

UNITED STATES
NUCLEAR REGULATORY COMMISSION
OFFICE OF NUCLEAR REACTOR REGULATION
WASHINGTON, D. C. 20555-0001

April 23, 1999

NRC INFORMATION NOTICE 97-15, SUPPLEMENT 1: REPORTING OF ERRORS AND CHANGES IN LARGE-BREAK/ SMALL-BREAK LOSS-OF-COOLANT EVALUATION MODELS OF FUEL VENDORS AND COMPLIANCE WITH 10 CFR 50.46(a)(3)

Addressees:

All holders of operating licenses for nuclear power reactors, except those who have permanently ceased operations and have certified that fuel has been permanently removed from the reactor.

Purpose:

The U.S. Nuclear Regulatory Commission (NRC) is issuing this information notice supplement to inform addressees of recent experience related to the requirements of 10 CFR 50.46 regarding reporting of changes or errors in emergency core cooling system (ECCS) evaluation models. The material in this supplement focuses on small-break loss-of-coolant accident (LOCA) analyses and on reporting by individual licensees. The material discussed in the original information notice issued in April 1997, focused principally on large-break LOCA analysis and on calculational activities by fuel vendors at their facilities. It is expected that recipients will review the information for applicability to their facilities and consider actions as appropriate to avoid similar problems. No specific action or written response is required by this notice.

Description of Circumstances:

Deficiencies have been identified in the review and treatment of LOCA analyses in that reports required by 10 CFR 50.46(a)(3) were not submitted when required. When the situation was noted, a licensee commented that his utility and perhaps other utilities had difficulty in understanding and applying the reporting requirements of 10 CFR 50.46(a)(3).

The Duquesne Light Company (DLC) submitted its annual 10 CFR 50.46 report for Beaver Valley Power Station, Units 1 and 2 on September 26, 1996. When, as part of its followup to Information Notice 97-15, the NRC staff reviewed the submittal, it appeared that large-break loss-of-coolant accident (LBLOCA) analyses had been appropriately treated but that the results of the small break loss-of-coolant accident (SBLOCA) analyses had not been reviewed and treated in accordance with the regulations. At least 190 °F of adjustments to peak cladding temperature (PCT) had been made since the last SBLOCA analyses. However, the DLC

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annual report lacked sufficient detail for the staff to determine if the errors, changes, and other factors leading to this amount of adjustment had been reported under 10 CFR 50.46(a)(3)(i) and whether the licensee had taken appropriate action as defined in 10 CFR 50.46 (a)(3)(ii). The staff, therefore, initiated followup activities with the licensee that eventually led to a request for additional information and several conference calls.

For changes in PCT with absolute values totaling more than 50 °F, 10 CFR 50.46(a)(3)(ii) requires that, within 30 days, the licensee report the existence of the deviations to the NRC and propose a schedule and method to deal with the situation. Further, the licensee must either reanalyze with an approved model for the present configuration to show compliance with 10 CFR 50.46 requirements or take other appropriate action.

DLC submitted another 10 CFR 50.46 report on March 21, 1997. In this report, the sum of the absolute values of additional changes and errors in PCT made in the SBLOCA analyses since the previous report exceeded 50 °F. However, the changes and errors had not been reported within 30 days, nor was a schedule proposed for addressing the significance of the deviation as required by 10 CFR 50.46(a)(3)(ii). The staff sent a request for additional information dated May 19, 1997, to the licensee to follow up on this. In a letter of October 10, 1997, DLC stated its intention to reanalyze both the large-break and small-break LOCA calculations and proposed a schedule date of June 1999 for completion. The NRC staff found the proposed schedule and resolution acceptable.

In its letter, DLC also suggested that the NRC disseminate more broadly detailed information on reporting of information to satisfy 10 CFR 50.46(a)(3) requirements. This supplement to the information notice is in part a response to that suggestion.

The staff's experience with DLC led it to examine in detail the annual submittals of other licensees. At least three others had made adjustments to their LOCA analyses of record. These adjustments resulted in PCT changes of more than 50 °F which exceeded the significance criterion of 10 CFR 50.46(a)(3). Although these licensees submitted the requisite reports, they failed to propose a schedule either to reanalyze with an approved model or to justify other appropriate actions.

Discussion:

The ECCS acceptance criteria rule requires in 10 CFR 50.46(a)(3)(i) that licensees

...estimate the effect of any change to or error in an acceptable evaluation model or in the application of an acceptable evaluation model to determine if the change or error is significant. For this purpose, a significant change or error is one which results in a calculated PCT different by more than 50 degrees F from the temperature calculated for the limiting transient using the last acceptable model, or is a cumulation of changes and errors such that the sum of the absolute magnitudes of the respective temperature changes is greater than 50 degrees F.

The next section of the rule, 10 CFR 50.46(a)(3)(ii), requires that

...for each change to or error discovered in an acceptable evaluation model or in the application of such a model that affects the temperature calculation, the licensee shall report the nature of change or error and its estimated effect on the limiting ECCS

J. Mc Knight
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analysis to the Commission at least annually as specified in 10 CFR 50.4. If the change or error is significant, the licensee shall provide this report within 30 days and include with the report a proposed schedule for providing a reanalysis or taking other action as may be needed to show compliance with 10 CFR 50.46 requirements.

The preceding two quotations define what must be done when errors or changes to an approved evaluation model are found. The scope of the evaluation modeling required is discussed in 10 CFR 50.46(a)(1)(i) which states

ECCS cooling performance must be calculated for a number of postulated LOCAs of different sizes, location, and other properties sufficient to provide assurance that the most severe postulated loss of coolant accidents are calculated.

Several assessments covering the entire spectrum of break sizes are generally necessary to determine whether the 10 CFR 50.46(b)(1) PCT criterion of 2200 °F is violated for the most limiting conditions. To meet this requirement, licensees often employ separate approved evaluation methodologies for large-break and for small-break LOCAs. These separate methodologies are all part of the "acceptable evaluation model." Changes and errors must logically be tracked separately for each evaluation methodology and the effect and "significance" of them assessed independently for each methodology.

When changes and errors arise in the evaluation model for either the LBLOCA or SBLOCA, the licensee reports their existence, nature, and estimated effect at least annually. If the absolute sum of these changes and errors in PCT for either LBLOCA or SBLOCA is greater than 50 °F; i.e., is "significant", then the licensee must report within 30 days and, in that report, propose a schedule for reanalysis or for such other action to comply with 10 CFR 50.46 requirements as is appropriate.

This information notice supplement requires no specific action or written response. If you have any questions about the information in this notice, please contact one of the technical contacts listed below or the appropriate Office of Nuclear Reactor Regulation (NRR) project manager.

Original signed by
S.F. Newberry FOR

David B. Matthews, Director
Division of Regulatory Improvement Programs
Office of Nuclear Reactor Regulation

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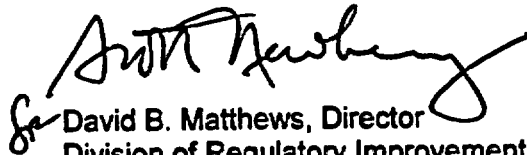
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Naturally a report would be required independently if the other PCT cumulative deviation exceeds 50 °F.

- At a minimum, the regulation requires that the cumulative changes and errors to both the large-break and small-break PCTs independently be reported annually.

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Naturally a report would be required independently if the other PCT cumulative deviation exceeds 50 °F.

- At a minimum, the regulation requires that the cumulative changes and errors to both the large-break and small-break PCTs independently be reported annually. The staff notes that many licensees, as a matter of course, report the cumulative changes to both PCTs in any 30-day report, even if only one or the other has changed enough to require a report. This is not required by the regulations but seems to be a convenient way to ensure that the annual report requirement, which applies to both PCTs, is not overlooked.

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Naturally a report would be required independently if the other PCT cumulative deviation exceeds 50 °F or 12 months.

- At a minimum, the regulation requires that the cumulative changes and errors to both the large-break and small-break PCTs independently be reported annually. The staff notes that many licensees, as a matter of course, report the cumulative changes to both PCTs in any 30-day report, even if only one or the other has changed enough to require a report. This is not required by the regulations but seems to be a convenient way to ensure that the annual report requirement, which applies to both PCTs, is not overlooked.

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99-10	Degradation of Prestressing Tendon Systems in Prestressed Concrete Containments	4/13/99	All holders of OIs for nuclear power reactors
99-09	Problems Encountered When Manually Editing Treatment Data on The Nucletron Microselectron-HDR (New) Model 105.999	3/24/99	All medical licensees authorized to conduct high-dose-rate (HDR) remote after loading brachytherapy treatments
99-08	Urine Specimen Adulteration	3/26/99	All holders of operating licensees For nuclear power reactors and licensees authorized to possess or use formula quantities of strategic special nuclear material (SSNM)
99-07	Fire Protection Preaction Sprinkler System Deluge Valve Failures and Potentials Testing Deficiencies	3/22/99	All NRC licensees
99-06	1998 Enforcement Sanctions as a Result of Deliberate Violation on NRC Employee Protection Requirements	3/19/99	All U.S. Nuclear Regulatory Commission licensees
99-05	Inadvertent Discharge of Carbon Dioxide Fire Protection System and Gas Migration	3/8/99	All holders of licenses for nuclear power, research, and test reactor, and fuel cycle facilities

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