

March 10, 2000

MEMORANDUM TO: Cynthia A. Carpenter, Chief  
Generic Issues, Environmental, Financial  
and Rulemaking Branch  
Division of Regulatory Improvement Programs, NRR

FROM: Dennis P. Allison, Senior Reactor Systems Engineer */RA/*  
Generic Issues, Environmental, Financial  
and Rulemaking Branch  
Division of Regulatory Improvement Programs, NRR

SUBJECT: NOTICE OF PUBLIC MEETING ON PROPOSED CHANGES TO EVENT  
REPORTING REQUIREMENTS IN 10 CFR 50.73 AND ASSOCIATED  
GUIDANCE

DATE AND TIME: March 22, 2000  
9:00 a.m. - 12:00 noon

LOCATION: U.S. Nuclear Regulatory Commission  
One White Flint North  
11555 Rockville Pike  
Rockville, Maryland 20852  
Room O-4B6

PURPOSE: The NRC staff will discuss plans for and exchange views on proposed final changes to 10 CFR 50.73 and associated guidance for nuclear power reactors. The focus of discussions will be the provisions of the proposed rule (64 FR 36291, 7/6/99) relating to reporting of degraded or nonconforming components and how the staff proposes to modify those provisions in response to the public comments received on the proposed rule. (See attached agenda)

PARTICIPANTS: NRC: Cynthia Carpenter, Dennis Allison, Melinda Malloy, et. al.  
PUBLIC: Any interested member of the public<sup>1</sup>

Attachment: Proposed Agenda

cc w/att: See next page

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<sup>1</sup> This meeting is open to participation by all interested members of the public. To ensure adequate meeting accommodations, members of the public who wish to attend should contact Dennis Allison at (301) 415-1178 or [dpa@nrc.gov](mailto:dpa@nrc.gov) no later than March 22, 2000.

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March 10, 2000

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Dennis Allison at (301) 415-1178 or [dpa@nrc.gov](mailto:dpa@nrc.gov) no later than March 21, 2000.

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Working group (via e-mail)

## PUBLIC MEETING ON EVENT REPORTING REQUIREMENTS

March 22, 2000

### Proposed Agenda

1. Opening Remarks (NRC) & Introductions (All)
2. Summary of:
  - (a) the language of proposed rule (64 FR 36291, 7/6/99) and associated guidance relating to the deletion of the requirement to report conditions outside the design basis of the plant and the proposed requirement relating to reporting degraded or nonconforming components (as discussed during a public ACRS meeting on February 3, 2000 and at another public meeting on February 25, 2000),
  - (b) questions posed in the proposed rule on these changes, and
  - (c) summary of public comments received on these changes.
3. Review and explanation of draft final rule language and guidance points and implementation examples. (See attached pages.)
4. Questions and open discussion
5. Closing Remarks (NRC, All)

Attached pages:  
Excerpts for Discussion

## Excerpts for Discussion

### Criterion:

(xi) - Any event or condition that as a result of a single cause or condition could have prevented the fulfillment of the safety function of two or more trains or channels in different 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.

(xii) - Events covered in paragraph (xi) may include cases of procedural error, equipment failure, and/or discovery of a design, analysis, fabrication, construction, and/or procedural inadequacy. However, licensees are not required to report an event pursuant to paragraph (xi) if it results from a shared dependency among trains or channels that is a natural or expected consequence of the approved plant design.

### Summary Guidelines:

This new criterion is closely related to paragraphs 50.73(a)(2)(v) and 50.72(b)(3)(v) [event or condition that could have prevented fulfillment of the safety function of structures and systems needed to: shut down the reactor and maintain it in a safe shutdown condition; remove residual heat; control the release of radioactive material; or mitigate the consequences of an accident]. Specifically:

- The meaning of the term "could have prevented the fulfillment of the safety function" is the same for this new criterion as it is for those paragraphs.
- Relative to those paragraphs, reporting under this new criterion applies to trains or channels in different systems.
- Relative to those paragraphs, reporting under this new criterion applies only to a single cause or condition.
- Finally, this new criterion does not capture an event that results from a shared dependency among trains or channels that is a natural or expected consequence of the approved plant design. For example, this new does not capture failure of a common electrical power supply that disables Train A of AFW and Train A of HPSI, because their shared dependency on the single power supply is a natural or expected consequence of the approved plant design.

### Examples:

#### (1) Solenoid Operated Valve Deficiency

During testing, two containment isolation valves failed to function. The single cause was improper air gaps in the solenoid operated valves that controlled the supply of instrument air to the containment isolation valves.

The valves were powered from the same electrical division. Thus, §50.73(a)(2)(vii) [common cause inoperability of independent trains or channels] would not apply. The



two valves isolated fluid process lines in two different systems. Thus §50.73(a)(2)(v) [condition that could have prevented fulfillment of the safety function of a structure or system] would apply only if engineering judgment indicates there was a reasonable expectation of preventing fulfillment of the safety function for redundant valves within the same system.<sup>1</sup> However, this new criterion would certainly apply because a single cause or condition could have prevented fulfillment of the safety function of two trains or channels in different systems.

(2) Degraded Valve Stems

A motor operated valve in one train of a system was found with a crack 75 percent through the stem. Although the valve stem did not fail, with further cracking the train would not have been capable of performing its safety function. As a result, the train was not considered capable of performing its specified safety function. The valve stem was replaced with a new one.

The root cause was determined to be environmentally assisted stress corrosion cracking which resulted from installation of an inadequate material some years earlier. The same inadequate material had been installed in a similar valve in a different system at the same time. The valve stem in the other train was also replaced with a new one.

The event is reportable under this new criterion if engineering judgment indicates that there was a reasonable expectation of preventing fulfillment of the safety function of both affected trains. This depends on details such as whether the second valve stem was also significantly degraded and, if not, whether any future degradation of the second valve stem would have been discovered and corrected, as a result of routine maintenance programs, before it could become problematic.

(3) Overpressure due to Thermal Expansion

It was determined that a number of liquid-filled and isolated containment penetration lines in multiple safety systems were not adequately designed to accommodate the internal pressure buildup that could occur because of thermal expansion caused by heatup after a design basis accident. The problem existed because the original design failed to consider this effect following a postulated accident. Several different corrective actions were taken, depending on the specific configurations of the penetrations, to prevent the buildup of excessive pressure after an accident.

The event is reportable under this new criterion because there was a reasonable expectation of preventing fulfillment of the safety function of multiple trains or channels as a result of a single cause or condition.

(4) Cable Degradation

One of three component cooling water pumps tripped due to a ground fault on the

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<sup>1</sup> Or, alternatively, there was reasonable doubt that the safety function would have been fulfilled if the affected trains had been called upon to perform them.

power cable leading to the pump. The likely cause was determined to be moisture permeation into the cable insulation over time

The event is reportable under this new criterion if engineering judgment indicates that there was a reasonable expectation of preventing fulfillment of the safety function of an additional train in a different system as a result of the same cause or condition.

(5) Overstressed Valve Yokes

It was determined that numerous valve yokes experienced over thrusting that exceeded design basis stress levels. The cause was lack of knowledge that resulted in inadequate design engineering at the time the designs were performed.

- (a) Some valve yokes, in different systems, required replacement.
- (b) Other valve yokes, in different systems, were being over stressed enough during routine operations that, although they were currently capable of performing their specified safety functions, the over stressing would, with the passage of time, render them incapable of performing those functions. These valves required modification of their control circuitry to limit stress during routine operation in order to preserve their ability to perform their specified safety functions.

The event is reportable under this new criterion if engineering judgment indicates there was a reasonable expectation of preventing fulfillment of the safety function of trains or channels in two or more different systems.<sup>2</sup>

(6) Heat Exchanger Fouling

Periodic monitoring of heat exchanger performance indicated that two heat exchangers in two different systems required cleaning in order to ensure they would remain operable. The degree of fouling was within the range of normal expectations upon which the monitoring and maintenance procedures were based.

The event is not reportable under this new criterion because there was not a reasonable expectation of preventing the fulfillment of the safety function of the heat exchangers.

**Detailed Guidelines:**

The following paragraphs are taken from the guidelines for §50.73(a)(2)(v) and (a)(2)(vii) in NUREG-1022, and adapted, as appropriate, to convey the same meaning of terms for this new criterion.

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, several different expressions such as "would have," "could have," "alone

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<sup>2</sup> Or, alternatively, there was reasonable doubt that the safety function would have been fulfilled if the affected trains had been called upon to perform them.

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.

The intent of these criteria is to capture those events where, as a result of a single cause or condition, there would have been a failure of two or more trains or channels to properly complete their safety function, regardless of whether there was an actual demand. For example if, as a result of a single cause or condition, a train of the high pressure safety injection system and a train of the auxiliary feedwater system failed, the event would be reportable even if there was no demand for the systems' safety functions.

However, criterion does not capture an event that results from a shared dependency among trains or channels which is a natural or expected consequence of the approved plant design. For example, it would not apply to failure of an electrical power supply that impacts Train A of AFW and Train A of HPSI, because their shared dependency on a single power supply is a natural or expected consequence of the approved plant design.

Examples of a single cause or condition responsible for a reportable event may include cases of procedural error, equipment failure, and/or discovery of a design, analysis, fabrication, construction, and/or procedural inadequacy. They may also include such factors as high ambient temperatures, heat up from energization, inadequate preventive maintenance, oil contamination of air systems, incorrect lubrication, or use of non-qualified components.

The event is reportable if, as a result of a single cause or condition, there would have been a failure of two or more trains or channels to properly complete their safety function, regardless of whether the problem was discovered in both trains at the same time.

Trains or channels for reportability purposes are defined as those trains or channels designed to provide protection against single failures. Many systems containing active components are designed as at least a two-train system. Each train in a two-train system can normally satisfy all the system functions.

This criterion does not include those cases where trains or channels are removed from service as part of a planned evolution, in accordance with the plant's technical specifications. For example, if a licensee removes two trains from service to perform maintenance, and the Technical Specifications permit the resulting configuration, and the trains are returned to service within the time limits specified in the Technical Specifications, the action need not be reported under this paragraph. However, if, while the trains or channels are out of service, the licensee identifies a single cause or condition that could have prevented the trains from performing their safety functions (e.g., the licensee finds a set of relays that is wired incorrectly), that condition must be reported.

The definition of the systems included in the scope of this criterion is provided in the rule itself. It includes systems required by the TS to be operable to perform one of the four

functions (A) through (D) specified in the rule. It is not determined by the phrases "safety-related," "important to safety," or "ESF."

Trains or channels must operate long enough to complete their intended safety functions as defined in the safety analysis report. Generic Letter 91-18 provides guidance on determining whether a system is operable.

The application of this reporting criterion and other reporting criteria involves the use of engineering judgment. In the case of this criterion, a technical judgment must be made as to whether a failure or operator action that did actually disable one train or channel, could have, but did not, disable another train or channel. If so, this would constitute an event that "could have prevented" the fulfillment of the safety function of multiple trains or channels, and, accordingly, must be reported.

Reporting is required if one train or channel fails and, as a result of a single cause or condition, there is reasonable doubt that another train or channel would remain operational until it completed its safety function or is repaired. For example, if a pump fails because of improper lubrication, and engineering judgment indicates that there is a reasonable expectation that another pump in a different system, which was also improperly lubricated, would have also failed before it completed its safety function, then the event is reportable under this criterion.

Reportable conditions under this criterion include the following:

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

The following types of events or conditions generally are not reportable under this criterion:

- 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 defective component that was delivered, but not installed
- removal of trains or channels from service as part of a planned evolution for maintenance or surveillance testing when done in accordance with the plant's technical specifications (unless a condition is discovered that could have prevented multiple trains or channels from performing their safety functions)
- independent failure of a single component (unless it is indicative of a generic problem, which alone could have caused failure of multiple trains or channels)
- a procedure error that could have resulted in defeating the safety function of multiple trains or channels but was discovered before procedure approval
- a failure of a system used only to warn the operator where no credit is taken for it in any safety analysis and it does not directly control any of the four safety functions in the rule

- a single stuck control rod that would not have prevented the fulfillment of a reactor shutdown
- unrelated component failures in different trains or channels

The applicability of this criterion 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 this criterion.

A design or analysis defect or deviation is reportable under this criterion if it could have prevented fulfillment of the safety function of multiple trains or channels. 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. 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.