conditions that affected or would have affected the functions under assumed design basis accident conditions.)

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## 10 CFR 50.72/73

- 10 CFR 50.72 (b)(2)(iii) Any event or condition that alone could have prevented the fulfillment of the safety function of structures or systems that are needed to:
  - A. Shut down the reactor and maintain it in a safe shutdown condition,
  - B. Remove residual heat,
  - C. Control the release of radioactive material, or
  - D. Mitigate the consequences of an accident.
- Implemented by direct rule in 1980, post-TMI corrective action.
  - After experience with 10CFR50.72, NRC implemented lessons learned with rulemaking in 1984. This criterion remained unchanged
- Revision in 1999 removed the word "alone"
  - Implication that other existing plant conditions at time of discovery must be considered in determination of reportability under this criterion.

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## Key Concepts

- Close tie to systems and structures assumed in the plant's safety analysis for handling a design basis accident
- Recognition of the use of Engineering Judgment or Technical Judgment in determining reportability
  - "The Commission recognizes that the application of this and other paragraphs of this section involves a technical judgment by licensees. In this case, a technical judgment must be made whether a failure or operator action that disabled one train of a safety system could have, but did not, affect a redundant train."
- While judgment is used to conclude whether a condition applies to other equipment, it is clear that the judgment extends only to concluding the *degree* to which the condition could affect the other equipment's ability to perform its specified function, and does not require conjecture as to whether the condition did or did not actually affect other equipment.

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## Conclusions on SSFF

- Immediate notification requirement implies tie to public health and safety.
  - Notification to NRC allows decision-making and stakeholder communication due to implications of condition.
  - Is not congruent with notifications of events/conditions for which fulfillment of the safety function is easily and reasonably ensured by operator action.
- Written notification allows deeper understanding for affected station and potential for follow-up at other stations.
- Tie of notification/reporting requirements to SSCs credited in safety analysis for design basis events is clear through evolution of the overall notification / reporting rule

## Reportability References

Date	Document	Description
10/27/1971	Safety Guide 16 R0	Reporting of Operating Information
10/1973	RG 1.16 R1	Reporting of Operating Information
9/1974	RG 1.16 R2	Reporting of Operating Information – Appendix A Technical Specifications
1/1975	RG 1.16 R3	Reporting of Operating Information – Appendix A Technical Specifications
8/1975	RG 1.16 R4	Reporting of Operating Information – Appendix A Technical Specifications
2/29/1980	45FR13434	Immediate Reporting of Significant Events at Operating Nuclear Power Reactors – Final Rule
7/26/1983	48FR33850	Licensee Event Reporting System – Final Rule
8/29/1983	48FR39039	Immediate Notification Requirements of Significant Events At Operating Nuclear Power Reactor
9/12/1983	48FR40882	Immediate Notification Requirements of Significant Events At Operating Nuclear Power Reactors (corrections to 48FR39039)
1/1998	NUREG 1022 R1	Event Reporting Guidelines, 10 CFR 50.72 and 50.73
7/23/1998	63FR39522	Reporting Requirements - ANPR
10/25/2000	65FR63769	10 CFR Parts 50 and 72, RIN 3150–AF98, Reporting Requirements for Nuclear Power Reactors and Independent Spent Fuel Storage Installations at Power Reactor Sites AGENCY: Nuclear Regulatory Commission ACTION: Final rule.
10/2000	NUREG 1022 R2	Event Reporting Guidelines, 10 CFR 50.72 and 50.73
3/15/2001	TIA 99-030	Task Interface Agreement (TIA) 99-030 From Region III Regarding The Reportability of Reactor Core Isolation Cooling (RCIC) System Failures (TAC NO. MA7367)
8/11/2009	74FR40244	RG 1.16 Revision 4 withdrawn



NUREG-1022  
Rev. 2

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# EVENT REPORTING GUIDELINES

## 10 CFR 50.72 and 50.73

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Manuscript Completed: October 2000  
Date Published: October 2000

**Comment [CBC1]:** NUREG 1022

**Team markup:**

A Microsoft Word 2003 document was created from NUREG 1022 Revision 2. In Revision 2, some, for some cases, strikethrough text and underlined text were used to show text deleted or added from Revision 1 (as noted in section 1.3). To prevent confusion, the strikethrough text has been deleted and the "underline" attribute removed to start with a clean copy prior to turning on track changes. The industry NUREG 1022 team has identified changes using the track changes feature in MS Word 2003. Comments have been added to provide a brief description / justification for the changes.

U.S. Nuclear Regulatory Commission  
Washington, DC 20555

## **1 INTRODUCTION**

This document provides guidance on the reporting requirements of Title 10 of the Code of Federal Regulations, Part 50, Sections 50.72 and 50.73 (10 CFR 50.72 and 10 CFR 50.73). While these reporting requirements range from immediate, 1-hour, 4-hour and 4 8-hour telephone notifications to 60-day written reports, covering a broad spectrum of events from emergencies to component level deficiencies, the NRC wishes to emphasize that reporting requirements should not interfere with ensuring the safe operation of a nuclear power plant. Licensees' immediate attention must always be given to operational safety concerns.

### **1.1 Background**

In 1983, partially in response to lessons from the Three Mile Island accident, the U.S. Nuclear Regulatory Commission (NRC) revised its immediate notification requirements via the emergency notification system (ENS) in 10 CFR 50.72 and modified and codified its written licensee event report (LER) system requirements in 10 CFR 50.73. The revision of 10 CFR 50.72 and the new 10 CFR 50.73 became effective on January 1, 1984. Together, they specified the types of events and conditions reportable to the NRC for emergency response and identifying plant-specific and generic safety issues. They have remained in effect since then with only minor modifications until early 2001.

In late October 2000, substantial amendments to 10 CFR 50.72 and 50.73 are to be published in the Federal Register, with an effective date in late January 2001.

### **1.2 Revised Reporting Guidelines**

The purpose of this Revision 2 to NUREG-1022 is to revise the event reporting guidelines to implement the amendments to 10 CFR 50.72 and 50.73 that are to be published in late October 2000. It also incorporates minor changes to the guidelines for the purpose of clarification. This report supersedes Revision 1 to NUREG-1022.

Section 2 clarifies specific areas of 10 CFR 50.72 and 50.73 that are applicable to multiple reporting criteria or that historically appear to be subject to varied interpretations. It covers such diverse subjects as engineering judgment, differences in tenses between the two rules, retraction and voluntary reporting, legal reporting requirements, and human performance issues.

Section 3 contains guidelines on event reporting for specific criteria in both rules by means of discussions and examples of reported events. To minimize repetition, similar criteria from both rules are addressed together. Section 3.1 addresses general ENS and LER reporting requirements. Section 3.2 addresses specific ENS and LER reporting criteria. It includes a comprehensive discussion of each specific reporting criterion with illustrative examples and Section 4 explains ENS communications reporting timeliness and completeness, voluntary notifications, and retractions. Appropriate ENS emergency notification methods are described. Section 5 provides guidelines on administrative requirements, preparation, and submittal of LERs. It specifies the information an LER should contain and provides steps to be followed in preparing an LER. It also includes an expanded human performance discussion to achieve ENS and LER content that examines both equipment and human performance.

Comment [CBC2]: Editorial to remove historical information.

Deleted: 1.3

Deleted: New or Different Guidance ¶

¶ Except in Table 1, reporting guidance that is considered new or different from that provided in NUREG-1022, Revision 1, is indicated by underlining the appropriate text. In some cases, strikeout marking is also provided to show that specific items are being deleted.

<p align="center"><b>Internal Threat or Hampering</b> (See Section 3.2.10 of this report)</p>	
	<p>§ 50.73(a)(2)(x) "Any event that posed an actual threat to the safety of the nuclear power plant or significantly hampered site personnel in the performance of duties necessary for the safe operation of the nuclear power plant including fires, toxic gas releases, or radioactive releases."</p>
<p align="center"><b>Transport of a Contaminated Person Offsite</b> (See Section 3.2.11 of this report)</p>	
<p>§ 50.72(b)(3)(xii) "Any event requiring the transport of a radioactively contaminated person to an offsite medical facility for treatment."</p>	↓
<p align="center"><b>News Release or Notification of Other Government Agency</b> (See Section 3.2.12 of this report)</p>	
<p>§ 50.72(b)(2)(xi) "Any event or situation, related to the health and safety of the public or on-site personnel, or protection of the environment, for which a news release is planned or notification to other government agencies has been or will be made. Such an event may include an on-site fatality or inadvertent release of radioactively contaminated materials."</p>	↓
<p align="center"><b>Loss of Emergency Preparedness Capabilities</b> (See Section 3.2.13 of this report)</p>	
<p>§ 50.72(b)(3)(xiii) "Any event that results in a major loss of emergency assessment capability, offsite response capability, or offsite communications capability (e.g., significant portion of control room indication, Emergency Notification System, or offsite notification system)."</p>	↓

**Comment [CBC3]:** Editorial - moved to correct column.

**Deleted: § 50.72(b)(3)(xii)** "Any event requiring the transport of a radioactively contaminated person to an offsite medical facility for treatment."

**Comment [CBC4]:** Editorial - moved to correct column.

**Deleted: § 50.72(b)(2)(xi)** "Any event or situation, related to the health and safety of the public or on-site personnel, or protection of the environment, for which a news release is planned or notification to other government agencies has been or will be made. Such an event may include an on-site fatality or inadvertent release of radioactively contaminated materials."

**Comment [CBC5]:** Editorial - moved to correct column.

**Deleted: § 50.72(b)(3)(xiii)** "Any event that results in a major loss of emergency assessment capability, offsite response capability, or offsite communications capability (e.g., significant portion of control room indication, Emergency Notification System, or offsite notification system)."

Table 2. Changes in Reporting Requirements

[Recommend this table to be deleted in Rev 3]

**Comment [CBC6]:** Editorial –  
recommend deleting this historical  
information.



(1) an LCO is not met and the associated ACTIONS are not met; (2) an associated ACTION is not provided, or (3) as directed by the associated ACTIONS themselves.

Entry into STS 3.0.3 (ISTS LCO 3.0.3) or its equivalent is not necessarily, However, it should be reviewed for reportability under this and other related criteria. For example, if the condition is not corrected within an hour, such that it is necessary to initiate actions to shutdown, cool down, etc., it could be reportable as an initiation of a Plant Shutdown Required by Technical Specifications [i.e., adding negative reactivity] [§ 50.72(b)(2)(i)] and completion of a Plant Shutdown Required by Technical Specifications if the plant enters the first shutdown condition required by a limiting condition for operations (LCO) [50.73(a)(2)(i)(A)]. Additional reportability criteria to consider related to the condition include: Operation or Condition Prohibited by Technical Specifications [§ 50.73(a)(2)(i)(B)] if the shutdown was not performed within the completion time, Common-cause Inoperability of Independent Trains or Channels [§ 50.73(a)(2)(vii)], and an Event or Condition That Could Have Prevented Fulfillment of a Safety Function [§ 50.72(b)(3)(v) & § 50.73(a)(2)(v)] if there was a reasonable expectation of preventing fulfillment of the safety function.

**Deleted:** reportable under this criterion

**Deleted:** considered

**Deleted:** reportable

**Deleted:** criterion

### Revised Technical Specifications

An LER is not required for discovery of an operation or condition that occurred in the past and was prohibited at the time it occurred if, prior to the time of discovery, the technical specifications were revised such that the operation or condition is no longer prohibited. Such an event would have little or no significance because the operation or condition would have been determined to be acceptable and allowed under the current technical specifications.

### Examples

#### (1) LCO Exceeded

In conducting a timely 30-day surveillance test a licensee found a standby component with a 7-day LCO allowed outage time and associated 8-hour shutdown action statement to be inoperable. (This is equivalent to a 7-day restoration completion time and an 8-hour action completion time in ISTS.) Subsequent review indicated that the component was assembled improperly during maintenance conducted 30 days previously and the post-maintenance test was not adequate to identify the error. Thus, there was firm evidence that the standby component had been inoperable for the entire 30 days.

An LER was required because the condition existed longer than allowed by the technical specifications (7-day LCO allowed outage time and the shutdown action statement time of 8 hours). Had the inoperability been identified and corrected within the required time, the event would not be reportable.

#### (2) Late Surveillance Tests

A licensee, with the plant in Mode 5 following a 10-month refueling outage, determined that certain monthly technical specifications surveillance tests, which were required to be performed regardless of plant mode, had not been performed as required during the outage. The STS 4.0.2 (equivalent to ISTS SR 3.0.2) extension was also exceeded. The surveillance tests were immediately performed.

**Comment [CBC7]:** Editorial - Clarified to be consistent with other sections of NUREG 1022.

Excerpt from NUREG section 3.2:  
"For § 50.72 reporting purposes, the phrase "initiation of any nuclear plant shutdown" includes action to start reducing reactor power, i.e., adding negative reactivity to achieve a nuclear plant shutdown required by TS. This includes initiation of any shutdown due to expected inability to restore equipment prior to exceeding the LCO action time. As a practical matter, in order to meet the time limits for reporting under § 50.72, the reporting decision should sometimes be based on such expectations. (See Example 4.)"

The event is not reportable under § 50.72(b)(2)(iv) or (b)(3)(iv) because the actuations were not valid. It is reportable under § 50.73(a)(2)(iv) because the actuations were not listed as (and were not) definitely expected to occur.

### 3.2.7 Event or Condition That Could Have Prevented Fulfillment of a Safety Function

<p style="text-align: center;"><b>§ 50.72(b)(3)(v)</b></p> <p>"Any event or condition that at the time of discovery could have prevented the fulfillment of the safety function of structures or systems that are needed to:</p> <p>(A) Shut down the reactor and maintain it in a safe shutdown condition;</p> <p>(B) Remove residual heat;</p> <p>(C) Control the release of radioactive material; or</p> <p>(D) Mitigate the consequences of an accident."</p>	<p style="text-align: center;"><b>§ 50.73(a)(2)(v)</b></p> <p>"Any event or condition that could have prevented the fulfillment of the safety function of structures or systems that are needed to:</p> <p>(A) Shut down the reactor and maintain it in a safe shutdown condition;</p> <p>(B) Remove residual heat;</p> <p>(C) Control the release of radioactive material; or</p> <p>(D) Mitigate the consequences of an accident."</p>
<p style="text-align: center;"><b>§ 50.72(b)(3)(vi)</b></p> <p>"Events covered in paragraph (b)(3)(v) of this section may include one or more procedural errors, equipment failures, and/or discovery of design, analysis, fabrication, construction, and/or procedural inadequacies. However, individual component failures need not be reported pursuant to paragraph (b)(3)(v) of this section if redundant equipment in the same system was operable and available to perform the required safety function."</p>	<p style="text-align: center;"><b>§ 50.73(a)(2)(vi)</b></p> <p>"Events covered in paragraph (a)(2)(v) of this section may include one or more procedural personnel errors, equipment failures, and/or discovery of design, analysis, fabrication, construction, and/or procedural inadequacies. However, individual component failures need not be reported pursuant to paragraph (a)(2)(v) of this section if redundant equipment in the same system was operable and available to perform the required safety function."</p>

An LER is required for an event or condition that could have prevented the fulfillment of the safety function of structures and systems defined in the rules. If the event or condition could have prevented fulfillment of the safety function at the time of discovery, and if it is not reported under § 50.72(a), (b)(1), or (b)(2), an ENS notification is required under (b)(3).

#### Discussion

The level of judgment for reporting an event or condition under this criterion is a reasonable expectation of preventing fulfillment of a safety function. In the discussions which follow, many of which are taken from previous NUREG guidance, several different expressions such as "would have," "could have," "alone could have," and "reasonable doubt" are used to characterize this standard. In the staff's view, all of these should be judged on the basis of a reasonable expectation of preventing fulfillment of the safety function. Engineering judgment can be used to provide reasonable expectation that the safety function of the system would or



would not be met. The staff considers that the use of engineering judgment implies a logical thought process that supports the judgment.

The intent of these criteria is to capture those events where there would have been a failure of a safety system to properly complete a safety function, regardless whether there was an actual demand. For example, if the high pressure safety injection system (both trains) failed, the event would be reportable even if there was no demand for the system's safety function.

If the event or condition could have prevented fulfillment of the safety function at the time of discovery an ENS notification is required. If it could have prevented fulfillment of the safety function at any time within three years of the date of discovery an LER is required.

These criteria cover an event or condition where structures, components, or trains of a safety system could have failed to perform their intended function because of: one or more personnel errors, including procedure violations; equipment failures; inadequate maintenance; or design, analysis, fabrication, equipment qualification, construction, or procedural deficiencies. The event must be reported regardless of whether or not an alternate safety system could have been used to perform the safety function. For example, if the onsite power system failed the event would be reportable, even if the offsite power system remained available and capable of performing the required safety function.

The definition of the systems included in the scope of these criteria is provided in the rules. These are the systems required to perform a safety function assumed in the plant's accident analysis to perform one of the four functions (A) through (D) specified in the rule and are typically in TS. It is not determined by the phrases "safety related," "important to safety," or "ESF." Support systems, including non-safety systems, are included within the scope of the reporting criteria to the extent that the condition would prevent the fulfillment of the safety function credited by the design basis accident analysis. This reporting criterion does not include systems included in the TS for reasons other than the system is assumed in the plant's accident analysis to perform one of the four functions (A) through (D) specified in the rule. These reporting criteria are applicable during plant modes, conditions, or accident situations as relied on in the plant safety analysis to meet regulatory requirements.

In determining the reportability of an event or condition that affects a system, it is not necessary to assume an additional random single failure in that system; however, it is necessary to consider other existing plant conditions. (See Example [4] below).

A system must operate long enough to complete its intended safety function as defined in the safety analysis report.

Appendix C, Section C.5, of Part 9900 addresses the use of temporary manual action in place of automatic action in support of operability to ensure that the specified safety functions of systems, structures and components (SSC) can be accomplished.

The extent to which manual actions may be credited is limited in the guidance. For instance, the guidance makes it clear that use of manual Operator actions in lieu of automatic actions to protect the plant's limiting safety system settings for nuclear reactors as defined in 10 CFR 50.36 is not considered acceptable.

However, while it is recognized that the guidance does delineate specific restrictions, the guidance recognizes that there are conditions in which credit for manual operator action may

**Comment [CBC8]:** Operator Action / Engineering Judgment:

Previously discussed in section 2.1.  
Added here for consistency.

**Comment [CBC9]:** The statement "The definition of the systems included in the scope of these criteria is provided in the rules." The sentence is only changed editorially by deleting the word "themselves."

**Deleted:** themselves

**Deleted:** it

**Deleted:** includes

**Deleted:** by the TS to be operable to

**Comment [CBC10]:** The proposed wording adds clarity to the sentence to reflect that the systems/functions to be reported are those assumed in the accident analysis. This reporting requirement was based on the assumption that safety-related systems and structures are intended to mitigate the consequences of an accident. This clarification is to make it clear that one of the functions (a) through (D) must be impacted in such away that it invalidates an assumption of the plant's design basis accident analysis.

**Comment [CBC11]:** The statement "Support systems not in TS, including non-safety systems, are included within the scope of the reporting criteria to the extent that they would prevent the safety function during design basis accident analysis conditions of a system required to be operable by TS" was added for consistency with other portions of NUREG 1022 Revision 2 and the stated intent of the requirement in 48FR33850, 48FR33854, and 48FR33858.

The following statement is added "This reporting criterion does not include systems included in the TS for reasons other than the system is assumed in the plant's accident analysis to perform ... [1]

**Comment [CBC12]:** Moved to paragraph above for clarity and consistency

**Deleted:** The term "safety function" refers to any of the four functions (A through D) listed in these reporting criteria that are required during any plant mode or accident situation as [2]

**Deleted:** Generic Letter 91-18 provides guidance on determining whether a system is operable. ¶



be accepted as a means for ensuring the operability of a SSC and therefore its continued ability to satisfactorily complete its safety function. Similarly, manual actions can be used to provide reasonable assurance that the safety function required by the rule can be fulfilled.

Plant assessments, evaluations, and calculations may be used to support a reasonable expectation that a system, structure, or component is capable of performing its safety function as defined by the rule. Reasonable expectation is not considered absolute assurance that a system can perform its function.

Both offsite circuits (circuits between the offsite transmission network and the onsite Class 1E AC Electrical Power Distribution System) and onsite emergency power (usually diesel generators) are considered to be separate functions by GDC 17. If either both offsite circuits or onsite emergency power is unavailable to the plant when required by TSs to be operable, it is reportable regardless of whether the other system is available. GDC 17 defines the safety function of each system as providing sufficient capacity and capability, etc., assuming that the other system is not available. Loss of offsite power (loss of both offsite circuits) should be determined at the essential switchgear busses.

The application of these and other reporting criteria involves the use of engineering judgment. In this case, a technical judgment must be made whether a failure or operator action that did actually disable one train of a safety system, could have, but did not, affect a redundant train within the system. If so, this would constitute an event that "could have prevented" the fulfillment of a safety function, and, accordingly, must be reported.

If a component fails by an apparently random mechanism it may or may not be reportable if the functionally redundant component could fail by the same mechanism. Reporting is required if the failure constitutes a condition where there is reasonable doubt that the functionally redundant train or channel would remain operational until it completed its safety function or is repaired. For example, if a pump in one train of an ESF system fails because of improper lubrication, and engineering judgment indicates that there is a reasonable expectation that the functionally redundant pump in the other train, which was also improperly lubricated, would have also failed before it completed its safety function, then the actual failure is reportable and the potential failure of the functionally redundant pump must be discussed in the LER.

For systems that include three or more trains, the failure of two or more trains should be reported if, in the judgment of the licensee, the functional capability of the overall system was jeopardized."

The licensee may also use engineering judgment to decide when personnel actions could have prevented fulfillment of a safety function. For example, when an individual improperly operates or maintains a component, he might conceivably have made the same error for all of the functionally redundant components (e.g., if he incorrectly calibrates one bistable amplifier in the Reactor Protection System, he could conceivably incorrectly calibrate all bistable amplifiers). However, for an event to be reportable it is necessary that the actions actually affect or involve components in more than one train or channel of a safety system, and the result of the actions must be undesirable from the perspective of protecting the health and safety of the public. The components can be functionally redundant (e.g., two pumps in different trains) or not functionally redundant (e.g., the operator correctly stops a pump in Train "A" and instead of shutting the pump discharge valve in Train "A," he mistakenly shuts the pump discharge valve in Train "B")."

**Comment [CBC13]:** Comes from 9900, sections 3.9 and 4.8.

**Deleted:** electrical power (transmission lines) and onsite emergency power (usually diesel generators)

**Deleted:** power

**Comment [CBC14]:** This change is consistent with revision to example 4 below

**Deleted:** .

As indicated in Paragraph 50.73(a)(2)(vi) "...individual component failures need not be reported pursuant to this paragraph if redundant equipment in the same system was operable and available to perform the required safety function."

A single failure that defeats the safety function of a redundant system is reportable even if the design of the system, which allows such a single failure to defeat the function of the system, has been found acceptable. For example, if a single RHR suction line valve should fail in such a way that the safety function in the accident analysis would not be performed, the event would be reportable.

There are a limited number of single-train systems that perform safety functions (e.g., the High Pressure Coolant Injection System in BWRs). For such systems, loss of the single train would prevent the fulfillment of the safety function of that system and, therefore, is reportable even though the plant technical specifications may allow such a condition to exist for a limited time.

Reportable conditions under these criteria include the following:

- an event or condition that disabled multiple trains of a system because of a single cause
- an event or condition where one train of a system is disabled; in addition, (1) the underlying cause that disabled one train of a system could reasonably be expected to have failed a redundant train and (2) there is reasonable expectation that the second train would not complete its safety function if it were called upon
- an observed or identified event or condition that could reasonably be expected to have prevented fulfillment of the safety function

Whenever an event or condition exists where the system could reasonably be expected to have been prevented from fulfilling its safety function because of one or more reasons for equipment inoperability or unavailability, it is reportable under these criteria. This would include cases where one train is disabled and a second train fails a surveillance test.

The following types of events or conditions generally are not reportable under these criteria:

- failures that affect inputs or services to systems that have no safety function (unless it could have prevented the performance of a safety function of an adjacent or interfacing system)
- a single defective component that was delivered, but not installed
- removal of a system or part of a system from service as part of a planned evolution for maintenance or surveillance testing when done in accordance with an approved procedure and the plant's TS (unless a condition is discovered that could have prevented the system from performing its function)
- independent failure of a single component (unless it is indicative of a generic problem, which alone could have caused failure of a redundant safety)
- a procedure error that could have resulted in defeating the system function but was discovered before procedure approval
- a failure of a system where no credit is taken for it in any design basis accident analysis
- a single stuck control rod that alone would not have prevented the fulfillment of a reactor shutdown
- unrelated component failures in several different safety systems
- minor operational events involving a specific component such as valve packing leaks, which could be considered a lack of control of radioactive material, should not be reported

**Comment [CBC15]:** Editorial for consistency with the rule and previous guidance.

**Deleted:** that RHR cooling cannot be initiated,

**Comment [CBC16]:** For consistency with first paragraph under discussion in NUREG Section 3.2.7

**Comment [CBC17]:** For consistency with first paragraph under discussion in NUREG Section 3.2.7

**Deleted:** alone

**Comment [CBC18]:** For consistency with first paragraph under discussion in NUREG Section 3.2.7

**Comment [CBC19]:** Expanded applicability to clarify intent.

**Deleted:** used only to warn the operator

**Deleted:** safety analysis and it does not directly control any of the safety functions in the criteria



under these criteria. System leaks or other similar events may, however, be reportable under other criteria

- failures that affect fire protection systems because the fire protection system is not a support system for any safety-related system to perform its safety function as assumed in the accident analysis. Failure affecting fire protection systems should be considered under criterion 50.73(a)(2)(ii)(B), which concerns the plant being in an unanalyzed condition that significantly degrades safety.

A design or analysis defect or deviation is reportable under this criterion if it could reasonably be expected to have prevented fulfillment of the safety function of structures or systems defined in the rules. Reportability of a design or analysis defect or deviation under this criterion should be judged on the same basis that is used for other conditions, such as operator errors and equipment failures. That is, the condition is reportable if there is a reasonable expectation of preventing fulfillment of the safety function.

### Examples

#### SINGLE TRAIN SYSTEMS

- (1) Failure of a Single-Train System Preventing Accident Mitigation and Residual Heat Removal

When the licensee was preparing to run a surveillance test, a high-pressure coolant injection (HPCI) flow controller was found inoperable; therefore, the licensee declared the HPCI system inoperable. The plant entered a technical specification requiring that the automatic depressurization, low-pressure coolant injection, core spray, and isolation condenser systems remain operable during the 7-day LCO or the plant had to be shut down.

The licensee made an ENS notification within 28 minutes and a followup call after the amplifier on the HPCI flow transmitter was fixed and the HPCI returned to operability. As discussed above, the loss of a single train safety system such as BWR HPCI is reportable.

- (2) Failure of a Single-Train Non-Safety System

Question: If RCIC is not a "safety system" in that no credit for its operation is taken in the safety analysis, are failures and unavailability of this system reportable?

Answer: If the plant's safety analysis considered RCIC as a system needed to mitigate a rod ejection accident, then its failure is reportable under this criterion; otherwise, it is not reportable under this section of the rule.

- (3) Failure of a Single-Train Environmental System

Question: There are a number of environmental systems in a plant dealing with such things as low level waste (e.g., gaseous radwaste tanks). Many of these systems are not required to meet the single failure criterion so a single failure results in the loss of function of the system. Are all of these systems covered within the scope of the LER rule?

**Comment [CBC20]:** Added to clarify the reporting criterion for considering fire protection systems failures.

**Comment [CBC21]:** Reworded for clarity. The deleted sentence is discussed earlier in this section. The remaining information is another example of a non-reportable condition and is added as the last bullet.

**Deleted:** The applicability of these criteria includes those safety systems designed to mitigate the consequences of an accident (e.g., containment isolation, emergency filtration). Hence, minor operational events involving a specific component such as valve packing leaks, which could be considered a lack of control of radioactive material, should not be reported under these criteria. System leaks or other similar events may, however, be reportable under other criteria.

**Comment [CBC22]:** For consistency with first paragraph under discussion in NUREG Section 3.2.7.

**Comment [CBC23]:** This sentence is not needed (the above sentence is adequate).

**Deleted:** Alternatively stated, the condition is reportable if there was reasonable doubt that the safety function would have been fulfilled if the structure or system had been called upon to perform it.

**Comment [CBC24]:** Change is consistent with NRC RIS-2001-014.

**Deleted:** (e.g., it is included in the Technical Specifications)

Answer: If such systems are required by Technical Specifications to be operational and the system is needed to fulfill one of the safety functions identified in this section of the rule then system level failures are reportable. If the system is not covered by Technical Specifications and is not required to meet the single failure criterion, then failures of the system are not reportable under this criterion.

## LOSS OF TWO TRAINS

### (4) Loss of Onsite Emergency Power by Multiple Equipment Inoperability and Unavailability

During refueling when required by TS to be operable, one emergency diesel generator (EDG) in a two train system was out of service for maintenance. The second EDG was declared inoperable when it failed its surveillance test.

Comment [CBC25]: Clarified to be consistent with previous NUREG statements.

An ENS notification is required and an LER is required. As addressed in the Discussion section above, loss of either the onsite power system or the offsite power system is reportable under this criterion.

### (5) Procedure Error Prevents Reactor Shutdown Function

The unit was in mode 5 (cold and depressurized; before initial criticality) and a post-modification test was in progress on the train A reactor protection system (RPS), when the operator observed that both train A and B source range detectors were disabled. During post-modification testing on train A RPS, instrumentation personnel placed the train B input error inhibit switch in the inhibit position. With both trains' input error inhibit switches in the inhibit position, source range detector voltage was disabled. The input error inhibit switch was immediately returned to the normal position and a caution was added to appropriate plant instructions.

This event is reportable because disabling the source range detectors could have prevented fulfillment of the safety function to shut down the reactor when required by the safety analysis.

Comment [CBC26]: Consistent with previous NUREG statements.

### (6) Failure of the Overpressurization Mitigation System

The RCS was overpressurized on two occasions during startup following a refueling outage because the overpressure mitigation system (OMS) failed to operate. The reason that the OMS failed to operate was that one train was out of service for maintenance and a pressure transmitter was isolated and a summator failed in the actuation circuit on the other train.

The event is reportable because the OMS failed to perform its safety function.

### (7) Loss of Salt Water Cooling System and Flooding in Saltwater Pump Bay

During maintenance activities on the south saltwater pump, the licensee was removing the pump internals from the casing when flooding of the pump area occurred. The north saltwater pump was secured to prevent pump damage.

The event is reportable because of the failure of the saltwater cooling system, which is the ultimate heat sink for the facility, to perform its safety function.



(8) Maintenance Affecting Two Trains

Question: Some clarification is needed for events or conditions that "could have" prevented the fulfillment of a system safety function.

Answer: With regard to maintenance problems, "events or conditions" generally involve operator actions and/or component failures that could have prevented the functioning of a safety system. For example, assume that a surveillance test is run on a standby pump and it seizes. The pump is disassembled and found to contain the wrong lubricant. The redundant pump is disassembled and it also has the same wrong lubricant. Thus, it is reasonable to assume that the second pump would have failed if it had been challenged. However, the second pump and, therefore, the system did not actually fail because the second pump was never challenged. Thus, in this case, because of the use of the wrong lubricant, the system "could have" or "would have" failed.

LOSS OF ONE TRAIN

(9) Contaminated Hydraulic Fluid Degrades MSIV Operation

Situation: During a routine shutdown, the operator noted that the #11 MSIV closing time appeared to be excessive. A subsequent test revealed the #11 MSIV shut within the required time, however, the #12 MSIV closing time exceeded the maximum at 7.4 sec. Contamination of the hydraulic fluid in the valve actuation system had caused the system's check valves to stick and delay the transmission of hydraulic pressure to the actuator. Three more filters will be purchased providing supplemental filtering for each MSIV. Finer filters will be used in pump suction filters to remove the fine contaminants. The #12 MSIV was repaired and returned to service. Since the valves were not required for operation at the time of discovery, the safety of the public was not affected.

Comments: The event is reportable under 50.73(a)(2)(v) because the condition could have prevented fulfillment of a safety function. The event is not reportable under 50.72(b)(3)(v) because, at the time of discovery, the plant was shutdown and the MSIV's were not required to be operable.

(10) Diesel Generator Lube Oil Fire Hazard

Situation: While performing a routine surveillance test of the emergency diesel generator, a small fire started due to lubricating oil leakage from the exhaust manifold. The manufacturer reviewed the incident and determined that the oil was accumulating in the exhaust manifold due to leakage originating from above the upper pistons of this vertically opposed piston engine. The oil remaining above the upper pistons after shutdown leaked slowly down past the piston rings, into the combustion space, past the lower piston rings, through the exhaust ports, and into the exhaust manifolds. The exhaust manifolds became pressurized during the subsequent startup which forced the oil out through leaks in the exhaust manifold gaskets where it was ignited. Similar events occurred previously at this plant. In these previous cases, fuel oil accumulated in the exhaust manifold due to extended operation under "no load" conditions. Operation under loaded conditions was therefore required before shutdown in order to burn off any accumulated oil.

Comments: The event is not reportable if the fire did not pose a threat to the plant (e.g., it did not significantly hamper site personnel [50.73(a)(2)(ix)]). The event would be reportable if it demonstrates a design, procedural, or equipment deficiency that could have prevented the fulfillment of a safety function (i.e., if the redundant diesels are of similar design and, therefore, susceptible to the same problem) [50.73(a)(2)(vi)].

#### (11) Single Failures

Question: Suppose you have one pump in a cooling water system (e.g., chilled water) supplying water to both trains of a safety system, but there is another pump in standby; is the loss of the one operating pump reportable?

Answer: No. Single, independent (i.e., random) component failures are not reportable if the redundant component in the same system did or would have fulfilled the safety function. However, if such failures have generic implications, then there may be other applicable reporting requirements to consider.

**Comment [CBC27]:** Editorial. For clarity. Assures that all reporting requirements are considered.

**Deleted:** an LER is to be submitted

#### (12) Generic Set-point Drift

Situation: With the plant in steady state power operation and while performing a Main Steam Line Pressure Instrument Functional Test and Calibration, a switch was found to actuate at 853 psig. The Tech Specs limit is 825 +15. The redundant switches were operable. The cause of the occurrence was set point drift. The switch was recalibrated and tested successfully per HNP-2-5279, Barksdale Pressure Switch Calibration, and returned to service. This is a repetitive event as reported in one previous LER. A generic review revealed that these type switches are used on other safety systems and that this type switch is subject to drift. An investigation will continue as to why these switches drift, and if necessary, they will be replaced.

Comments: The event is not reportable due to the drift of a single pressure switch. The event could be reportable if it is indicative of a generic and/or repetitive problem with this type of switch.

**Deleted:** is

**Comment [CBC28]:** Editorial for clarity.

**Deleted:** which is used in several safety systems [50.73(a)(2)(vi) or (vii)]

Question: Are set point drift problems with a particular switch to be reported if they are experienced more than once?

Answer: The independent failure (e.g., excessive set point drift) of a single pressure switch is not reportable unless it could have caused a system to fail to fulfill its safety function, or is indicative of a generic problem that could have resulted in the failure of more than one switch and thereby cause one or more systems to fail to fulfill their safety function. In general, conditions related to multiple failures, where trends or analysis conclude that there is a potential common cause involved, are potentially reportable under several criteria. These criteria include: Operation or Condition Prohibited by Technical Specifications § 50.73(a)(2)(i)(B), Common-cause Inoperability of Independent Trains or Channels § 50.73(a)(2)(vii), Single Cause that Could Have Prevented Fulfillment of the Safety Functions of Trains or Channels in Different Systems § 50.73(a)(2)(ix), and this criterion if it would have caused a system to fail to fulfill a safety function within the scope of this rule.

**Comment [CBC29]:** Editorial for consistency with other revised sections. Assures that all reporting requirements are considered.

#### (13) Maintenance Affecting Only One Train



Question: Suppose the wrong lubricant was installed in one pump, but the pump in the other train was correctly lubricated. Is this reportable?

Answer: Engineering judgement is required to decide if the lubricant would have been used on the other pump, and, therefore, the system function would have been lost. If the procedure called for testing of the first pump before maintenance was performed on the second pump and testing clearly identified the error, then the error would not be reportable. However, if the procedure called for the wrong lubricant and eventually both pumps would have been improperly lubricated, and the problem was only discovered when the first pump was actually challenged and failed, then the error would be reportable.

**Comment [CBC30]:** For consistency with first paragraph under discussion in NUREG Section 3.2.7. Update with discussion from statements of consideration

**Deleted:** could

## OTHER CONDITIONS

### (14) Conditions Observed While System Out of Service

Question: Suppose during shutdown we are doing maintenance on both SI pumps, which are not required to be operational. Is this reportable? While shutdown, suppose I identify or observe something that would cause the SI pumps not to be operational at power. Is this reportable?

Answer: Removing both SI pumps from service to do maintenance is not reportable if the resulting system configuration is not prohibited by the plant's technical specifications. However, if a situation is discovered during maintenance that could have caused both pumps to fail, (e.g., they are both improperly lubricated) then that condition is reportable even though the pumps were not required to be operational at the time that the condition was discovered. As another example, suppose the scram breakers were tested during shutdown conditions, and it was found that for more than one breaker, opening times were in excess of those specified, or that UV trip attachments were inoperative. Such potential generic problems are potentially reportable in an LER under several criteria including Operation or Condition Prohibited by Technical Specifications §50.73(a)(2)(i)(B, Common-cause Inoperability of Independent Trains or Channels §50.73(a)(2)(vii), and this criterion if it would have caused the system to fail to fulfill a safety function within the scope of this rule..

**Comment [CBC31]:** Editorial, for clarity and consistency with other sections. Assures that all reporting requirements are considered.

### (15) Diesel Generator Bearing Problems

During the annual inspection of one standby diesel generator, the lower crankshaft thrust bearing and adjacent main bearing were found wiped on the journal surface. The thrust bearing was also found to have a small crack from the main oil supply line across the journal surface to the thrust surface. Inspection of the second, redundant standby diesel generator revealed similar problems. It was judged that extended operation without corrective action would have resulted in bearing failure.

The event is reportable because there was a reasonable reasonable expectation that the diesels would not have completed an extended run under load, as required, if called upon.

**Comment [CBC32]:** For consistency with first paragraph under discussion in NUREG Section 3.2.7.

**Deleted:** could

**Deleted:** doubt

**Comment [CBC33]:** Editorial for consistency with discussion above.

### (16) Multiple Control Rod Failures

There have been cases in which licensees have erroneously concluded that sequentially discovered failures of systems or components occurring during planned testing are not reportable. This situation was identified as a generic concern on April 13, 1985, in NRC



Information Notice (IN) 85-27, "Notifications to the NRC Operations Center and Reporting Events in Licensee Event Reports," regarding the reportability of multiple events in accordance with §§ 50.72(b)(3)(v) and 50.73(a)(2)(v) [event or condition that could have prevented fulfillment of a safety function].

IN 85-27 described multiple failures of a reactor protection system during control rod insertion testing of a reactor at power. One of the control rods stuck. Subsequent testing identified 3 additional rods that would not insert (scram) into the core and 11 control rods that had an initial hesitation before insertion. The licensee considered each failure as a single random failure; thus each was determined not to be reportable. Subsequent assessments indicated that the instrument air system, which was to be oil-free, was contaminated with oil that was causing the scram solenoid valves to fail. While the failure of a single rod to insert may not cause a reasonable doubt about the ability of other rods to insert, the failure of more than one rod does cause a reasonable doubt.

As indicated in IN 85-27, multiple failures of redundant components of a safety system are sufficient reason to expect that the failure mechanism, even though not known, could have prevented the fulfillment of the safety function.

#### (17) Potential Loss of High Pressure Coolant Injection

During normal refueling leak testing of the upstream containment isolation check valve on the High Pressure Coolant Injection (HPCI) steam exhaust, the disc of the non-containment isolation check valve was found lodged in downstream piping. This might have prevented HPCI from functioning if the disc had blocked the line. The event was caused by fatigue failure of a disc pin.

Following evaluation of the condition, the event was determined to be reportable because the HPCI could have been prevented from performing its safety function if the disc had blocked the line. In addition, the event is reportable if the fatigue failure is indicative of a common-mode failure.

#### (18) Operator Inaction or Wrong Action

Question: In some systems used to control the release of radioactivity, a detector controls certain equipment. In other systems, a monitor is present and the operator is required to initiate action under certain conditions. The operator is not "wired" in. Are failures of the operator to act reportable?

Answer: Yes. The operator may be viewed as a "component" that is an integral, and frequently essential, part of a "system." Thus, if an event or condition meets the reporting criterion, it is to be reported regardless of the initiating cause.

#### (19) Results of Analysis

Question: A number of criteria indicate that they apply to actual situations only and not to potential situations identified as a result of analysis; yet, other criteria address "could have." When do the results of analysis have to be reported?

Answer: The results need only to be reported if the applicable criterion requires the reporting of conditions that "could have" caused a problem. However, others have a need

to know about potential problems that are not reportable; thus, such items may be reported as a voluntary LER.

#### (20) System Interactions

Question: Utilities are not required to analyze for system interactions, yet the rule requires the reporting of events that "could have" happened but did not. Are we to initiate a design activity to determine "could have" system interactions?

Answer: No. Report system interactions that you find as a result of ongoing routine activities (e.g., the analysis of operating events).

#### 3.2.8 Common-cause Inoperability of Independent Trains or Channels

§ 50.72	§ 50.73(a)(2)(vii)
<i>There is no corresponding requirement in § 50.72.</i>	<p>"Any event where a single cause or condition caused at least one independent train or channel to become inoperable in multiple systems or two independent trains or channels to become inoperable in a single system designed to:</p> <ul style="list-style-type: none"><li>(A) Shut down the reactor and maintain it in a safe shutdown condition;</li><li>(B) Remove residual heat;</li><li>(C) Control the release of radioactive material; or</li><li>(D) Mitigate the consequences of an accident."</li></ul>

An LER is required for a common cause inoperability of independent trains or channels.

#### Discussion

This criterion requires those events to be reported where a single cause or condition caused independent trains or channels to become inoperable. Common-causes may include such factors as high ambient temperatures, heat up from energization, inadequate preventive maintenance, oil contamination of air systems, incorrect lubrication, use of non-qualified components or manufacturing or design flaws. The event is reportable if the independent trains or channels were inoperable at the same time, regardless of whether or not they were discovered at the same time. (Example (2) below illustrates a case where the second failure was discovered 3 days later than the first.)

An event or failure that results in or involves the failure of independent portions of more than one train or channel in the same or different systems is reportable. For example, if a cause or condition caused components in Train "A" and "B" of a single system to become inoperable, even if additional trains (e.g., Train "C") were still available, the event must be reported. In addition, if the cause or condition caused components in Train "A" of one system and in Train "B" of another system (i.e., train that is assumed in the safety analysis to be independent) to become inoperable, the event must be reported. However, if a cause or condition caused components in Train "A" of one system and Train "A" of another system (i.e., trains that are not assumed in the safety analysis to be independent), the event need not be reported unless it meets one or more of the other reporting criteria.