

**From:** Maria Lopez-Otin  
**To:** WND1.WNP1(CGM, DLS1, JNS, JRG, LAH1, LDL, LVC, TLC...  
**Date:** 10/2/96 2:14pm  
**Subject:** SRM on SECY-96-189 (50.54(f) LETTERS) -Reply

Ken,

Those were the agreed to words. SRM is ok.

Maria

TO: C. Miller  
D. Smith, OCM/ED  
J. Sorensen, OCM/KR  
J. Gray, OCM/EM  
L. Hill, OCM/SS  
L. Jewis  
L. Vance, OCM/KR  
T. Chan, OCM/GD

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(11.2)

UNITED STATES  
NUCLEAR REGULATORY COMMISSION  
WASHINGTON, D.C. 20555-0001

October 9, 1996

[Name of Utility CEO]  
[Title]  
[Utility Name]  
[Utility Address]

SUBJECT: REQUEST FOR INFORMATION PURSUANT TO 10 CFR 50.54(f) REGARDING  
ADEQUACY AND AVAILABILITY OF DESIGN BASES INFORMATION

Dear Mr. [Name]:

The purpose of this letter is to require information that will provide the U.S. Nuclear Regulatory Commission (NRC) added confidence and assurance that your plant(s) are operated and maintained within the design bases and any deviations are reconciled in a timely manner.

Background

In the mid- to late 1980s, NRC safety system functional inspections (SSFIs) and safety systems outage modifications inspections (SSOMIs) identified concerns that design bases information was not being properly maintained and plant modifications were being made without the licensee having an understanding of the plant design bases. The NRC's findings heightened the nuclear industry's awareness of the need to improve the adequacy and availability of design documentation, and many licensees voluntarily initiated extra efforts to improve the design bases information for their plants.

To assist the industry in performing design bases improvement programs, the Nuclear Management and Resources Council (NUMARC)<sup>1</sup> developed a guidance document, NUMARC 90-12, "Design Basis Program Guidelines." These guidelines were intended to provide a standard framework for licensee programs to improve plant design bases information.<sup>2</sup> The NRC staff reviewed the guidelines and provided comments to NUMARC in November 1990. In emphasizing the importance of validating the facility against current design information, the staff stated that the goal of any program should be to establish confidence that the existing facility is in accordance with the current design documents and that

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<sup>1</sup>NUMARC was consolidated into the Nuclear Energy Institute (NEI) on March 23, 1994.

<sup>2</sup>As discussed in NUMARC 90-12, these programs or efforts would emphasize collation of design basis information and the supporting design information, not the identification or re-creation of the licensing basis for a plant or the regeneration of missing analyses and calculations.

9/37

any deviations will be reconciled. The staff concluded that the NUMARC guidelines would provide worthwhile insights to utilities undertaking design reconstitution programs and that the guidelines appeared to provide sufficient flexibility for licensees to structure their programs to respond most efficiently to any unique needs and circumstances of a particular licensee. The staff requested NUMARC to consider making design reconstitution a formal NUMARC initiative and commented that design documents that support technical specification values and that are necessary to support operations or to respond to events should be regenerated if missing. NUMARC subsequently concluded that a formal initiative was not necessary because most of its members were already conducting or evaluating the need to conduct design reconstitution programs, and agreed to forward the guidelines, with the NRC's comments, to its members for use on a voluntary basis.

To provide more information to the industry on this topic and to provide an independent view of the design control issue, the staff conducted a survey of six utilities and one nuclear steam supply system vendor to determine the status of design control problems and the strengths and weaknesses of the sample utility programs. The results were published in February 1991 in NUREG-1397, "An Assessment of Design Control Practices and Design Reconstitution Programs in the Nuclear Industry." The survey observations were as follows:

- The need for a design documentation reconstitution program was directly proportional to the age of the plant.
- The general intent of the program should be to provide a central location for design bases information, with emphasis on the design intent (the "why" of the design).
- The design bases documents should be a top-level directory that defines the current plant configuration.
- Reestablishment of design bases without reconstitution of the supporting design documents, as necessary, may not provide a sufficient level of information for future modifications or current plant operation, or to quickly respond to operating events.
- Minor changes to the design should be tracked to support the conclusion that the changes in the aggregate do not affect the validity of existing calculations and the ability of a system to perform its design functions.

Some common weaknesses of licensee programs identified during the survey included the following:

- Design reconstitution programs had not identified in advance the documents that are necessary to demonstrate that a structure, a system, or a component will function properly.

- The process for regenerating missing design documentation was not always proceduralized so that it could be handled in a systematic manner.
- Validation of the content of specific output documentation was not always thoroughly carried out.

In late 1991, the NRC staff evaluated whether rulemaking, guidance, or a policy statement was needed to address the issue of licensees retaining accurate design bases information. It concluded that the existing regulatory requirements for design control were adequate; however, it determined that the publication of a policy statement addressing design bases information and publication of a generic letter requesting licensees to describe their design reconstitution programs would be beneficial. Additionally, the staff stated its intention to continue to evaluate design control adequacy during its performance-based inspections such as SSFIs and SSOMIs. The staff also expected that the enforcement policy guidance to provide greater opportunities for enforcement discretion<sup>3</sup> would encourage voluntary identification of past design, engineering, and installation issues by licensees. With the Commission's approval, the staff proceeded with this approach.

In August 1992, the NRC issued a Commission policy statement "Availability and Adequacy of Design Bases Information at Nuclear Power Plants" (57 FR 35455) (Attachment 1). This policy statement stressed the importance of maintaining current and accessible design documentation to ensure that (1) plant physical and functional characteristics are maintained and consistent with design bases, (2) systems, structures, and components can perform their intended functions, and (3) the plant is operated in a manner consistent with the design bases. In the policy statement, the Commission recommended that all power reactor licensees assess the accessibility and adequacy of their design bases information and that they be able to show that there is sufficient documentation to conclude that the current facility configuration is consistent with the design bases. The policy statement outlined the additional actions the NRC would take to keep apprised of the industry's design reconstitution activities previously discussed.

Following review by the Committee To Review Generic Requirements (CRGR) and the Commission, a draft generic letter was issued for public comment on March 24, 1993. The proposed generic letter requested licensees, on a voluntary basis, to submit information and schedules for any design bases programs completed, planned, or being conducted, or a rationale for not implementing such a program. All but one of the commenters concluded that the generic letter was unnecessary and unwarranted. NUMARC responded that it believed the NRC's request for descriptions, schedules, and dates would have a negative impact on ongoing design efforts and that NRC's focus on schedules would undermine the licensees' ability to manage the activities.

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<sup>3</sup>NRC would refrain from imposing civil penalties for violations up to Severity Level II if the violations were identified and corrected as a result of systematic voluntary initiatives.

In SECY-93-292, "Generic Letter on the Availability and Adequacy of Design Bases Information," dated October 21, 1993, the staff recommended that the generic letter not be issued. The staff stated that publication of the policy statement and the proposed generic letter conveyed to the industry the Commission's concern and that publication of the generic letter would not further licensees' awareness of the importance of the activities. The staff proposed to continue performing design-related inspections and to gather information and insights as to how well the licensees' design-related programs were being implemented. The Commission issued a staff requirements memorandum that agreed with the staff's proposal.

In response to the findings relating to the regulatory burden of team inspections identified in the 1991 Regulatory Impact Survey, during the past several years the staff has reduced its effort on specific, resource-intensive, design-related team inspections, and followed the issue of accurate and accessible design documentation at plants principally as an element of inspection and followup of operations-related activities. The issuance of the NUMARC guidelines and ongoing industry efforts to improve and maintain design bases information also contributed to this decision.

#### Current Problem

Over the past several months, NRC's findings during inspections and reviews have identified broad programmatic weaknesses that have resulted in design and configuration deficiencies at some plants, which could impact the operability of required equipment, raise unreviewed safety questions, or indicate discrepancies between the plant's updated final safety analysis report (UFSAR) and the as-built or as-modified plant or plant operating procedures. These inspections and reviews have also highlighted numerous instances in which timely and complete implementation of corrective action for known degraded and nonconforming conditions and for past violations of NRC requirements has not been evident. Overall, the NRC staff has found that some licensees have failed to (1) appropriately maintain or adhere to plant design bases.<sup>4</sup>

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<sup>4</sup>As described in 10 CFR 50.2, design bases is defined as, "Design bases mean that information which identifies the specific functions to be performed by a structure, system, or component of a facility, and the specific values or ranges of values chosen for controlling parameters as reference bounds for design..." The design bases of a facility, as so defined, is a subset of the licensing basis and is contained in the FSAR. Information developed to implement the design bases is contained in other documents, some of which are docketed and some of which are retained by the licensee.



(2) appropriately maintain or adhere to the plant licensing basis,<sup>5</sup>  
(3) comply with the terms and conditions of licenses and NRC regulations, and  
(4) assure that UFSARs<sup>6</sup> properly reflect the facilities. Attachment 2 provides examples of some of the deficiencies recently identified by the staff. As a consequence of this new information, the NRC believes that the industry's voluntary efforts to improve and maintain design bases information for their plants, consistent with NUMARC 90-12, the staff's comments on the industry guidelines, and the Commission policy statement, have not been effective in all cases.

The magnitude and scope of the problems that the NRC staff has identified raise concerns about the presence of similar design, configuration, and operability problems and the effectiveness of quality assurance programs at other plants. Of particular concern is whether licensee programs to maintain configuration control at plants licensed to operate are sufficient to demonstrate that plant physical and functional characteristics are consistent with and are being maintained in accordance with their design bases. The extent of the licensees' failures to maintain control and to identify and correct the failures in a timely manner is of concern because of the potential impact on public health and safety should safety systems not respond to challenges from off-normal and accident conditions.

It is emphasized that the NRC's position has been, and continues to be, that it is the responsibility of individual licensees to know their licensing basis, to have appropriate documentation that defines their design bases, and to have procedures for performing the necessary assessments of plant or procedure changes required by NRC regulations. Attachments 3 and 4 are a recent exchange of correspondence between J. Colvin, NEI, and Chairman S. Jackson, NRC, regarding these subjects.

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<sup>5</sup>The licensing basis for a plant originally consists of that set of information upon which the Commission, in issuing an initial operating license, based its comprehensive determination that the design, construction, and proposed operation of the facility satisfied the Commission's requirements and provided reasonable assurance of adequate protection to public health and safety and common defense and security. The licensing basis evolves and is modified throughout a plant's licensing term as a result of the Commission's continuing regulatory activities, as well as the activities of the licensee.

<sup>6</sup>The FSAR is required to be included in, and is one portion of, an application for an operating license (OL) for a production or utilization facility. 10 CFR 50.34(b) describes the information which must be included in an FSAR. The FSAR is the principal document upon which the Commission bases a decision to issue an OL and is, as such, part of the licensing basis of a facility. It is also a basic document used by NRC inspectors to determine whether the facility has been constructed and is operating within the license conditions.

Action

The NRC has concluded that it requires information that can be used to verify compliance with the terms and conditions of your license(s) and NRC regulations, and that the plant UFSAR(s) properly describe the facilities, as well as to determine if other inspection activities<sup>7</sup> or enforcement action<sup>8</sup> should be taken. Therefore, you are required, pursuant to Section 182(a) of the Atomic Energy Act of 1954, as amended, and 10 CFR 50.54(f), to submit a response to this letter within 120 days of its receipt. Your response must be written and signed under oath or affirmation.

Please submit the original copy of your response to the NRC Document Control Desk, and send a copy to the Director, Office of Nuclear Reactor Regulation and to the appropriate regional administrator. The following information is required for each licensed unit:

- (a) Description of engineering design and configuration control processes, including those that implement 10 CFR 50.59, 10 CFR 50.71(e), and Appendix B to 10 CFR Part 50;
- (b) Rationale for concluding that design bases requirements are translated into operating, maintenance, and testing procedures;
- (c) Rationale for concluding that system, structure, and component configuration and performance are consistent with the design bases;
- (d) Processes for identification of problems and implementation of corrective actions, including actions to determine the extent of problems, action to prevent recurrence, and reporting to NRC; and
- (e) The overall effectiveness of your current processes and programs in concluding that the configuration of your plant(s) is consistent with the design bases.

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<sup>7</sup>A number of design bases inspections are being planned, and your response will be used in the planning process.

<sup>8</sup>Section VII.8.3 of the NRC Enforcement Policy addresses how old design issues involving past problems in engineering, design, or installation are to be handled from an enforcement standpoint. In a related matter, the Commission recently approved changes that would modify this policy to encourage licensees to undertake voluntary initiatives to identify and correct FSAR noncompliances by (1) the exercise of discretion to refrain from issuing civil penalties for a two-year period where a licensee undertakes a voluntary initiative in this area and (2) the exercise of discretion to escalate the amount of civil penalties for violations associated with departures from the FSAR identified by the NRC subsequent to the two-year voluntary initiative period.

In responding to items (a) through (e), indicate whether you have undertaken any design review or reconstitution programs, and if not, a rationale for not implementing such a program. If design review or reconstitution programs have been completed or are being conducted, provide a description of the review programs, including identification of the systems, structures, and components (SSCs), and plant-level design attributes (e.g., seismic, high-energy line break, moderate-energy line break). The description should include how the program ensures the correctness and accessibility of the design bases information for your plant and that the design bases remain current. If the program is being conducted but has not been completed, provide an implementation schedule for SSCs and plant-level design attribute reviews, the expected completion date, and method of SSC prioritization used for the review.

This request is covered by the Office of Management and Budget (OMB) clearance number 3150-0011, which expires July 31, 1997. The reporting burden for this collection of information is estimated to average 400 hours per response, including the time for reviewing instructions, searching existing data sources, gathering and maintaining the data needed, and completing and reviewing the collection of information. Send comments regarding this burden estimate or any other aspect of this collection of information, including suggestions for reducing this burden, to the Information and Records Management Branch (T-6 F33), U.S. Nuclear Regulatory Commission, Washington, D.C. 20555-0001, and to the Desk Officer, Office of Information and Regulatory Affairs, NEOB-10202 (3150-0011), Office of Management and Budget, Washington, D.C. 20503. The NRC may not conduct or sponsor, and a person is not required to respond to, a collection of information unless it displays a currently valid OMB control number.

In accordance with 10 CFR 2.790 of the NRC's "Rules of Practice," a copy of this letter and your response will be placed in the NRC Public Document Room (PDR), the Gelman Building, 2120 L Street, N.W., Washington, DC, and in the local public document room(s) for your facility or facilities.



Mr. [Name]

- 8 -

If you have any questions about this matter, please contact the staff members listed below, or the appropriate Office of Nuclear Reactor Regulation (NRR) project manager.

Sincerely,

/s/

James M. Taylor  
Executive Director  
for Operations

Attachments:

1. Policy Statement on Availability and Adequacy of  
Design Bases Information at Nuclear Power Plants
2. Background Information on Recently Identified Problems
3. Letter from J. Colvin (NEI) to Chairman S. Jackson (NRC)  
dated 8/2/96
4. Letter from Chairman S. Jackson (NRC) to J. Colvin (NEI)  
dated 8/14/96

Contacts: Kristine M. Thomas  
(301) 415-1362  
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Docket No(s). 50-xxx and 50-xxx

cc: See next page [applicable plant service list]

## BACKGROUND INFORMATION ON RECENTLY IDENTIFIED PROBLEMS

Over the past several months, design and engineering information has been obtained that indicates that design bases at certain plants have not been appropriately maintained or adhered to. Specific examples follow:

### Millstone Units 1, 2, and 3

An NRC inspection team recently found examples in which design bases information and the Updated Final Safety Analysis Report (UFSAR) did not agree with the as-built plant, operational procedures, and maintenance practices. The team found inconsistencies that required analyses, procedure changes, and design changes to resolve. For example, the Millstone Unit 3 operating procedures required isolation for the turbine-driven auxiliary feedwater pump during certain plant conditions, in conflict with technical specification requirements for operability. The team found that certain protective relays at Millstone Unit 3 were not set in accordance with the design bases information. This required re-analyses and resetting of certain relays. Based on the team's findings, the licensee initiated design changes to correct nonconforming conditions between the UFSAR and the as-built plant, including changes to the design of the Millstone Unit 2 reactor protection system to meet the design bases with respect to physical separation of redundant channels and changes to the design of the Millstone Unit 2 (post-loss-of-coolant accident (LOCA)) hydrogen monitors to meet the design bases for single failure vulnerabilities.

### Haddam Neck

An NRC inspection team found examples in which the design bases information and the UFSAR did not agree with the as-built plant, operational procedures, and maintenance practices. The team identified a number of deficiencies in engineering calculations and analyses that were relied upon to ensure the adequacy of the design of key safety systems. Deficiencies were identified in the calculations and analyses supporting the station batteries, emergency diesel generators, containment cooling system, and other key safety systems. In some cases, the inspection findings were resolved by revising the calculations and analyses. In other cases, procedure and design changes were required to resolve the issues. For example, the team identified that the design bases calculations supporting the size of the station batteries were inconsistent with the design bases stated in the FSAR. Field measurements and design modifications were required to resolve this issue.

Other issues were identified by the NRC and the licensee following the issuance of this special team inspection report that led the licensee to enter a refueling outage earlier than originally scheduled. Discrepancies included inadequate configuration management of the containment sump design and as-built conditions; a lack of detailed analysis and technical justification for the reliance on post-accident back pressure inside the containment to assure adequate net positive suction head for the residual heat removal pumps; inadequate inspection and verification of the sump as-built and material

conditions; and the lack of aggressive action in response to generic communications of industry events, which contributed to an inadequate operability determination regarding the sump screen design and mesh size. These issues impacted the operability of the emergency core cooling systems (ECCSs) under certain postulated design basis events.

#### Maine Yankee

On January 10, 1996, the NRC issued a Confirmatory Order Suspending Authority for and Limiting Power Operation and Containment Pressure and a Demand for Information to the Maine Yankee Atomic Power Company. The order was based, in part, on the NRC's determination that Maine Yankee did not apply a computer code that was proposed to demonstrate compliance with the ECCS requirements of 10 CFR 50.46 in a manner that conforms to the requirements of 10 CFR Part 50, Appendix K, nor to the conditions specified in the staff's safety evaluation dated January 30, 1989. Specifically, the licensee did not demonstrate that the RELAP5YA code will reliably calculate the peak cladding temperature for all break sizes in the small-break LOCA spectrum for Maine Yankee, nor has the licensee submitted the justification for the code options selected and other justifications and sensitivity studies to satisfy conditions in the staff's safety evaluation.

In addition, the licensee assumed an initial containment pressure of 2.0 psig for calculating peak design-basis accident pressure, even though the plant's technical specifications allow a maximum operating pressure in containment of 3.0 psig. Assuming an initial containment pressure of 3.0 psig results in a calculated peak accident pressure in excess of the containment design pressure described in the UFSAR.

#### Refueling Practices Survey

In a survey of licensee refueling practices conducted during the spring of 1996, the NRC identified deficiencies in the management of design bases assumptions. Many plants were found to have aspects of their design bases that were only loosely proceduralized or not proceduralized at all. Typical of this kind of discrepancy was the identification of a lack of procedures for controlling the assumptions regarding hold-up time before beginning fuel transfer. The NRC found a number of instances in which other design bases assumptions were not captured in procedures. In addition, it was necessary for licensees at 12 sites (23 units) to upgrade procedures to directly implement the design bases assumptions. In other cases, the licensee performed engineering analyses, documented pursuant to 10 CFR 50.59, as necessary, to ensure that the planned activities would not exceed design bases assumptions.