August 27, 1996

MEMORANDUM TO: James M. Taylor
Executive Director for Operations

FROM: Edward L. Jordan, Chairman Original Signed by: E. L. Jordan
Committee to Review Generic Requirements

SUBJECT: MINUTES OF CRGR MEETING NUMBER 290

The Committee to Review Generic Requirements (CRGR) met on Thursday, August 22, 1996 from 9:00 to 11:30 a.m. A list of attendees is provided in Attachment 1.

T. Martin (NRR) and F. Akstulewicz (NRR) presented for CRGR review and endorsement the proposed generic 50.54(f) letter entitled "Request for Additional Information Pursuant to 10 CFR 50.54(f) Regarding Adequacy and Availability of Design Bases Information", to address NRC concerns that design bases information is not being properly maintained and plant modifications are being made without the licensee having an understanding of the plant design bases. The Committee endorsed issuance of the proposed letter subject to several changes discussed at the meeting. This matter is discussed in Attachment 2.

In accordance with the EDO's July 18, 1983 directive concerning "Feedback and Closure of CRGR Review," a written response is required from the cognizant office to report agreement or disagreement with the CRGR recommendations in these minutes. The response is to be forwarded to the CRGR Chairman and if there is disagreement with the CRGR recommendations, to the EDO for decision making.

Questions concerning these meeting minutes should be referred to James H. Conran (415-6839).

Attachments: As stated

cc: Next page
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DATE	08/26/96		08/ /96		08/26/96					

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C. Paperiello, NMSS
H. Miller, RI
S. Ebneter, RII
A.B. Beach, RIII
L. Callan, RIV
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REmrit
SMagruder
MMalloy
JShapekar
STreby

R002

Attachment 1 to the Minutes of CRGR Meeting No. 290

Attendance List

August 22, 1996

CRGR Members

E. Jordan
F. Miraglia
M. Knapp
J. Murphy
J. Moore (for D. Dambly)
C.W. Hehl (by telephone)

NRC Staff

T. Martin
B. Grimes
D. Matthews
F. Akstulewicz
M. Malloy
S. Magruder

CRGR Staff

J. Conran

Attachment 2 to the Minutes of CRGR Meeting No. 290

Proposed Generic 50.54(f) Information Request Letter

"Request for Additional Information Pursuant to 10 CFR 50.54(f) Regarding Adequacy and Availability of Design Bases Information"

(CRGR Meeting No. 290 - August 22, 1996)

TOPIC

The proposed letter addresses NRC concerns that design bases information is not being properly maintained and plant modifications are being made without the licensee having an understanding of the plant design bases. The general concern regarding availability of complete design bases information and the need for licensees to properly maintain complete information documenting their design bases was addressed in a Commission Policy Statement dated August 10, 1992. This topic was also considered previously by CRGR at Meeting No. 229. (The proposed generic letter considered at that time (same title) was approved to be issued for comment, but was not issued in final after evaluation of comments received.)

BACKGROUND

The draft package provided initially for CRGR consideration in this expedited review process was transmitted to the members by email; the package was comprised of the following:

1. Draft 50.54(f) Letter to Licensees, subject title (undated);

2. Draft Commission Paper, subject title (undated).

[Copies of these documents are enclosed (Attachment 2A)]

CONCLUSIONS AND RECOMMENDATIONS

The CRGR focused its review on the proposed 50.54(f) to be sent to licensees, and did not discuss the proposed Commission paper in detail in this expedited review process. A major emphasis in the Committee's review was to ensure that the letter did not involve backfitting at this point, either explicitly or inadvertently, but instead should be clearly restricted to requesting information regarding licensees' programs for documenting and maintaining properly the design bases for their facilities.

The Committee inquired whether the NUMARC 90-12 guidance which was provided earlier to assist licensees in developing the needed design bases information was considered acceptable guidance in the current context. The staff felt that the guidance would still be useful, but noted that it does not specify reconstitution of any missing information. The Committee recommended that the wording of the letter rely heavily on and follow as closely as possible the

wording of the Policy Statement, that the Policy Statement be included with the letter when issued, and that the letter state clearly the staff's current concern that reliance on the industry's voluntary efforts on improving design bases information, consistent with the NUMARC 90-12 guidance, the staff's comments on that industry guidance, and the Commission's Policy Statement, may not have been sufficient to maintain configuration control at some number of plants.

There was discussion regarding whether it was appropriate for the letter to state "...the following information is required..." (rather than "requested") in the lead-in to Action Items (1) and (2). (The usual wording of 50.54 information requests for several years has been to "request" the specific information sought and "require" licensee response.) This question was referred by the Committee to OGC for final determination.

All of the specific changes recommended by the Committee are reflected in Attachment 2B. The staff agreed that conforming changes would be appropriately reflected in the proposed Commission paper as well.

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

[date]

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

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

Dear Mr. [Name]:

Background:

In the mid- to late 1980's, NRC safety system functional inspections (SSFIs) and safety system outage modification 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 findings heightened the industry's awareness of the need to improve the adequacy and availability of design documents, and many licensees voluntarily initiated extensive efforts to improve the design bases information for their plants.

To assist the industry in performing design basis improvement programs, the Nuclear Management and Resources Council (NUMARC)[1] 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.[2] 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 any deviations be reconciled. The staff concluded that the NUMARC guidelines would provide worthwhile insights to utilities undertaking design reconstitution programs

[1]NUMARC was consolidated into the Nuclear Energy Institute (NEI) on March 23, 1994.

[2]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 recreation of the licensing basis for a plant or the regeneration of missing analyses and calculations.

Attachment 2A

and 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 design documents necessary to support operations or 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. However, NUMARC forwarded 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: 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 define 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 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: design reconstitution programs had not identified in advance the documents that are necessary to demonstrate that a structure, system, or component will function properly; the process for regeneration of 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 inspection such as SSFIs and SSOMIs. The staff also expected that revisions to the enforcement policy guidance to provide greater opportunities for enforcement discretion[3] 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 the policy statement, "Availability and Adequacy of Design Bases Information at Nuclear Power Plants" (57 FR 35455). The 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 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 industry's design reconstitution activities (discussed above).

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 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.

In SECY-93-292, "Generic Letter on the Availability and Adequacy of Design Bases Information," the staff recommended 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 licensee design-related programs were being implemented. The Commission issued an SRM which agreed with the staff's proposal.

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[3]NRC would refrain from imposing civil penalties for violations up to Severity Level III if the violations were identified and corrected as a result of systematic voluntary initiatives.

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 guideline and ongoing industry efforts to improve and maintain design bases information also contributed to this decision.

Current Problem:

Over the past several months, NRC findings during inspections and reviews have identified broad programmatic weaknesses that have resulted in design and configuration deficiencies at a number of 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 where 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 has found failures of some licensees (1) to appropriately maintain or adhere to plant licensing and design bases information, (2) to comply with the terms and conditions of licenses and NRC regulations, and (3) to assure that UFSARs properly reflect the facilities. Attachment 1 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 have not in all cases been effective.

The magnitude and scope of the problems that the NRC has identified raise concerns about the presence of similar design, configuration, and operability problems and the effectiveness of quality assurance programs industry-wide. Of particular concern is whether licensee programs to maintain configuration control are sufficient to demonstrate that plant physical and functional characteristics are consistent with the design bases and whether operating plants are being maintained in accordance with their design basis. The extent of licensee 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. Attachments 2 and 3 are a recent exchange of correspondence between J. Colvin, NEI, and S. Jackson, NRC, regarding these subjects.

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), NRC regulations, and the plant UFSAR(s), and which may be used to decide whether to modify, suspend, or revoke the operating

license(s) for your facility or facilities, or whether other enforcement action 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 from receipt of this letter. Your response must be written and signed under oath or affirmation.

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

(1) a description of any design review or reconstitution programs, including identification of the systems and plant-level design attributes (e.g., seismic, high-energy line break, moderate-energy line break), which have already been completed, are planned, or are being conducted to ensure the correctness and accessibility of the design bases information for your plant and to ensure that it is maintained current. If the program is planned or being conducted but has not been completed, provide an implementation schedule for systems and plant-level design attribute reviews and expected completion date.

(2) if no design review or reconstitution program has been implemented, a rationale for not implementing such a program and a description of the extent of the design information you have obtained from the nuclear steam supply system (NSSS) vendor and architect-engineer (A/E) or which is accessible at the NSSS vendor or A/E offices.

The responses provided pursuant to paragraphs (1) and (2) above should address the following areas of particular interest, as previously expressed in the Commission policy statement and other NRC documents:

(a) examination of engineering design and configuration control processes, including 10 CFR 50.59, 10 CFR 50.71(e), and Appendix B to 10 CFR Part 50;

(b) selection and prioritization of systems for review;

(c) verification that design bases requirements are translated into operating, maintenance, and testing procedures;

(d) verification that system performance is within the design bases;

(e) handling of problem identification and implementation of corrective actions, including actions to determine the extent of problems, action to prevent recurrence, and reporting to NRC;

(f) determination of the overall effectiveness of the program in adequately maintaining the licensing and design bases; and

I wish to emphasize that the NRC 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.

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-6F33), 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.

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.

[Signature]

Attachments:
1. Background on Recently Identified Problems
2. Letter from J. Colvin (NEI) to S. Jackson (NRC) dated 8/2/96
3. Letter from S. Jackson (NRC) to J. Colvin (NEI) dated 8/14/96

Contacts: Frank M. Akstulewicz, NRR
(301) 415-1136
Internet: fma@nrc.gov

Eileen M. McKenna, NRR
(310) 415-2189
Internet: emm@nrc.gov

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 which indicates that design bases at certain plants have not been appropriately maintained or adhered to. Some specific examples include:

Millstone Units 1, 2, and 3

Since November 1995, licensee submissions and NRC inspections have indicated that design control deficiencies, and degraded and nonconforming conditions have been identified at Northeast Utilities' (NU's) Millstone Units 1, 2, and 3. These deficiencies include errors in licensing bases and design bases documentation, and translation of design bases to procedures and hardware, as well as inadequate plant modifications; modifications not installed in accordance with the approved design; modifications based on incorrect design assumptions; and identification of inoperable systems. The following are some examples.

NRC inspections at Millstone Unit 2 identified a potential design deficiency that could block or reduce safety injection flow during the recirculation phase of an accident, as well as inadequate containment sump screen mesh and a flawed post-accident containment hydrogen monitor design. On February 20, 1996, NU shut down Millstone Unit 2 when both trains of the high pressure safety injection (HPSI) system were declared inoperable due to the potential to clog the HPSI discharge throttle valves during the recirculation phase following a loss-of-coolant (LOCA) accident.

An NRC special inspection team at Millstone Unit 3 found instances where NU did not adequately translate design bases information into procedures, practices and drawings. In one instance, a modification that installed the Unit 3 service water intake structure sump pump called for specific periodic testing, but such testing was never performed. In another case, prelubrication of the auxiliary feedwater pump was not performed every 40 days as required by the vendor.

The NRC has also identified a number of instances where the original design bases was inadequate or the original installation was incorrect. For example, the licensee failed to remove plastic shipping plugs from Rosemount transmitters prior to installation, notwithstanding the vendor's instructions which required those plugs' replacement with stainless steel plugs.

Haddam Neck

On March 11-29 and April 15-26, 1996, a special inspection team from the NRC assessed the engineering and licensing activities at NU's Haddam Neck Station. The special inspection team focused on the licensee's processes used to identify, evaluate, and resolve technical issues. The team identified programmatic weaknesses and potential violations of NRC's regulatory requirements (10 CFR 50.59, 50.71(e), and Criteria III and XVI of Appendix B to 10 CFR Part 50) in design calculations and analyses, and design bases documentation.

The team identified a number of deficiencies in the engineering calculations and analyses which were relied upon to ensure the adequacy of the design of key safety systems at Haddam Neck. Deficiencies were identified in the calculations and analyses supporting the station batteries, emergency diesel generators, containment air recirculation (CAR) system, service water (SW) system, and the systems and components needed to support the emergency core cooling system transfer from the injection phase to sump recirculation. The types of deficiencies noted by the team included technical errors, nonconservative methods and assumptions, as well as the failure to consider all applicable design bases information. The team concluded that weaknesses in engineering programmatic requirements and a lack of technical rigor, thoroughness, and attention to detail in the design process, either contributed to or directly caused the identified errors. In addition, design control measures such as independent reviews, supervisory reviews, and reviews by oversight committees did not identify these deficiencies.

In addition, the team identified operability concerns that require further staff evaluation and which have led to the recent shutdown of Haddam Neck. These concerns include: (1) the potential for water hammer in the SW piping and in the tubes of the containment fan coolers, (2) the potential for two-phase flow in the SW system in the tubes of the containment fan coolers, (3) the licensee crediting post-LOCA accident pressure in containment for residual heat removal pump net positive suction head (NPSH), and (4) the potential that the feedwater regulating valves may not close during a main steamline break event.

Maine Yankee

On January 10, 1996, the NRC issued a Confirmatory Order Suspending Authority for and Limiting Power Operation and Containment Pressure; and 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, proposed to demonstrate compliance with the emergency core cooling system (ECCS) requirements of 10 CFR 50.46, in a manner conforming to the requirements of 10 CFR Part 50, Appendix K, nor in conformance to the conditions specified in the staff's Safety Evaluation (SE) 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 SE.

In addition, the licensee assumed an initial containment pressure of 2.0 psig for calculating peak design-basis accident pressure even though the plant 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 updated final safety analysis report (UFSAR).

Refueling Practices Survey

In response to recent problems encountered at Millstone Unit 1 regarding compliance with the UFSAR, during the spring of 1996, the NRC conducted a survey of licensee refueling practices. During the course of this survey, the NRC determined that nine sites (15 units) needed to modify their licensing basis or plant practices to ensure that their reload practices were in compliance with their licensing basis.

Deficiencies in the management of design bases assumptions were also noted in the survey. Many plants were found to have aspects of their design and licensing 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, licensees at 12 other sites (23 units) upgraded procedures to directly implement the design bases assumption. 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.

FOR: The Commissioners

FROM: James M. Taylor
Executive Director for Operations

SUBJECT: ISSUANCE OF 10 CFR 50.54(f) LETTERS ON THE AVAILABILITY AND ADEQUACY OF DESIGN BASES INFORMATION

PURPOSE:

To request Commission approval of the staff's proposal to send 10 CFR 50.54(f) letters to utility chief executive officers (CEOs), including only Seabrook Unit 1 of Northeast Utilities' plants. These letters will require information to gain added confidence and assurance that plants are operated and maintained within the design basis of the plant and any deviations are reconciled in a timely manner.

SUMMARY:

Recent inspection findings have indicated that design bases information has not been appropriately maintained and implemented at certain plants and that this may have a potential public health and safety impact. The staff is proposing to require information from licensees regarding the availability and adequacy of design bases information to identify how engineering design and configuration control processes are examined; design bases requirements are translated into operating, maintenance, and testing procedures; system performance is verified to be within the design bases; and problem identification and implementation of corrective actions are handled.

CONTACTS:

Frank M. Akstulewicz, NRR
(301) 415-1136

Eileen M. McKenna, NRR
(301) 415-2189

BACKGROUND:

In the mid- to late 1980's, U.S. Nuclear Regulatory Commission (NRC) safety system functional inspections (SSFIs) at power reactor licensees and safety system outage modification inspections (SSOMIs) raised concerns about design bases information not being properly maintained and plant modifications being made without the licensee having an understanding of the plant design bases. The NRC's findings heightened the industry's awareness of the need to improve the adequacy and availability of design documentation and many licensees voluntarily initiated extensive efforts to improve their design bases information.

To assist the industry in performing these activities, the Nuclear Management and Resources Council (NUMARC), now the Nuclear Energy Institute (NEI), developed the guidance document, NUMARC 90-12, "Design Basis Program Guidelines." The document outlined a standard framework for developing a design basis program that collates design basis information and supporting design information, but does not identify or recreate the licensing basis of the plant. In a letter dated November 9, 1990, the staff concluded that the guideline would provide worthwhile insights to those utilities undertaking design bases programs and appeared to provide sufficient flexibility for licensees to structure their programs to respond most efficiently to any unique needs and circumstances of a particular license. In emphasizing the importance of validation of the facility against current design information, the staff stated that the goal of any program should be to establish confidence that the existing facility conforms to the current design bases documents and that any identified deviations are reconciled. The staff also emphasized that design documents that support technical specification values and design documents necessary to support operations or respond to events should be regenerated if missing. The staff requested that NUMARC consider making the design bases effort a NUMARC initiative. In SECY-91-364, "Design Basis Reconstitution" dated November 12, 1991, the staff reported NUMARC's conclusion that an initiative was not necessary because most of their members were already conducting or evaluating the need to conduct such programs. Although NUMARC decided not to pursue a formal initiative, it forwarded the guidelines and NRC comments to their 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: 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 which define 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; and 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: design reconstitution programs had not identified in advance the documents that are necessary to demonstrate that a structure, system, or component will function properly; the process for regeneration of 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 Commission requested the staff to consider whether rulemaking, regulatory guidance, or a policy statement was needed to outline the NRC's expectations concerning accurate design bases documentation. In SECY-92-193, "Design Bases Reconstitution" dated May 26, 1992, the staff concluded that additional regulations were not needed because existing regulatory requirements for design control were sufficient. However, the staff proposed issuance of a policy statement and issuance, for public comment, of a generic letter requesting licensees to describe their programs. Additionally, SECY-92-193 documented the staff's intention to continue performing design-related inspections. Also, the staff expected that planned revisions to the enforcement policy guidance (to refrain from issuing civil penalties for violations up to Severity Level III if the issues were identified and corrected as a result of systematic voluntary initiatives) would encourage licensees to identify past design, engineering, and installation issues. The Commission responded in a Staff Requirements Memorandum (SRM) on SECY-92-193 which approved the staff's approach.

In August 1992, the Commission issued the policy statement, "Availability and Adequacy of Design Bases Information at Nuclear Power Plants" (57 FR 35455). The 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 stated that all power reactor licensees should assess the accessibility and adequacy of their design bases documentation and 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 further actions the staff would perform to keep apprised of industry's activities.

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 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.

In SECY-93-292, "Generic Letter on the Availability and Adequacy of Design Bases Information" dated October 21, 1993, the staff recommended 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 licensee design-related programs were being implemented. The Commission issued an SRM which 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 guideline and ongoing industry efforts to improve and maintain design bases information also contributed to this decision.

DISCUSSION:

Beginning in late 1995, NRC identified information during a number of inspections at different sites which indicated that design bases were not in some cases being appropriately maintained or adhered to by some licensees. Contrary to earlier indications and expectations, the staff now believes there are situations where licensees have not critically examined their design control and configuration measures. For example, inspection teams identified a number of engineering calculations and analyses for key safety systems that were incorrect and did not confirm that safety system functional requirements would be met (resulting in inoperable safety systems on some occasions). Numerous instances were identified where design basis information was not adequately translated into procedures, practices and drawings; the original design basis was inadequate and the original installation was incorrect; modifications were not installed in accordance with the design; and modifications were based on incorrect design assumptions. Additionally, cases were identified where quality assurance requirements and corrective action requirements had not been properly implemented to appropriately maintain design basis information. Details of the findings are outlined further in the attachment to the proposed letter.

By letter dated August 2, 1996, NEI informed the staff that an initiative had been approved by the Nuclear Strategic Issues Advisory Committee (consisting of chief nuclear officers) to provide additional assurance and confidence that existing programs are adequate to ensure: (1) plants are operated in conformance with their licensing basis, (2) the licensing basis is adequately maintained, (3) differences between the operating practices and licensing basis could not result in a significant public health and safety concern, and (4) degraded or nonconforming conditions are captured on tracking systems and resolved in a timely manner. The letter stated that each licensee would conduct an assessment of the program in place to reaffirm that plants are operated in conformance with their licensing basis. In a letter dated August 14, 1996, the NRC stated its concern that the proposed initiative may not be of sufficient scope and depth and that an in-depth vertical slice review of actual design basis documentation and comparison of "as-built" and "as operated" safety systems would be more appropriate. The NRC confirmed its position that it is the responsibility of individual licensees to know their licensing basis, to have appropriate documentation that defines their design basis and to have procedures for performing the necessary assessment of plant or procedure changes required by NRC regulations.

Design and configuration deficiencies currently being identified at some plants indicate failures (1) to comply with the terms and conditions of licenses and NRC regulations and (2) to assure that Updated Final Safety Analysis Reports properly reflect the facilities. These findings raise questions whether licensee programs to maintain configuration control are sufficient to demonstrate that plant physical and functional characteristics are consistent with the design bases and whether operating plants are being maintained in accordance with their design basis. The staff believes that reliance on the industry's voluntary efforts on improving design bases information may not be sufficient to maintain configuration control at some number of plants. These problems are of concern because of their potential impact on public health and safety.

Therefore, the staff proposes to send 10 CFR 50.54(f) letters (Attachment) to utility CEOs, including only Seabrook Unit 1 of Northeast Utilities' plants, which require licensees to (1) submit a description of any programs already completed, planned, or being conducted to ensure correctness and accessibility of the design bases information, or (2) submit a rationale for not implementing such a program and a description of the extent of design information already obtained from suppliers and vendors, and (3) submit a schedule for the completion date of any planned design reconstitution program. The program description must identify how engineering design and configuration control processes are examined; design bases requirements are translated into operating, maintenance, and testing procedures; system performance is verified to be within the design bases; and problem identification and implementation of corrective actions are handled. The staff will use the information to prioritize and to better focus design-related inspections such as SSFIs and SSOMIs to verify compliance with the terms and conditions of licenses, NRC regulations, and Updated Final Safety Analysis Reports. Such inspections sample the process and products of design bases information programs and, therefore, provide insights as to the effectiveness of licensee programs without reviewing the programs themselves.

COORDINATION:

In view of the need for timely information regarding this matter, comments or concurrence from the Advisory Committee for Reactor Safety (ACRS) were not sought. The CRGR was briefed on this action at an emergency meeting held on August 22, 1996. The Office of the General Counsel has reviewed this paper and the enclosed sample letter and has no legal objection.

RECOMMENDATION:

That the Commission approve issuance of the letters under the signature of either the Chairman, the EDO, or the Director, Nuclear Reactor Regulation.

James M. Taylor
Executive Director
for Operations

Attachment: Sample letter to CEO

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

[date]

[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]:

Background:

In the mid- to late 1980's, NRC safety system functional inspections (SSFIs) and safety system outage modification 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 findings heightened the industry's awareness of the need to improve the adequacy and availability of design documents, and many licensees voluntarily initiated extensive efforts to improve the design bases information for their plants

To assist the industry in performing design basis improvement programs, the Nuclear Management and Resources Council (NUMARC)[1] 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.[2] 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 any deviations be reconciled. The staff concluded that the NUMARC guidelines would provide worthwhile insights to utilities undertaking design reconstitution programs and 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

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[1]NUMARC was consolidated into the Nuclear Energy Institute (NEI) on March 23, 1994.

[2]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 recreation of the licensing basis for a plant or the regeneration of missing analyses and caiculatior ..

Attachment 2B

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 design documents necessary to support operations or 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: 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 define 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 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: design reconstitution programs had not identified in advance the documents that are necessary to demonstrate that a structure, system, or component will function properly; the process for regeneration of 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 inspection such as SSFIs and SSOMIs. The staff also expected that revisions to the enforcement policy guidance to provide greater opportunities for enforcement discretion[3] would encourage voluntary identification of past design, engineering, and installation issues by licensees. With the Commission's approval, the staff proceeded with this approach.

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[3]NRC would refrain from imposing civil penalties for violations up to Severity Level III if the violations were identified and corrected as a result of systematic voluntary initiatives.

In August 1992, the NRC issued the policy statement, "Availability and Adequacy of Design Bases Information at Nuclear Power Plants" (57 FR 35455) (Attachment 1). The 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 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 industry's design reconstitution activities (discussed above).

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 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.

In SECY-93-292, "Generic Letter on the Availability and Adequacy of Design Bases Information," the staff recommended 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 licensee 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 findings during inspections and reviews have identified broad programmatic weaknesses that have resulted in design and configuration deficiencies at a number of 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 where 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 has found failures of some licensees (1) to appropriately maintain or adhere to plant licensing and design bases information, (2) to comply with the terms and conditions of licenses and NRC regulations, and (3) to assure that UFSARs 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 has identified raise concerns about the presence of similar design, configuration, and operability problems and the effectiveness of quality assurance programs industry-wide. Of particular concern is whether licensee programs to maintain configuration control are sufficient to demonstrate that plant physical and functional characteristics are consistent with the design bases and whether operating plants are being maintained in accordance with their design basis. The extent of licensee 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 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 S. Jackson, NRC, regarding these subjects.

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), NRC regulations, and the plant UFSAR(s), and which may be used to decide whether to modify, suspend, or revoke the operating license(s) for your facility or facilities, or whether other inspection activities or enforcement action 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 from receipt of this letter. Your response must be written and signed under oath or affirmation.

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

(1) a description of any design review or reconstitution programs, including identification of the systems, structures, and components, and plant-level design attributes (e.g., seismic, high-energy line break, moderate-energy line break), which have already been completed, are planned, or are being conducted to ensure the correctness and accessibility of the design bases information for your plant and to ensure that it is maintained current. If the program is planned or being conducted but has not been completed, provide an implementation schedule for systems, structures, and components, and plant-level design attribute reviews and expected completion date.

(2) a rationale for not implementing such a program, if no design review or reconstitution program has been implemented or planned.

The responses provided pursuant to paragraphs (1) and (2) above should address how current or planned plant processes or programs address the following areas of particular interest, as expressed in NUMARC 90-12, the staff's comments on the industry guidelines, and the Commission policy statement:

(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) selection and prioritization of systems, structures, and components for review (item (1) only);

(c) rationale for concluding that design bases requirements are translated into operating, maintenance, and testing procedures;

(d) rationale for concluding that system, structure, and component configuration and performance are consistent with the design bases;

(e) processes for problem identification and implementation of corrective actions, including actions to determine the extent of problems, action to prevent recurrence, and reporting to NRC; and

(f) the overall effectiveness of your current processes and programs in concluding that the configuration of your plant(s) is consistent with the design bases.

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-6F33), 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.

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.

[Signature]

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

Contacts: Frank M. Akstulewicz, NRR
(301) 415-1136
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Internet: emm@nrc.gov

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 which indicates that design bases at certain plants have not been appropriately maintained or adhered to. Some specific examples include:

Millstone Units 1, 2, and 3

The recent NRC inspection team found examples where the FSAR and design bases information did not agree with the as-built plant, operational procedures, and maintenance practices which were resolved by correcting the documentation. The team found other more significant 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 FSAR 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

The team found examples where the FSAR and design bases information did not agree with the as-built plant, operational procedures, and maintenance practices which were resolved by correcting the documentation. 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. The team found examples of inconsistencies between the as-built plant, vendor-supplied information, and the assumptions used in engineering calculations and analyses. 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. Additional examples are documented in the special team inspection report for Haddam Neck, 50-213/96-201. Other issues were identified by the NRC and the licensee following the issuance of this inspection report that lead the licensee to enter a refueling outage earlier than originally scheduled. These issues include discrepancies between the as-built plant and the design bases for the service water system pressure, containment sump screens, feedwater isolation valves, and containment penetrations.

Maine Yankee

On January 10, 1996, the NRC issued a Confirmatory Order Suspending Authority for and Limiting Power Operation and Containment Pressure; and 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, proposed to demonstrate compliance with the emergency core cooling system (ECCS) requirements of 10 CFR 50.46, in a manner conforming to the requirements of 10 CFR Part 50, Appendix K, nor in conformance 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 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 updated final safety analysis report (UFSAR).

Refueling Practices Survey

In response to recent problems encountered at Millstone Unit 1 regarding compliance with the UFSAR, during the spring of 1996, the NRC conducted a survey of licensee refueling practices. During the course of this survey, the NRC determined that nine sites (15 units) needed to modify their licensing basis or plant practices to ensure that their reload practices were in compliance with their licensing basis.

Deficiencies in the management of design bases assumptions were also noted in the survey. Many plants were found to have aspects of their design and licensing 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, licensees at 12 other sites (23 units) upgraded 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.