



Callaway Plant

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U.S. Nuclear Regulatory Commission
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Division of Freedom of Information
and Publication Services
Office of Administration
Washington, D.C. 20555

ULNRC-2522

Dear Mr. Meyer:

DOCKET NUMBER 50-483
CALLAWAY PLANT
COMMENTS ON DRAFT NUREG-1022,
"EVENT REPORTING SYSTEMS, 10CFR50.72 AND 50.73"

Union Electric Company submits the attached comments to the subject draft NUREG-1022. The comments are marked on the attached applicable pages of the draft NUREG. A summary of the comments is also provided on a separate attachment.

Sincerely,

A. C. Passwater

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Manager,
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JDB/TPS/lrj

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UNION ELECTRIC, CALLAWAY PLANT

ATTACHMENT TO ULNRC-2522

SUMMARY OF DRAFT NUREG-1022 COMMENTS

Overall Comments:

A number of the proposed rule interpretations contrast sharply with the original NUREG 1022 and its two supplements. These deletions/additions to the previous guidance appear to be intended solely to lower the reporting threshold in some areas, thereby increasing utility expenses without improving public health and safety. If the reporting threshold is to be lowered, it should be done with a rule change rather than by interpretation guidance. See the following specific comments for examples.

As a whole, the proposed NUREG 1022 revision confirms some of our previous interpretations, but does not provide a net relief from reporting items of a low threshold. If the comments are incorporated, the final NUREG 1022 revision will be much more beneficial.

Specific Comments:

- 2.7, page 18 Disagree that a single component failure discovered during surveillance testing is reportable if the failure mechanism could reasonably be expected to occur in one or more redundant components and thereby prevent fulfillment of the system's safety function. Merely predicting failure is not firm evidence that the redundant components could have failed. Surveillance testing of the redundant components would uncover the failure mechanism.
- 2.7, page 18 The last two paragraphs are not consistent with Sections 5.2.1 and 3.2.2, pages 35 and 37, concerning the "time of discovery". If there is firm evidence the common failure condition existed prior to the surveillance testing, then the condition should be reported. Reference the previous NRC guidance per NUREG 1022 Supplement 1, answer 2.3.
- 3.2.1, page 31 The definition of initiation of any nuclear plant shutdown is not clear for a T/S required shutdown begun in Modes 3 or 4 with completion in Modes 4 or 5. The temperature/pressure reductions of these modes occur after the plant is subcritical.

- 3.2.2(5),
page 36 The new guidance is not as clear as previously provided by NUREG 1022 Supplement 1, answer 2.9. This is especially true for inadequate Health Physics posting conditions.
- 3.2.2(6),
page 36 A Temporary Waiver of Compliance (TWOC) is usually requested and certainly not approved by the NRC Staff until after STS 3.0.3 has been entered. Therefore, a 50.72 notification will probably be made because it is doubtful the TWOC will be approved within 60 minutes. However, an LER will not be sent if the TWOC is approved.
- (1), page 37 The proposed wording will confuse the operators. Use LCO and action statement terminology consistent with Generic Letter 87-09.
- 3.2.4(2),
page 43 The draft guidance has added "potentially" or "potentially could" in the definition for unanalyzed condition. This change is contrary to the previous guidance provided by NUREG 1022 Supplement 1, answers 4.1 and 10.3. It is also contrary to the rule which discusses if a condition results in the plant being in an unanalyzed condition. The rule does not use "potentially" or "could have" but uses present or past tense for the existing condition.
- 3.2.4(4),
page 45 Reporting significant valve misalignments as a plant condition not covered by operating and emergency procedures is confusing. If valves in a safety-related or support system are misaligned, an operability evaluation by the operators or engineers will be performed. In most cases, an NRC notification will be made because the valve condition rendered one or more trains of the system inoperable not because procedures are inadequate. Delete this example.
- 3.2.4(3),
page 48 The untested containment isolation valves should be treated as a missed surveillance, especially if subsequent testing meets the acceptance criteria. Loss of containment integrity per STS 3.6.1.1 should not be assumed in this case. STS 3.6.1.2 and 3.6.3 actions should be followed. Delete the example from this section.
- 3.2.6(2),
page 61 Planned outages of the plant computer are not addressed.
- 3.2.8, page 64 Discharges of halon systems to unoccupied rooms and rooms which will not require operator access for plant operation should not be reported.

- 3.2.8, page 65 Merely using radiation work permits or protective clothing is too low a reporting threshold for "significantly hampering site personnel."
- 3.2.8, page 69 55 gallons should not be inferred as the limit for reporting significant spills.
- 3.3.2(1), pg.81&
3.3.2(6), pg.87 Since plants rarely have the same design, each plant should define their ESF systems in Chapter 6 of the FSAR per Regulatory Guide 1.70. Previous NUREG 1022 Supplement 1 answers 6.1 and 6.2 state so. The proposed guidance will increase confusion. This is another case where the NRC staff is appearing to lower the reporting threshold without changing the rule and without enhancing public health and safety.
- 3.3.2(3),
page 83 The threshold for ESF actuation reporting needs to include a requirement for the electrical/electronic signal to travel through the ESF logic system. The proposed guidance will create a low reporting threshold with increased nuisance reporting.
- 3.3.2(2),
page 84 It is not clear how an invalid signal may occur to actuate an ESF system if the system has been properly removed from service. Delete this example.
- 3.3.2(1),
page 85 If the RPS is properly removed from service such that a signal to open the reactor trip breakers cannot be sent, then an invalid signal processed by the RPS should not be reported. Per plant procedures, it is planned and known the reactor trip breakers are removed from service. This was discussed in March 1986 with Mr. Fred Hebdon (AEOD).
- 3.3.3(3),
page 94 The guidance is not consistent with previous guidance provided by NUREG 1022 Supplement 1, answer 7.13. If a system is not in STS and is not required to meet the single failure criterion, it does not perform a "safety function." Additionally, the second to last paragraph of page 90 infers the safety function applies during the operation of a system (safety or non-safety related) as described or relied on in the plant safety analysis. If a non-safety system's operation is not required by the plant safety analysis, this condition is not reportable. It appears this change was made for the sole purpose of increasing reporting requirements without changing the rule.
- 3.3.7,
pages 109 & 114 Verbatim compliance with the rule requires the licensee to call the NRC when other government agencies are notified, especially if the latter are required by law. This appears to be an interpretation of convenience when in reality the rule should be changed.

Editorial Comments:

page vi	Add: 30-Day
2.5, page 17	Add: voluntary
2.8, page 19	Move to 5.2, pages 166 and 167 to combine with same subject matter to facilitate finding it.
2.9, page 19	Move to 5.1.5 to combine in order to find it in one place.
(4), page 38	Replace: "or had a high potential for" with 10CFR20.403 wording: "may have caused or threatens to cause."
(1), page 47	Replace: "FSAR" with "design".
3.2.8, page 64	Add: "Which may pose a threat" to middle of page.

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criteria noted above. The ENS notification is to include what is known at that time. The following LER may include similar overloaded hangers that are found during the 30-day period.

2.5 10 CFR 50.9 Reporting

The stated intent for 10 CFR 50.9(a) is that information provided to the Commission by a licensee be complete and accurate in all material respects. Sections 50.72 and 50.73 have provisions for updating and revising reports that should be used to correct material incompleteness or inaccuracies that are discovered. For example, submittal of a revised LER is appropriate to correct any previously submitted inaccuracies of a material nature.

The stated intent for 10 CFR 50.9(b) is that any licensee information with significant health, safety, common defense, or security implications is to be reported to the NRC notwithstanding the absence of a specific reporting requirement. The Statements of Consideration for 10 CFR 50.9 refer to such licensee information as "residual information" that could affect licensed activities. Licensees may report such information under the LER format to give the information broad consideration, as discussed in Section 5.1.5 of this report.

Voluntary
The provisions of 10 CFR 50.9 should not be used to report information that is required to be reported under 10 CFR 50.72 or 50.73.

2.6 Events and Conditions Initially Communicated Verbally to NRC Staff or Identified by NRC Inspections

Some licensees erroneously believed that if a reportable event or condition had been discussed with the resident inspector or other NRC staff, there was no need to report under 10 CFR 50.72 and 50.73 because the NRC was aware of the situation. Some licensees also expressed a similar understanding for cases in which the NRC staff identified a reportable event or condition to the licensee via inspection or assessment activities. Such means do not satisfy the event reporting rules. The requirement is to report to the ENS and LER systems events or conditions meeting the criteria stated in the rules so that the events or conditions can receive structured NRC reviews set up for that purpose and they can be collected, stored, and retrieved as operating experience information. Licensees not submitting information in accordance with the reporting rules are subject to enforcement action.

2.7 Multiple Component Failures During Surveillance Testing

There have been numerous cases in which licensees have not reported multiple, sequentially discovered failures of systems or components occurring during planned testing. 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)(2)(iii), 50.73(a)(2)(i)(B), 50.73(a)(2)(v), and 50.73(a)(2)(vii).

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 that other rods would fail to insert, the failure of more than one rod does cause a reasonable doubt that other rods could be affected, thus affecting the safety function of the rods.

Not
consistent
with #
2.3.3.
Words
are
not
clear.

A single component failure in a safety system is reportable if it is determined that the failure mechanism could reasonably be expected to occur in one or more redundant components and thereby prevent fulfillment of the system's safety function.

The other
train
components
must be
determined
inoperable
for the
condition.

Some licensees have misinterpreted the reporting requirements and considered multiple failures of similar components (in which each component was inoperable during the required surveillance testing) as a series of individual events. They improperly reasoned that each individual component failure, in itself, was not reportable. The proper interpretation is to assume that such multiple failures or inoperabilities concurrently existed (particularly because of the short interval between each test), and are therefore reportable.

Another example of an improper determination of reportability involved the sequential testing of main steam safety valves. Of the 20 safety relief valves tested, 17 were out of tolerance (13 with set points above the technical specification limit and 4 below the limit). Individual valves were out of specification by as much as 4 percent. The licensee initially did not report this condition because it believed the valves could fulfill their safety function because no safety relief valve set pressure exceeded 1397 psia (110 percent of the system design pressure). However, the licensee determined a common-mode failure mechanism was the cause for most of the failures; therefore, the condition was reportable.

The last two paragraphs need to be consistent with § 5.2.1 and § 3.2.2^{pages 35 and 37} concerning "time of discovery." If there is firm evidence that the common failure condition existed prior to the surveillance testing, then the condition is reportable.

Draft NUREG-1022, Rev. 1

This has been utility practice per NUREG-1022 Supplement 1, question 2.3.
/answer

MOVE TO 4.5.2, pages 166 and 167, to put with
operator error
discussion.

2.8 Human Performance Issues

Human performance often, beneficially or detrimentally, influences the outcome of nuclear power plant events. Detrimental personnel errors may be caused by inadequate procedures, training, verbal communications, human engineering, quality control management, or supervision.

A specific description of the causes and effects of human performance as they relate to an event are to be included in the LER pursuant to 50.73(b)(2). Based on recent NRC site visits to better understand operator response to plant events, it was found that significant human performance information was known to the licensees; however, the licensees had not generally included the information in the submitted LERs. While complete human performance information may not be available at the time of an ENS notification, the NRC is interested in any known human performance issues related to the event.

In the LER, and where possible in the ENS notification, the intent is to include a substantive description of relevant human performance information and root causes. Typical examples of human performance problems as they relate to the event or root cause are given in Section 5.2.1(2) of this report.

2.9 Voluntary Reporting

MOVE TO 4.5.1.5 TO PUT INFO. IN ONE PLACE.

The Statement: Consideration for 10 CFR 50.73 specifically address the use of voluntary LERs. Licensees are permitted and encouraged to report any event or condition that does not meet the criteria contained in 50.73(a) if the licensee believes that the event or condition might be of safety significance or of generic interest or concern. Thus, regardless of operational mode, if a failure or degradation of a component, system, or structure could have generic safety implications or be a precursor to a significant event and no part of 10 CFR 50.73 specifically requires reporting, it is intended that the event be reported as a voluntary LER. Voluntary reporting of LERs is further discussed in Section 5.1.5 of this report. In addition, voluntary reporting is encouraged under 10 CFR 50.72, as discussed in Section 4.2.3 of this report.

However, the NRC staff considered many of the voluntary reports submitted in 1990 to be required under 10 CFR 50.72 and 50.73. These included a manual reactor scram, ESF actuations, technical specifications required shutdowns, unanalyzed plant conditions, large spills, and common mode failures. Submittals of such improperly classified ENS notifications or LERs in lieu of required reports do not meet 10 CFR 50.72 or 50.73. Licensees are expected to properly classify and report events in accordance with these rules.

2.10 Retraction/Cancellation of Event Reports

Licensees have expressed concerns about the counting of event reports, both ENS notifications and LERs. The NRC staff has indicated that its interest is in evaluating the reported information, not in counting the number of events reported. While event reports may be formally withdrawn, the staff has often found the information reported useful and has maintained the information on file with the withdrawal notation. Licensees are encouraged to convert each report to a voluntary report rather than a retraction or cancellation.

If a licensee so chooses, an ENS notification can be retracted and an LER can be canceled using the same procedure by which the initial report was made. The retractions and cancellations are further discussed in Section 4 for ENS notifications and Section 5 for LERs. Sound, logical bases for the withdrawal or conversion to a voluntary report are to be communicated with the request. Such actions receive staff review.

3.2.1 Plant Shutdown Required by Technical Specifications

§50.72(b)(1)(i)(A)	§50.73(a)(2)(i)(A)
Licensees shall <u>report</u> : "The initiation of any nuclear plant shutdown required by the plant's Technical Specifications."	Licensees shall <u>submit a Licensee Event Report on</u> : "The completion of any nuclear plant shutdown required by the plant's Technical Specifications."

If not reported as an emergency under §50.72(a), licensees are required to report the initiation of a plant shutdown required by TS to the NRC via the ENS as soon as practical and in all cases within 1 hour of the start of power reduction. Licensees are required to submit an LER if the shutdown is completed.

It is not clear for a T/S required shutdown begun in Modes 3 or 4 with completion in Mode 5 or 4. Discussion

The reactor is already subcritical. The temperature/pressure reductions just make it move subcritical. This §50.72 reporting requirement is intended to capture those events for which TS require the initiation of reactor shutdown to provide the NRC with early warning of safety significant conditions serious enough to warrant that the plant be shut down.

For §50.72 reporting purposes, the phrase "initiation of any nuclear plant shutdown" is the performance of any action to start reducing reactor power to achieve an operational condition or mode that requires the reactor to be subcritical, as a result of a TS requirement (e.g., a limiting condition for operation (LCO) action statement or Standard Technical Specification 3.0.3, or equivalent). This includes any means of power reductions, such as control rod insertion, boron concentration changes, or boiling water reactor (BWR) recirculation flow reduction.

For §50.73 reporting purposes, the phrase "completion of any nuclear plant shutdown" is defined as the point in time during a TS required shutdown when the plant enters the first operating mode that requires the reactor to be subcritical. For example, if at 0200 hours a plant enters an LCO action statement that states, "restore the inoperable channel to operable status within 12 hours or be in at least Hot Standby within the next 6 hours," the plant must be shut down (i.e., at least in hot standby) by 2000 hours. An LER is required if the inoperable channel is not returned to operable status by 2000 hours and the plant enters hot standby.

An LER is not required if a failure can be corrected before a plant is required to be in a shutdown condition and no other criteria in §50.73 apply. The shutdown is reportable, however, if

the situation cannot be corrected before the completion of the shutdown or if the plant shuts down early to correct the problem.

Examples

(1) Initiation of a TS Required Plant Shutdown

The monitor alarmed for one of three safeguard equipment cabinets and the cabinet was declared inoperable. The plant's TS required that if one cabinet is out of service, the plant must be in hot standby within 6 hours. The licensee initiated a plant shutdown from full power and made an ENS notification.

The licensee made an update ENS notification after the equipment was repaired, the cabinet was declared operable, and the power reduction was stopped before completion of the shutdown.

An ENS notification is required because a TS required power reduction was started. The update ENS notification is required immediately under §50.72(c)(2)(ii) to report the effectiveness of the response taken to the event. An LER is not required because the plant did not reach hot standby or hot shutdown.

(2) Initiation and Completion of a TS Required Plant Shutdown

When leakage around the primary containment ventilation exhaust dampers exceeded the maximum allowable combined secondary bypass leakage rate, the plant TS required the plant be in hot shutdown within 12 hours. The licensee commenced a reactor shutdown at 10 percent per hour and made an ENS notification within 13 minutes.

The licensee made update ENS notifications, when the plant reached hot and cold shutdown and the technical specification was exited.

An ENS notification is required because a plant shutdown was initiated as required by the plant's TS. This event also is reportable under §50.72(b)(1)(ii) as a degraded plant condition. The update ENS notifications were made under §50.72(c)(2)(ii) to report the effectiveness of the response taken to the event. An LER is required because the plant shutdown was completed.

(3) Shutdown Before the End of TS Time Limit

While at full reactor power, a plant's essential service water pump discharge check valve failed its monthly surveillance test. Because repairs could not be completed

other compensatory measures. Such time constraints are based on the safety significance of the component or system being removed from service. Exceeding LCO action requirements is prohibited.

An LER is required if the conditions of an LCO are not met (e.g., by exceeding the permitted time constraints). The LCO allows a plant a specified time interval (e.g., 6 hours) to accomplish corrective actions (e.g., an orderly shutdown to either the hot- or cold-shutdown mode). The staff is interested in the frequency of occurrence and the TS involved in events in which a shutdown did not occur within the given time constraint.

If a plant is in a degraded mode longer than permitted by the TS, the condition is reportable even if the condition was not discovered until considerably later and the condition was corrected immediately after its discovery.

(3) TS Surveillance Requirements

For the purpose of evaluating the reportability of discrepancies found during TS surveillances, an operation or condition prohibited by the TS existed and is reportable if the use of actual equipment inoperability exceeded the LCO allowance. It should be assumed that the situation occurred at the time of discovery unless there is firm evidence, based on a review of relevant information, to believe otherwise (e.g., the equipment history and cause of failure).

For missed surveillance requirements, the staff is interested in the effectiveness of ensuring that surveillance tests are conducted within the required periods. If the surveillance interval plus the allowable time extensions for conducting a surveillance are exceeded, the event is reportable even though the surveillance is subsequently satisfactorily performed.

(4) Design Features

Design features of a licensed facility are attributes such as materials of construction and geometric features which, if altered or modified, can have a significant effect on safety and are not covered by items (1) through (3) above. Reportability requirements related to design features are included in other sections of 10 CFR 50.72 and 50.73.

(5) Administrative Requirements, Including Radiological Controls, Required by Section 6 of the STS, or Equivalent

Section 6 of the STS, or its equivalent, has a number of administrative requirements such as organizational structure; the required number of personnel on shift; the maximum hours of work permitted during a specified interval of time; and the requirement to have, maintain and implement certain specified procedures. Failure to meet such administrative requirements is prohibited by the TS. Whether it is reportable as an LER depends upon whether it results in a condition covered by the LER rule. If a variance from the administrative requirements of TS results in operations or conditions prohibited by the TS, then the variance is reportable.

Confusing
NUREG-1022
supplement
1. question
2. 4 is more
clear for
inadequate

HP posting

Radiological conditions and events that are prohibited by a plant TS are generally reportable under the requirements of 10 CFR 20.403 and 20.405. Sections 20.403 and 20.405 use the reporting methodology contained in 10 CFR 50.72 and 50.73. Redundant reporting is not required.

(6) Entry into STS 3.0.3

STS 3.0.3, or its equivalent, establishes requirements for actions when an LCO is not met and no action statement is provided. Entry into STS 3.0.3 is considered to be the action taken, as required, when operations or conditions required by TS LCO action statements are not met. Thus, until a plant is placed in a mode for which an LCO does not apply, the plant is considered to be in a condition prohibited by TS. Entry into STS 3.0.3 for any reason or justification is reportable unless a temporary waiver of compliance is obtained. The staff is interested in the frequency and the specific TS involved.

Generally,
a TWOC
is not
requested
unless 3.0.3
has been
entered.
A 50.72
notification
will be made
upon 3.0.3 entry prior to TWOC approval. Once TWOC approved, a 50.73 LER would not be

(7) Missed or Deficient Tests Required by ASME Section XI required. Inservice Testing (IST) and Inservice Inspection (ISI) and by STS 4.0.5, or Equivalent.

Section 50.55a(g) of 10 CFR requires the implementation of an IST/ISI program in accordance with the applicable edition of the ASME Code for those pumps and valves whose function is required for safety. STS Section 4.0.5 (or an equivalent) covers these testing requirements. If an IST or ISI is not performed when required, or if ASME Section XI tests or inspections (examinations) show that components fail to meet requirements, the failures are reportable when they cause the associated systems required for safety to be declared inoperable.

(8) Fire Protection Systems When Required by TS

When fire protection systems are covered by TS (e.g., through an LCO), they are within the scope of the LER rule.

Breaches of fire barriers required by TS and conditions that could prevent the required operation of fire protection features specified in TS are reportable conditions unless preplanned and covered by compensatory measures.

Examples

(1) LCO Exceeded

Terminology not consistent with Generic Letter 87-09. An LCO includes action statements. There are Allowed Outage Time and Shutdown Action portions of the action statements.

A licensee found a standby component with a 7-day LCO and associated 8-hour action statement to be inoperable during a 30-day surveillance test. Subsequent review indicated that the component was inadvertently assembled improperly during maintenance conducted 30 days previously and a post-maintenance test of the component had been conducted which was not adequate to identify the error. There was firm evidence that the standby component had been inoperable for the entire 30 days.

An LER was required because the 7-day LCO and the action statement time of 8 hours was exceeded. If the component had been made operable after the 30-day test and before the LCO expired, an LER would not be required.

(2) Missed Surveillance Tests

A licensee, with the plant in mode 5 following a 10-month refueling outage, determined that certain monthly TS surveillance tests, which were required to be performed regardless of plant mode, had not been performed as required during the outage. The surveillance tests were immediately performed. An LER is required because the time interval exceeded the TS surveillance interval, including extensions permitted by TS.

(3) Entering STS 3.0.3

With essential water chillers (A) and (B) out of service, the only remaining operable chiller (A/B) tripped. This condition caused the plant to enter STS 3.0.3 for 1 hour until chiller (A) was restored to service and the temperature was restored to within TS limits. An LER is required for this event because STS 3.0.3 was entered.

(4) Administrative Requirements, Including Radiological Controls, Required by Section 6 of the STS, or Equivalent

If a control room is operated with less than the required number of people on shift or is operated with a required procedure that had not been properly approved, these operations would constitute a condition or event prohibited by the TS, and as such are reportable. However, if a requirement is only administrative and does not affect plant operation, then an LER is not required.

If a change in the plant's organizational structure is made that has not yet been approved as a TS change, an LER is required. The implementation of TS changes before NRC approval, such as deletion of a shift technical advisor position, is clearly operating in a condition prohibited by TS and would be reportable.

During a plant startup, a reactor water cleanup (RWCU) system isolation was initiated by a sensed high-differential flow. This condition is identified in the plant's TS as a required isolation during the plant's present operational mode. While trying to restore the RWCU system to operation, the system continually isolated from high temperature to the RWCU system demineralizer bed. This RWCU system high temperature isolation was another isolation required by TS during the plant's operational mode. The shift supervisor determined that reactor chemistry would deteriorate and eventually place the plant in an LCO action statement. Therefore, the shift supervisor directed the RWCU system high-temperature isolation be bypassed, even though such action was not covered by approved procedures. The supervisor reasoned that the TS LCO for inoperable RWCU system high-temperature isolation permitted up to 1 hour before the instrumentation must be placed in the tripped condition. Within 1 hour after the shift supervisor's decision, the jumpers were installed, the system was returned to operation (once the system was started, the hot water causing the high-temperature isolation was pumped to the feedwater system), and the jumpers were removed.

The installation without approved procedures of jumpers which bypass a TS required actuation during modes when the actuation is required is an action prohibited by TS and an LER is required.

A licensee failed to implement radiation protection controls required by the TS. Such failure resulted in, (or had a high potential for), personnel exposures in excess of NRC prescribed limits. An LER is required under the requirements of §20.403 and this §50.73 criterion; one report should cite both requirements.

use §20.403
wording:
"may have caused
or threatens to
cause"

identified these types of adverse conditions, but did not inform management responsible for reporting until exhaustive evaluations were performed. Management responsible for reporting should be promptly informed if there is reasonable belief that an adverse condition exists so that the condition can be evaluated for reportability even though further analysis might reveal the condition was acceptable.

Further clarification of the types of conditions included in the reporting requirements of §50.72(b)(1)(ii) and §50.73(a)(2)(ii) are given below.

(1) Plant Being Seriously Degraded

A nuclear plant's components, systems, or structures are designed to meet applicable NRC requirements, fulfill system functional requirements, satisfy the current licensing basis, and conform to specified codes and standards. These components, systems, or structures are designed and operated with design margins and engineering margins of safety to ensure that some loss of quality or functional capability does not mean immediate failure. Additionally, many licensees add conservatism so that even if a partial loss of quality or functionality occurs, the margins of safety are still maintained.

The phrase "plant being seriously degraded" refers to a condition of a system, structure, or component in which there has been some loss of quality or functional capability as evidenced by decreases in the margins and conservatisms beyond that added by the licensee and not previously considered by the NRC in a safety evaluation. Analysis, test, experience with operating events, engineering judgment, or a combination of these factors should be used to determine if margins and conservatisms have been reduced to the point at which systems, structures, or components have become seriously degraded and reportable.

Abnormal degradation of the principal safety barriers (i.e., the fuel cladding, reactor coolant system pressure boundary, or the containment) caused by material (e.g., metallurgical, chemical) or other (e.g., mechanical, electrical, operation) problems is included under these reporting criteria.

(2) Plant in an Unanalyzed Condition

"An unanalyzed condition that significantly compromises plant safety" exists if (1) the condition potentially affecting a component, system, or structure is of more than minor safety significance; and (2) the condition potentially could (a) increase the probability of occurrence or the consequences of an accident or malfunction of equipment results in the plant

Refer also to NUREG-1022

Supplement 1, answer 10.3⁴³

which requires a report if a condition actually occurred and caused the plant to be outside the design basis of the plant.

Draft NUREG-1022, Rev. 1 being in an unanalyzed condition not potentially.

NUREG-1022 Supplement 1, question/answer

4.1 states: "The event is not reportable if the plant was never in an unanalyzed condition." Also, the rule here

requires a report if the condition

being in an

NUREG-1397 defines current licensing basis to be "the NRC requirements imposed on the plant that are currently in effect....The licensing bases are contained in NRC regulations, plant technical specifications, orders, license conditions, exemptions, [NRC staff safety evaluations], and licensee commitments contained in the final safety analysis report, and other docketed licensing correspondence including responses to bulletins and generic letters."

In addition to the current licensing basis, other design constraints, which are implemented to achieve certain economies of operation, maintenance, procurement, installation, or construction, identified in NUREG-1397 are:

- system functional requirements (including specifications)
- conformance to accepted industry codes and standards...
- vendor interface requirements (including approved operations and maintenance (O&M) manual recommendations)
- other design considerations that could be classified as "generally accepted good engineering practice"

If one of the following conditions exists, the plant is considered to be outside the bounds of its design basis:

- a structure, system, or component is unable to perform its intended safety function(s)
- a structure, system, or component is exceeding the specific value or range of values that were chosen for controlling parameters as its reference bounds for design
- entry into STS 3.0.3, or its equivalent *but not reportable as discussed on pg.36*

(4) Plant Condition Not Covered by Operating and Emergency Procedures

For plant conditions not covered by the plant's operating or emergency procedures, an ENS notification and LER are required for either of the following:

- the condition is required to be procedurally controlled (e.g., by a license condition or by a licensing commitment, such as a commitment to comply with Regulatory Guide 1.33, "Quality Assurance Program Requirements", and no applicable operating or emergency procedure exists
- the plant is operating outside existing required operating or emergency procedures for safety-related equipment

Too restrictive!

[Minor valve misalignment, such as a local instrument root valve, are not reportable. Significant valve misalignments are reportable.]

Define significant. IF valves are closed operability must be determined. The valves are already covered by plant procedures for operation

Examples

(1) Plant Being Seriously Degraded

• Reportable Events or Conditions

- physical deformation occurring to components, systems, or structures (including supports) or causing inoperability of equipment that is important to plant safety that could reasonably have resulted from water hammer
- fuel cladding failures in the reactor or in the storage pool that exceed expected values, that are unique or widespread, or that resulted from unexpected factors
- cracks and breaks in piping, the reactor vessel, or major components in the primary coolant circuit (e.g., steam generators, reactor coolant pumps, valves) that have safety relevance, including significant welding or material defects
- an inadvertent loss of a significant quantity (>100 gallons) of the reactor coolant system (RCS) inventory as a result of a mispositioned valve, a main steam safety/relief valve failing to reclose during testing while at power, or an unknown cause
- a reactor trip breaker failing its trip bar lift force measurement test as a result of a significant design, maintenance, or test problem

• Containment Integrity Lost During Operation

While at 100 per cent power, during the performance of a surveillance test of the containment door interlock, the inner containment door failed open allowing a direct path from the containment to the atmosphere for a short time.

An ENS notification is required because of the loss of primary containment integrity, a serious degradation of a principal safety barrier. An LER is required.

• Local Leak Rate Test Failures During Operation

A 10 CFR 50, Appendix J, local leak rate test determined that a containment purge exhaust line penetration was leaking at 0.7 La. The total Type B and C leakage was 0.85 La, which exceeded the TS limit of 0.6 La. The licensee reported this in an ENS notification. The licensee made an update ENS notification when a TS required shutdown was begun several hours later and an

Unusual Event was declared. The licensee made update ENS notifications when the plant shut down and the Unusual Event was terminated after repairs to the valves were made and the leak rate was within TS limits.

An ENS notification is required under this criterion because of the degradation of a principal safety barrier (primary containment) during operation, as evidenced by the leakage exceeding TS limits, requiring a plant shutdown. An immediate update ENS notification was required by §50.72(b)(1)(i)(A) of the initiation of the plant shutdown and by §50.72(c)(1)(i), §50.72(a)(1)(i) of the declaration of an emergency. The notification of the termination of the emergency was required by §50.72(c)(1)(iii). Although an LER is not required under §50.73(a)(2)(i)(A), it is required under §50.73(a)(2)(i)(B) and §50.73(a)(2)(ii).

- Degraded Reactor Head Studs

Plant technical staff was notified by engineering that destructive testing of a reactor head stud revealed the stud hardness was outside the FSAR requirements by eight hardness numbers.

The condition is reportable under two reporting criteria: first, as a serious degradation of the RCS pressure boundary, and second, as a condition outside the design basis of the plant.

(2) Plant in Unanalyzed Condition

- Reportable Events or Conditions

- spills that create conditions that could affect component operability, qualification, or design life because of
 - a) the extent and depth of water that floods or wets components not designed to be submerged or wetted and that restricts personnel access for safety-related functions
 - b) higher-than-analyzed temperatures and humidity when the water is not, which degrades components and can result in failures
 - c) radiation levels above the area design basis that degrade components
- serious RCS temperature or pressure transients exceeding design or technical specifications limits

- any significant deviation in either direction (beyond the allowable range) from a calculated critical position during reactor startup, even if a reactor trip does not occur and subsequent analysis adequately explains the anomaly, for example
 - a) deviations caused by unexplained phenomena, improper rod position, unlicensed or improperly supervised trainees, are reportable
 - b) deviations caused by routine calculational uncertainties are not reportable
- a containment spray discharge line, analyzed in a dry condition, containing water from system testing and resulting in an unanalyzed seismic condition

• EDG Room Temperature Slightly Exceeds FSAR

The FSAR specifies the maximum permissible ambient air temperature for the emergency diesel generators is 95 °F. On a summer afternoon ambient air temperature was 96 °F. This represents an unanalyzed condition. If a priority engineering judgment indicates that the effect of the high ambient air temperature is inconsequential, the situation does not represent a reportable unanalyzed condition. (It also is not considered outside the design basis of the plant because it is a minor variation. Thus it is not reportable under this criterion.) If the engineering judgment indicates that the effect is not inconsequential, it is reportable.

(3) Plant Outside Design Basis

• Untested Containment Isolation Valves

A licensee determined that six normally open valves used for containment airlock cycling were containment isolation valves. The valves, which had not been leak rate tested, were closed to ensure containment integrity.

This event is reportable because equipment had not been operated, analyzed, or tested for the safety-related function it was required to serve and containment integrity was called into question.

• Service Water System Leaks

A licensee experienced degradation of the service water system piping over time and numerous pinhole leaks or

*would be
handed
as a
missed
surveillance.
Especially
if later
testing
shows
they met
requirements.*

Follow STS actions 3.6.1.2 and 3.6.3.

radios), or more importantly, the capability to alert a large segment of the population for a period of 1 hour or more would warrant an immediate notification.

Loss of Communications Capability

A major loss of communications capability for other than a short time (less than 1 hour) may typically include, but not be limited to, the partial loss of the ENS, dedicated telephone communication link to a State or a local government agency and emergency offsite response facilities, in-plant paging and radio systems, or commercial telephone lines.

Examples

Loss of Emergency Assessment Capability

(1) Loss of Emergency Operations Facilities (EOF) Computers

Power was lost to the local EOF air conditioning and computer when a transmission line was lost. When the computer room temperature exceeded 78 °F, the computer tripped as designed. Concurrently, the corporate EOF computer was out of service for planned work on that facility's air conditioning system. Both EOF computers were out of service for several hours. The technical support center computer remained operable throughout the event.

An ENS notification is required because of loss of use of the EOF. No LER is required.

(2) Loss of Plant Computer Data Acquisition System (DAS)

The plant computer lost its DAS although the safety parameter display system and other control room indications remained operable. The licensee considered this loss of the DAS to be a major degradation of the plant's emergency assessment capability. The licensee initiated investigation and repair efforts, informed the NRC resident inspector, and made an ENS notification within an hour of the loss of the DAS. The licensee also made a followup call to the NRC Operations Center several hours later when the computer was restored to service.

An ENS notification is required because the loss of this computer was considered by the licensee to be a major loss of assessment capability. No LER is required.

Does this include planned outages of the plant computer for short periods of less than 1 hour? See page 63, (3).

Loss of Offsite Response Capability

(1) Plant Access Roads Closed by Storm

The local sheriff notified the licensee that all roads to and from the plant were closed because of a snow storm. The licensee had two full shift crews on site to support plant operations and no emergency declaration was made. The licensee notified State and local authorities of the situation and made an ENS notification. The licensee deactivated its station isolation procedures after the storm passed and the roads were passable.

An ENS notification is required because the sheriff's road closing may prevent the plant staff from staffing the TSC, etc., or from fully responding to some emergencies. A followup ENS notification is to be made when the situation has been rectified, if periodic updates were not specifically requested per §50.72(c)(2)(ii). This event is also reportable under §50.72(b)(1)(iii). No LER is required.

(2) Loss of Public Prompt Notification System

ENS notifications of the loss of the emergency sirens or tone alert radios vary according to the licensee's locale and interpretations of "major loss" and have included:

- 4 of 37 offsite sirens reported inoperable by local fire department (licensee procedures defined major loss as > 10%)
- 12 of 40 county alert sirens disabled for several hours because of loss of power as a result of severe weather
- 28 of 54 alert sirens reported out of service for an hour as a result of a local ice storm and a return-to-service estimate was unknown
- All offsite emergency sirens were
 - found inoperable during a monthly test
 - taken out of service for 4 hours of repair
 - inoperable because control panel power was lost for an unknown period
 - inoperable because the county radio transmitter failed for 4 hours

An ENS notification is required because of the major loss of the public prompt notification system. An LER is not required.

Loss of Communications Capability

(1) ENS Telephone Problem

The licensee determined, during the monthly ENS surveillance test, that the technical support center ENS telephone was inoperable for over 1 hour.

An ENS notification is required because of the loss of the ENS telephone. No LER is required. If the NRC Headquarters Operations Officer notifies the licensee of an inoperable ENS line, that discussion constitutes the required ENS notification and no further notification is necessary.

(2) Loss of Direct Communication Line to Police

The licensee contacted the State Police via commercial telephone lines and reported to the NRC Operations Center that the direct telephone line to the State Police was inoperable for over 1 hour. The licensee notified the NRC Operations Center in a followup ENS call that the line was restored to operability.

An ENS notification is required because of the loss of the direct telephone line(s) to various police, local, or State emergency or regulatory agencies. The followup ENS notification was required by §50.72(c)(2)(ii) after the line is restored. No LER is required.

(3) Loss of In-Plant Paging System

The licensee removed its in-plant paging system from service for modifications for 8 hours while the plant was in cold shutdown, without establishing compensatory measures that ensured communication with personnel during an emergency.

An ENS notification is required because of the loss of the in-plant paging system without sufficient compensatory measures, if the licensee relies on its use during an emergency. A followup ENS call when the system has been returned to service is required per §50.72(c)(2)(ii). If the system loss is anticipated, i.e., being removed from service for planned maintenance, the ENS notification should be made before its removal from service. No LER is required.

3.2.8 Internal Threat to Plant Safety

§50.72(b)(1)(vi)	§50.73(a)(2)(x)
Licensees shall report: "Any event that poses an actual threat to the safety of the nuclear power plant or significantly hampers 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."	Licensees shall report: "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."

If not reported as an emergency under §50.72(a), licensees are required to report such an event or condition to the NRC via the ENS as soon as practical and in all cases within 1 hour. Licensees are required to submit an LER within 30 days.

Discussion

These criteria pertain to internal threats. The criteria for external threats, §50.72(b)(1)(iii) and §50.73(a)(2)(iii), are described in Section 3.2.5.

Fires, toxic gas releases, and radioactive releases are not the only reportable threats or hindrances to safe operation of the plant. They were included in the criteria as examples only and were not meant to be an exclusive list of reportable threats. Additional typical examples of conditions reportable under these criteria are listed below.

- in-plant (radioactive) spills or floods
- smoke from failed electrical equipment
- ignition, detonation, burns, combustion, explosion and the like of solid, liquid, or gaseous material in safety- and non-safety-related nuclear process systems or elsewhere
- high levels of carbon monoxide or dioxide in rooms
- discharge of carbon dioxide or halon systems
- significant operational problems (e.g., the loss of main or auxiliary transformer cooling during operation causing immediate power reductions/trips and personnel evacuations)

"which may pose a threat"

Discharges to unoccupied rooms should not be reported since not a threat.

because of an explosion hazard that could cause transformer, switchyard, or hydrogen fires, and loss of offsite power).

To clarify the intent of these criteria, the specific concepts are explained below.

- Threat

The phrase "an actual threat to the safety of the nuclear power plant" is a reporting trigger. An actual "threat" is an imminent source of peril to the plant. Such an event is a source of impending peril to the safety of the nuclear power plant or its safety-related or other non-safety-related equipment, or it could have already degraded the plant's safety margins. The NRC is interested in real or actual threats as opposed to threats without credibility.

- Broad Scope

The scope of the regulation is broad, covering more than just safety systems. The regulation refers to "the safety of the nuclear power plant" and "safe operation of the nuclear power plant," which covers not only many systems found in the reactor building, but also most of those systems in the turbine or auxiliary building.

- Significant Hampering of Site Personnel

Some of these examples make the threshold too low increasing nuisance reporting.

The phrase "significantly hampers site personnel" ranges from hindering or interfering with (i.e., causing additional or unusual time-consuming precautionary measures, such as radiation work permits, protective or anticontamination clothing, cool suits, bunker gear, and self-contained breathing apparatus in areas not normally so encumbered) to, and including, prohibiting or preventing automatic or manual actions.

To be reportable, an event need not prevent site personnel from performing their duties--it is only necessary that they be significantly hampered, hindered, or interfered with. If the event caused a large portion of a major building to be contaminated, evacuated, flooded, or filled with smoke or gas, personnel may be able to perform their functions, but they are significantly hampered in their performance. If the condition makes performing routine functions in the nuclear power plant significantly more difficult and it is something more than a routine nuisance, it is reportable.

This part of the criteria includes only those events that significantly hamper the ability of site personnel in performance of duties necessary for safe operation. Licensees must use engineering judgment in determining if

the event crosses the threshold of significantly hampering site personnel. The safety significance of the equipment involved, the potential effect of its failure on the plant operation and/or challenges to safety systems, and the potential need for immediate or periodic personnel access, should be factors in determining the significance of an event with regard to significantly hampering site personnel. Significant hampering of site personnel in the secondary plant areas is also reportable, because it often increases the reactor transients initiated by secondary system anomalies.

- Plant Mode

Plant mode may be considered in determining if there is an actual internal threat to a plant; however, licensees need to use engineering judgment on a case-by-case basis. Do not incorrectly assume that everything that happens while a plant is shut down is unimportant and not reportable. Licensees should consider other reporting requirements or voluntarily reporting if the event has potential generic implications to another plant or to another mode.

- Evacuations

In-plant releases are reportable if they require evacuation of rooms or buildings and, as a result, the ability of the plant personnel to perform necessary safety functions is significantly hampered.

Fairly common events such as minor spills, small gaseous waste releases, or the disturbance of contaminated particulate matter (e.g., dust) that require temporary evacuation of an individual room until the airborne concentrations decrease or until respiratory protection devices are used, are not reportable unless the required evacuation affects the major part of a building or facility.

Any evacuation of multiple rooms or a significant portion of a large area, such as the containment, reactor auxiliary, turbine, radwaste, or spent fuel pool buildings, as a result of an actual fire, spill, flood, gas or radioactive release, is reportable.

A precautionary evacuation is an evacuation that was made in order to be prudent, but was later found to be unnecessary because the condition causing concern did not actually exist. Although generally not reportable, precautionary evacuations are reportable under §30.72 if the causative condition is not fully investigated or understood within the 1-hour reporting limit (e.g., radiation monitors alarm, but grab samples had not been processed).

Evacuation of multiple rooms or a significant portion of a large area is reportable, as previously discussed.

In-Plant Spill/Flood Threat

Significant in-plant spills in excess of 55 gallons or floods have been under reported by licensees in some instances. These events are of interest to the NRC because of the potential for equipment damage, significant hampering of site personnel in the performance of duties, implications for environmental qualification, intersystem loss-of-coolant accidents (LOCAs), precursors to more serious events, or the potential for fuel becoming uncovered. *This should not become the criteria limit.*

In-plant spills or floods are reportable if any of the following, or other typically significant, consequences occur:

- The leaking system is a safety system and potentially involves an intersystem LOCA.

This does not include small packing or gasket leaks, but does include events in which the packing is blown out. If leaks cause a significant flood, are located in an unisolable section of the primary system, cause significant eroding of piping or bolting, or cause personnel injury or hazard, they are reportable. Small leaks that directly affect other equipment, normal operations, or cause evacuations are reportable. The intent is to have significant spills and floods reported.

- The leaking fluid is radioactive and contaminates a significant area, contaminates several individuals, or significantly contaminates one individual.
- The leaking fluid is not radioactive, but is in a vital area, and potentially affects vital equipment.
- Operational compensatory measures are required, such as a power level decrease or equipment operation swap.
- An ESF or safety equipment is rendered inoperable.
- Electrical equipment was wetted down, such as from the containment spray headers.
- Flooding hampers operations personnel in performance of their duties (e.g., flooding in excess of sump pump capability, a depth of several inches on the floor, contamination requiring new access control measures, or electrical hazards).

Examples

Fire Threat

(1) Main Generator Excitor Fire

The licensee reported a fire in the main generator excitor housing. The reactor was manually tripped and taken to cold shutdown. The station fire brigade successfully extinguished the fire; no offsite fire-fighter assistance was required. Smoke from the fire was released to the environment via the turbine building. There were no radioactive releases or injuries to plant personnel.

An ENS notification is required because the fire threatened the safety of the nuclear power plant and significantly hampered personnel in the safe operation of the plant (i.e., the fire was sufficiently severe to threaten the loss of offsite power and require a manual trip). The licensee is required to submit an LER under both 50.73(a)(2)(x) and 50.73(a)(2)(iv) because an actual threat was posed and a manual reactor trip occurred.

(2) Control Room Fire

With Unit 2 operating at full power, a fire started at a hand switch in the control panel for an auxiliary feedwater (AFW) pump trip/throttle valve. At the same time, the solenoid for the valve, located in the AFW pump room, was smoking. The fuses blew as the 1-2 minute fire was put out with a portable fire extinguisher. The solenoid stopped smoking after the circuit fuse blew. The licensee did not sound the fire alarm, announce the location of the fire, or notify the fire brigade leader by radio pager of the condition. The fire was caused by an incorrect adjustment of the overspeed trip mechanism on the valve actuator, as a result of personnel error. For corrective actions, maintenance, post-maintenance testing, and fire reporting procedures and instructions were revised, and the remote electrical trip was redesigned. The licensee judged that the event was not a significant safety hazard to the plant and therefore was not reportable; however, the licensee submitted a voluntary LER a month later.

Making ENS or LER voluntary reports of a reportable event does not meet the requirements of 10 CFR 50.72 or 50.73. If a fire is determined to have been a safety threat after the fact, required reporting is necessary.

This event is reportable because it, as well as the licensee's actions, threatened plant safety. Other control

actuations of ESFs sometimes provide insights into systems interactions and system dynamics that testing does not disclose. The guidelines also define ESF systems (including emergency power), RPSS, and actuations for reporting consistency.

Definitions

(1) ESF Systems

ESFs are defined to be those nuclear power plant systems that function to mitigate the consequences of postulated accidents. Postulated accidents are generally identified in plant safety analysis (e.g., Chapter 15, "Accident Analysis," of a plant's final or updated safety analysis report (SAR)).

New position expands all areas of ESF reporting. Each plant should specify the components.
If components or systems are taken credit for in safety analysis, these components or systems are considered to be ESFs for reportability purposes. Many, but not necessarily all, ESF systems are identified in Chapter 6, "Engineered Safety Features," of an SAR. In some instances, components or systems taken credit for in safety analysis might not be specified as being ESFs, but are considered as such for reportability purposes. The intent of this is to achieve comparable reporting among all plants. For older plants that do not conform to Regulatory Guide 1.70, "Standard Format and Content of Safety Analysis Reports for Nuclear Power Plants," this information might be found in other chapters of the SAR. *Plants rarely have the same design. This is not consistent with*

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Table 2 contains a partial listing of typical ESF systems that, if taken credit for in safety analysis, are subject to reportability. Equivalent plant systems with different names are to be considered ESF systems for reportability. As Table 2 is only a typical listing of ESF systems, licensees should provide site-specific lists of ESFs to their staffs for use in reportability determinations. *6.1 and 6.2.*

(2) Reactor Protection Systems

RPSS are defined to be those nuclear plant systems that function to shut down (i.e., trip or scram) the reactor, including RPS sensors, power supplies, logic, bypass circuitry, hydraulic scram systems, and reactor trip breakers (or their equivalents).

The NRC staff recognizes that some plants have not previously reported actuations of some of these ESFs because the FSAR designations of ESF equipment varies (e.g., emergency diesel generators).

TABLE 2 TYPICAL ESF SYSTEMS

Emergency Core Cooling Systems (ECCSs)

For pressurized water reactors (PWRs):

- reactor coolant system accumulators
- boron injection system
- high-, intermediate-, and low-head injection systems, including systems for charging using centrifugal charging pumps, safety injection, and residual (decay) heat removal and their water sources
- associated valves, piping, instrumentation, interlocks, pumps, tanks, and necessary heat tracing

For boiling water reactors (BWRs):

- high- and low-pressure core spray systems and their water sources
- high-pressure coolant injection system, feedwater coolant injection system, residual heat removal system, and their water sources
- isolation condenser system, reactor core isolation cooling system
- automatic depressurization system
- associated valves, piping, instrumentation, interlocks, pumps, tanks, and necessary heat tracing

Containment Systems

- containment and reactor vessel isolation systems
- containment heat removal and depressurization systems, including the containment spray and additive system and the fan cooler system
- containment air purification and cleanup systems
- containment combustible gas control systems, including hydrogen recombiners, igniters, nitrogen inerting systems, and containment atmospheric dilution systems
- BWR standby gas treatment systems

Heating, Ventilating and Air Conditioning (HVAC) Systems for the Control Room and Fuel Handling Areas

PWR Auxiliary Feedwater Systems

Electrical Systems

- emergency ac electrical power systems, including emergency diesel generators (EDGs) and their associated support systems (even if classified as an essential auxiliary support in the plant's SAR), and BWR dedicated Division 3 EDGs and their associated support systems
- actuation and control systems (including associated interlocks) for engineered safety feature (ESF) systems

Essential Auxiliary Support Systems

Auxiliary support systems are those systems that are necessary for ESF systems to be capable of performing their specified functions and that receive an actuation signal (e.g., a safety injection signal, ESF actuation signal, or other similar actuation signal) to initiate their functions, such as

- cooling water systems
- HVAC systems for ESF equipment areas

For guidance on reporting ATWS actuations, see "Anticipated Transients Without Scram (ATWS) System Reporting" at the end of this "Discussion" section.

(3) Actuation of an ESF or the RPS

Actuation of a system or component of an ESF or the RPS is defined as either

Threshold too low. Nuisance reporting will increase.

- receipt of a signal(s) in the plant's protection system sufficient to satisfy the protection channel coincidence logic necessary to activate the ESF/RPS system or component, independent of whether the ESF/RPS system or component operates

what about manually closing a containment Isolation Valve remotely or locally?

- deliberate or inadvertent actions (manual or automatic) or plant conditions that activate the ESF or RPS system/component without the protection channel coincidence logic being satisfied (e.g., manual activation of a safety injection pump, an electrical jumper being used to start an emergency diesel generator, or set point drift causing a BWR main steam safety/relief valve to open)

(4) Valid Actuation

For the electrical/electronic signal to travel through the ESF logic system. Valid ESF/RPS actuations are those that are (a) the ESF logic system, automatically initiated by the measurement of an actual physical system parameter that was within the established set point band of the sensor that provides the signal to the protection system's logic (whether or not the ESF functions properly or a design basis need exists) and (b) manually initiated in response to plant conditions.

(5) Invalid Actuations

Invalid ESF/RPS actuations are those not considered "valid" as defined above.

Reportability of Events

All ESF actuations, including actuations of the RPS, are reportable regardless of the plant operating mode or power level or the significance of the structure, system, or component that initiated the event or whether initiated manually or automatically. The fact that the safety analysis assumes that an ESF system will actuate automatically under certain plant conditions does not preclude the need to report such actuations.

Add:

"or required by T/S action statements"

The following exceptions apply:

- (1) Actuations that result from and are part of the preplanned sequence during testing or reactor operation. This implies that the procedural step indicates the specific ESF or RPS actuation that will be generated and control room personnel are aware of the specific signal generation before its occurrence or indication in the control room.

However, if the ESF actuates during the planned operation or test in a way that is not part of the planned procedure, such as at the wrong step, that event is reportable.

- (2) Invalid actuations that occur when a system has been properly removed from service if all requirements of plant procedures for removing equipment from service have been met. This would include required clearance documentation, equipment and control board tagging, and properly positioned valves and power supply breakers. *If properly removed from service, an actuation will not occur.*

RPS/ESF Component or System Failure

If the actuation involved a component or system failure, in addition to reporting the event under these reporting criteria, it also should be evaluated for reportability under other 10 CFR 50.72 and 50.73 criteria (e.g., as a single failure that prevented the fulfillment of a safety function, a common-mode failure, a degradation of the plant, or an operation prohibited by the technical specifications).

If the actuation involved a component failure that is reportable within the scope of the nuclear plant reliability data system (NPRDS), it should be reported to that system as noted in the Statements of Consideration for 10 CFR 50.73.

Anticipated Transients Without Scram (ATWS) System Reporting

ATWS is defined as an expected operational transient accompanied by a failure of the RPS to shut down the reactor. ATWS accidents are a cause for concern because they could lead to severe core damage and release of radioactivity to the environment. Section 50.62 of 10 CFR requires that ATWS mitigation systems function as a backup for RPS and that they initiate specific ESF system operation, as needed, while minimizing inadvertent scrams or challenges to other safety systems. Therefore, ATWS actuations should be reported under these criteria. The guidance given above for RPS and ESF definitions, reportability, and exceptions, also applies to the reporting of ATWS system automatic, manual, or inadvertent actuations or failures to actuate.

Examples

(1) RPS Actuation

- The licensee was placing the residual heat removal (RHR) system in its shutdown cooling mode while the plant was in hot shutdown. The BWR vessel level decreased for unknown reasons, causing a RPS scram and Group III primary containment isolation signals, as designed. All control rods had been previously inserted and all Group III isolation valves had been manually isolated. The licensee isolated RHR to stop the decrease in reactor vessel level.

This event is reportable within 4 hours under this criterion because the RPS scram and primary containment isolation signals were valid and the actuations were not part of a planned procedure. The automatic signals were valid because they were generated from the sensor by measurement of an actual physical system parameter that was at its set point. However, this event also is reportable within 1 hour under §50.72(b)(1)(ii) because the primary coolant system was seriously degraded when the water level decreased as a result of unknown reasons. An LER is required under both §50.73(a)(2)(ii) and §50.73(a)(2)(iv).

- With the BWR defueled, an invalid signal actuated the RPS. There was no component operation because the control rod drive system had been removed from service. This event is not reportable because the system had been properly removed from service and the RPS signal was invalid.

Disagree.
IF the signal was invalid

then the breakers should not have been required to open.

Also, if RPS removed from service properly, the breakers would never receive a trip signal.

With the control rods fully inserted into the core and the RPS properly removed from service, an invalid signal actuated the RPS, but the closed reactor trip breakers failed to open. Even though this event is not reportable under this criterion, it is reportable under other criteria, for example, §50.72(b)(2)(iii), §50.73(a)(2)(ii) or (a)(2)(v), because fulfillment of a safety function could have been prevented, the plant was seriously degraded, or shutdown of the reactor could have been prevented if the plant had been operating.

(2) BWR Control Rod Block Monitor Actuation

*Mr. Fred Heddon (AEOD)
of March 1986.*

A rod block that was part of the planned startup procedure occurred from the rod block monitor, which is classified as a portion of the RPS or as an ESF.

This event is not reportable because it occurred as a part of a preplanned startup procedure that specified certain rod blocks may occur. However, if it was caused by a significant reactivity anomaly or inadvertent criticality, an ENS notification and LER are required.

(3) Emergency Diesel Generator (EDG) Starts

- The EDG automatically started when a technician inadvertently caused a short circuit that de-energized an essential bus during a calibration. An ENS notification and LER are required because the ESF actuation (EDG auto-start) was not identified at the step in the calibration procedure being used.
- After an automatic EDG start and for unknown reasons, the emergency bus feeder breaker from the EDG did not close when power was lost on the bus. An ENS notification and LER are required because the ESF actuation logic for the EDG start was completed, even though the ESF function was not completed.
- EDG starts from certain anticipatory signals (e.g., loss of offsite startup power sensed on the startup feeder breaker) are not reportable if no credit was taken for the anticipatory EDG start feature in safety analysis, and the EDG did not load onto the vital bus as a result of a subsequent undervoltage condition on the bus (a valid ESF signal).

(4) Reactor Trip and Auxiliary Feedwater (AFW) Actuation

A PWR tripped from 92-percent power, and the AFW system actuated because a steam generator low-low level occurred when a main steam isolation valve (MSIV) closed. All systems operated as designed and the unit stabilized in mode 3 (hot standby). The licensee later determined that a blown fuse caused the MSIV to close. An update ENS notification was made 6 hours after the reactor trip.

An ENS notification is required within 4 hours of the reactor trip or ESF actuation, whichever occurred first. In this case, the licensee made an ENS notification within 1 hour of the reactor trip, which meets the intent and explicit requirements of reporting such events as soon as practical. Both ESF (AFW and MSIV) and RPS actuations occurred and are reportable within the single notification. Regardless of whether any expected ESF actuations are listed in emergency operating procedures, they are to be reported during the ENS notification. Update reporting of the cause of a reactor trip is always encouraged. An LER is required.

(5) Preplanned Manual Scram

During a normal reactor shutdown, the reactor shutdown procedure required that reactor power be reduced to a low power at which point the control rods were to be inserted by a manual reactor scram. The rods were manually scrambled.

This event is not reportable because the manual scram results from and is, by procedure, part of a preplanned sequence of reactor operation. However, if conditions develop during the process of shutting down that require an unplanned reactor scram, the RPS actuation (whether manually or automatically produced) is reportable via ENS notification and LER.

see comment on page 83

(6) Actuation of Wrong Component During Testing

During surveillance testing of the MSIVs, an operator incorrectly closed MSIV "D" when the procedure specified closing MSIV "C."

This event is reportable because the ESF actuation that occurred (closing of MSIV "D") was not specified in the step of the procedure being used.

(7) Control Room Ventilation System (CRVS) Isolation

While the CRVS was in service with no testing or maintenance in progress, a voltage transient caused spiking of a radiation monitor resulting in isolation of the CRVS, as designed.

This event is reportable under this criterion because neither exception (1) nor (2) above apply. An ENS notification and LER are required.

(8) Reactor Water Cleanup (RWCU) Isolations

- The RWCU isolation valves closed in response to high water temperature, as designed. Even though the RWCU system was designed with high water temperature as a non-protective (non-ESF) process parameter to prevent damage to the resin beds from high temperature, this event is reportable as an ESF actuation.
- An RWCU primary containment isolation (ESF actuation) occurred on pressurization between the RWCU suction

The requirements for continued reportability of these types of ESF actuations are being reconsidered separately under rulemaking.

containment isolation valves during the restoration of the RWCU system after a maintenance outage. An ENS notification and LER are required because a valid ESF signal initiated the RWCU isolation and the actuation was not part of a planned procedure.

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 LCU 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.

This single failure of the single train BWR system is reportable under §50.72(b)(2)(iii)(B and D) and §50.73(a)(2)(v)(B and D) because the system was unable to perform its safety function to remove residual heat or mitigate the consequences of an accident. It is reportable despite other systems being available that could have performed the safety function. The timeliness of reporting was appropriate.

(3) Single Failure Prevents Radioactive Release Control in Non-Safety-Related System

During a liquid radwaste release, a discharge monitor alarmed, sending a signal to close the discharge valve. The valve closed and reopened without the operators being aware of it. The operators manually shut the valve to secure the release 5 minutes later. The tank was resampled and was found to still be within limits. The licensee made an ENS notification 24 hours later. No physical problems were found with the monitor or valve. The alarm was attributed to high background radiation level in the monitor area. A caution was added to an abnormal operating procedure warning that the valve will reopen after being reset, if the monitor alarm condition cleared. The licensee submitted an LER within 30 days.

Page 90 Also requires the system to be described in or relied on in the plant analysis.
An ENS notification is required because the failure of the valve to remain closed demonstrated a condition for an uncontrolled release of radioactive materials. This is reportable even though the system is not safety related because it performs the safety function of controlling radioactive materials releases. However, the ENS notification should have been made within 4 hours of discovery. The LER is required.

(4) Potential Common-Mode Failure

Unit 1 was at full power when it was determined that a rupture of the house heating steam system piping located in the switchgear and the mechanical equipment rooms could create a harsh environment for safety-related equipment in those areas. The licensee removed the house heating system from service the day this problem was found. Eleven days

This is not consistent with previous guidance provided by NUREG-1022 Supplement 1, answer 7.13.

It states: "If the system is not covered by Technical Specifications and is not required to meet the single failure criterion, then the system does not perform a "safety function" in the context of the LER rule and failures of the system are not reportable."

input error inhibit switch was immediately returned to the normal position and a caution was added to appropriate plant instructions.

This event is reportable under §50.72(b)(2)(iii)(A) and §50.73(a)(2)(v) because the actions could have prevented fulfillment of the safety function to shutdown the reactor.

This is
a subset
OF 50.73(a)(2)(v).
So both should be

3.3.4 Common-Mode Failures of Independent Trains or Channels marked

40 CFR 50.72	§50.73(a)(2)(vii)
[No corresponding Part 50.72 requirement.]	Licenseses shall report: "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:
OV	(A) Shut down the reactor and maintain it in a safe shutdown condition;
OV	(B) Remove residual heat;
	(C) Control the release of radioactive material; or
	(D) Mitigate the consequences of an accident."

on an
LER
abstract
if
50.73(a)
(2)(vii)
applies.

Although no ENS notification is specifically required for this type of event, it is probable that such an event could place the plant in an unanalyzed condition, outside the design basis, or in a condition not covered by the plant's operating or emergency procedures, in which case §50.72(b)(1)(ii), (b)(2)(i), or (b)(2)(iii) would apply. Licensees are required to report a common-mode failure as an LER within 30 days.

(b)(2)(iii) is almost identical to 50.73(a)(2)(vii) Discussion

The intent of this part of the rule is to collect information on common-mode or common-cause failures that caused multiple independent safety system trains or channels to become inoperable. (Operability is defined in Section 3.3.3.) Included in the common-mode failures are malfunctions caused by such factors as high ambient temperatures, heatup from energization inadequate preventive maintenance, oil contamination of air systems, incorrect lubrication, or use of nonqualified components.

Failures reported under this part of the rule should be actual failures, not potential ones. [Potential common-mode failures may be reportable under 50.73(a)(2)(v) if they could prevent the

- release of radioactively contaminated tools or equipment to public areas
- non-routine releases of radioactive effluents
- inadvertent public notification system operation or inoperability
- events previously reported under other §50.72 criteria

Licensees generally do not have to report media and government interactions unless they are related to, or perceived by the public to be related to, the radiological health and safety of the public, onsite personnel, or protection of the environment. For example, the NRC does not generally need to be informed under this criterion of:

- administrative matters
 - NRC reactor operator licensee testing *requires NRC notification if other gov't. agencies are notified*
 - licensee management changes
 - systematic assessment of licensee performance (SALP) ratings
 - civil penalties
 - normal plant startups, shutdowns, or maintenance
 - transportation of non-contaminated injured personnel
 - responses to media inquiries *especially if these agencies require notification by law.*
- minor deviations from sewage or chlorine effluent limits
- routine reports of effluent releases to other agencies
- minor non-radioactive, onsite chemical spills
- minor incidents involving endangered species
- problems with plant stack or water tower aviation lighting
- peaceful strikes or civil demonstrations

This criterion emphasizes notifying the NRC in a timely manner of such events or situations. Generally, the 4-hour ENS notification clock starts at the time of the event, regardless of when other government agencies are notified or when the press release is issued. Usually, such notifications are required by plant procedures.

When a press release or government notification is not required by plant procedures, the ENS notification clock starts at the time of the decision to plan the press release or make the government notification. The criterion's wording that a press release or government notification "is planned" or "will be made" implies early notification to the NRC rather than after the fact.

Press Release

The NRC has an obligation to inform the public about issues within the NRC's purview that affect or raise a concern about the public health and safety and to correct significant misconceptions. Thus, the NRC needs accurate, detailed

information in a timely manner regarding such situations. The NRC should be aware of information that is available for the press or other government agencies. Licensees are encouraged to fax a copy of the press release to the NRC Operations Center and to inform the NRC resident inspector and the NRC region public affairs officer.

However, the NRC need not be notified of every press release a licensee issues. The field of NRC interest is narrowed by the phrase "related to the health and safety of the public or onsite personnel, or protection of the environment," in order to exclude administrative matters or those events without real or perceived safety significance.

If a particular effluent release has safety significance or is expected to generate public, media, or other attention as a result of being unusual or abnormal, then it is reportable under this criterion.

Planned or low-level radiation releases are not specifically reportable under this criterion. However, if a release receives media attention, the release can no longer be considered routine and the situation is reportable under this criterion.

If possible, licensees should make an ENS notification before issuing a press release because news media representatives will usually contact the NRC public affairs officer shortly after its issuance for verification, explanation, or interpretation of the facts. It is advantageous to the licensee, NRC, and news media, to provide the NRC staff with the time to consider the subject of the press release before any inquiry is received so the NRC can better address the public's concern.

Other Government Notifications

For reporting purposes, "other government agencies" refers to local, State or other Federal agencies. Because other government agencies often rely on the NRC for an independent explanation of the safety implications of events at nuclear power plants, the NRC needs to be cognizant of reportable events in a timely manner.

Notifying another Federal agency does not relieve the licensee of the requirement to report to the NRC. Most Federal agencies notified by the licensee do not contact the NRC Operations Center. The Department of Transportation's National Response Center informs the NRC Operations Center of the licensee's notification by procedure.

Routine reports to a local, State, or Federal agency that do not convey a perceived threat to the plant, environment, or public safety need not be reported to the NRC under this criterion.

An ENS notification is required within 4 hours under this criterion because of the notification of the State agency of the inadvertent radiological contamination of plant personnel. This and many other events reportable under this criterion also are reportable under more limiting reporting criteria. In this case, an ENS notification is required within 1 hour under §50.72(b)(1)(vi) and an LER is required under both §50.73(a)(2)(x) and §50.73(a)(2)(v).

(8) State Notification of Improper Dumping of Radioactive Waste

The licensee transported two secondary side filters to the city dump as nonradioactive waste but later determined they were radioactive. The dump site was closed and the filters retrieved. The licensee notified the appropriate State agency and the NRC resident inspector.

An ENS notification is required because of the notification to the State agency of the improper transport of radioactive material off site, which affects the radiological health and safety of the public and environment.

(9) Non-Routine State Environmental Notification

The licensee notified its State environmental protection agency and the NRC resident inspector of a fish kill involving 51 species in the circulating water discharge canal, possibly resulting from thermal water conditions.

An ENS notification is required because of the notification of a State agency of a significant fish kill, which the media or public could perceive as related to an offsite radiological hazard to the health and safety of the environment and public.

(10) Routine Reports Regarding Endangered Species

The licensee notified the National Fish & Wildlife agency and a State agency that an endangered species of sea turtle was found in their circulating water structure trash bar. No press release was issued.

An ENS notification is not required under this criterion. Routine environmental reports to State and Federal agencies are below the threshold of reporting under this criterion.

(11) Non-Routine Environmental Protection Agency Notification

A licensee found a tear in their evaporative pond that was releasing hydrazene to the environment. The licensee was not authorized by the U.S. Environmental Protection Agency

(EPA) to release any hydrazene. The licensee notified the EPA, several State agencies, and the county.

An ENS notification is required because notifications were made to five government agencies regarding significant toxic releases related to the health and safety of the public.

(12) Routine Federal Agency Notifications

A licensee notified the EPA that the circulation water temperature rise exceeded the release permit allowable. This event was caused by the unexpected loss of a circulating water pump while operating at 92-percent power. The licensee reduced power to 73 percent so that the circulating water temperature would decrease to within the allowable limits until the pump could be repaired.

A licensee notified the Federal Aviation Agency that it removed part of its auxiliary boiler stack aviation lighting from service to replace a faulty relay.

A licensee notified the State, EPA, U.S. Coast Guard and Department of Transportation that 5 gallons of diesel fuel oil had spilled onto gravel-covered ground inside the protected area. The spill was cleaned up by removing the gravel and dirt.

Although an ENS notification is not required on such typical routine notifications to other Federal agencies because these events do not pertain to the radiological health and safety of the public or the protection of the environment, licensees are encouraged to inform their NRC resident inspectors.

The FAA requires notification by law to protect the ^{public} health and safety. Verbatim compliance with 10CFR50.72 requires NRC notification upon FAA notification. A change to 10CFR50.72 would allow the above position of no NRC report required.