Mr. David Modeen
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January 28, 1998

Project Number: 689

Dear Mr. Modeen:

Your letter of July 22, 1997, transmitted clarifications of a number of issues raised by utility staff as they implement severe accident management. Although NRC comments were not requested, we consider a response appropriate, given the issues involved and their impact on utility implementation.

Overall, the clarification offered in the letter is generally consistent with NRC staff views and should aid in the utility implementation process. There are several areas where we either do not agree with the clarification provided, or feel that additional clarification is warranted. Our comments and views in these areas are provided in the enclosure to this letter.

In your letter you indicated an intent to incorporate the clarifying guidance into a future revision of NEI 91-04, "Severe Accident Issue Closure Guidelines." Because of the numerous changes suggested by our comments, we recommend that the guidance be reconciled with the comments prior to revising the NEI report. If you consider it worthwhile, we can arrange a meeting with the appropriate NRC staff to discuss these issues further.

If you have any questions, please contact Robert Palla at (301) 415-1095.

Sincerely.

Original signed by:

Gary M. Holahan, Director
Division of Systems Safety and Analysis
Office of Nuclear Reactor Regulation

Enclosure: As stated

cc: See next page

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Enclosure

NRC Staff Views on Clarifications Contained in
NEI's July 22, 1997 Letter on Severe Accident Management

Application of 10 CFR 50.59 to SAM Implementation

PWR Application of 10 CFR 50.59

NEI states that no screening review or Unreviewed Safety Question (USQ) analysis is necessary for PWR plants to implement Severe Accident Management Guidelines (SAMG) since PWR SAMG covers a regime outside the plant's Technical Specifications and FSAR and therefore cannot involve a USQ. Although we do not expect that PWR SAMG implementation would generally involve a USQ or require a §50.59 evaluation, there may be SAMG-related hardware or procedure changes involving or affecting hardware or procedures within the scope of §50.59. Such changes will require the §50.59 evaluation. Examples of such changes are provided in the NEI discussion on Applicability of "Safety Related" and Appendix B to SAM Implementation, and illustrate the need to evaluate hardware and procedure changes for their impact. Also, severe accident guidelines that involve cross-ties to a second, non-affected unit would warrant an evaluation for impacts on the second unit. Given the potential for SAMG-related changes to affect hardward or procedures within the scope of §50.59, we believe that a screening review must be performed as part of SAMG implementation for PWRs.

BWR Application of 10 CFR 50.59

The staff agrees with the NEI discussion on BWR application of 10 CFR 50.59, but believes that additional guidance is needed to address those situations where the Severe Accident Guidelines may be entered during design basis events. Staff views are provided below.

The BWROG Emergency Procedure and Severe Accident Guidelines (EP/SAG) contain an Emergency Procedure Guideline (EPG) section and a separate Severe Accident Guideline (SAG) section. The former is essentially EPG Rev. 4, with changes to address: (1) resolution of DBA-related issues, some of which were reviewed by NRC (e.g., changes due to thermal hydraulic stability concerns) and others which were not, (2) actions within the EPG scope identified during development of severe accident guidance, and (3) relocation of certain actions to the SAG section. The latter includes some material that was previously in EPG Rev. 4, and supplementary guidance for severe accidents. The transition between the two sets of guidelines is generally the onset of a severe accident, but as noted in the BWROG Accident Management Guidelines Overview Document, it is believed that the licensing basis DBA LOCA can produce conditions that require entry into the SAG, even though the event will not result in core damage.

Changes to the current Emergency Operating Procedures (EOPs) due to implementation of the EP/SAG should be made in accordance with §50.59, to the extent that §50.59 is applicable. In general, §50.59 is considered applicable to changes related to implementation of the EPG section of the EP/SAG, as well as those portions of the SAG that could be entered in response to licensing basis accidents (e.g., large break LOCAs in certain BWR plants) or previously analyzed FSAR accidents. Previously analyzed FSAR accidents include analyses related to degraded core hydrogen control measures, hardened wetwell vents, and containment flooding capabilities in the design, where such provisions are described in the FSAR. We expect that in performing the §50.59 evaluation, licensees will be able to utilize or build upon previous SERs and §50.59 evaluations where the basic actions or functions addressed in the

original evaluation are not fundamentally different in the EP/SAG. Section 50.59 is considered not applicable to the SAG section of the EP/SAG (with the above exceptions) or to the Technical Support Guidelines. However, a screening review of all EP/SAG-related changes to plant hardware and procedures should be performed to ensure that they do not affect the licensing basis as reflected in the FSAR, thereby requiring a §50.59 USQ determination.

Decisionmaking and Application of 10 CFR 50.54(x) & (y)

The staff agrees with the general characterization of decision-making by ERO personnel and considers the guidance in Reference 3 (NRC letter re: Big Rock Point) to still be relevant. We also agree that a declaration of §50.54(x) and (y) can be performed at the licnesee's option upon "entry" into SAMG, but take exception to the view that the determination as to whether the operator is in §50.54(x) and (y) space depends on whether the plant has implemented SAMG through the use of §50.59, as discussed below in greater detail.

10 CFR 50.54(x) & (y)

We agree that "entry" into SAMG (that is, a determination to discontinue following plant operating procedures and/or emergency operating procedures, and to begin following SAMG), by itself, does not constitute a departure from a license condition or Technical Specification and, therefore, does not require operators to invoke 50.54(x) and (y) in order to properly transition to the SAMG. Thus, we agree with NEI's characterization that declaration of §50.54(x) and (y) upon entry into SAMG is at the plant's option. However, we caution that actions taken almost immediately upon entry into SAMG could depart from the licensing basis and Technical Specifications, and therefore require licensees almost immediately to invoke §50.54(x) and (y). For example, the first step in the Severe Accident Control Room Guidelines (SACRG-1) for Westinghouse plants calls for operators to place the control switches for certain equipment in pull-to-lock position, thereby violating the licensing basis, and requiring this action to be taken pursuant to §50.54(x) and (y). Licensees should continue to carefully consider the implications of all actions taken under SAMG, and to obtain appropriate technical review and approvals.

We disagree with the position that the determination as to whether the operator is in §50.54(x) and (y) space depends on whether the plant has implemented the SAMG through the use of §50.59. Specifically, we do not believe that the existence of a prior safety analysis conducted for purposes of determining whether an unreviewed safety question exists is sufficient to determine whether §50.54 (x) and (y) must be invoked.

Finally, regardless of the licensee's philosophy regarding applicability of §50.54(x) and (y) to SAMG entry, NRC should be informed of any transition into the SAMG pursuant to §50.72(b)(1)(ii)(C). This regulation requires licensees to report any event or condition that results in the plant being in a "condition not covered by the plant's operating and emergency procedures". We consider the transition into the SAMG or SAG, and the plant conditions under which this transition would occur, consistent with the criteria for notification. This notification should be made regardless of whether the SAMG or SAG has received a review under §50.59.

Transfer of Decision-Making Responsibility

The transfer of decision-making responsibility that occurs following entry into SAMG represents a fundamental change in the relationship between the TSC and the control room that warrants additional consideration by licensees. Prior to implementation of the SAMG, the TSC provides support to the control room staff in: (1) control of repair team personnel, (2) setting priorities for repair of equipment, and (3) proposing alternate methods for mitigating the event (i.e., methods not described in the EOPs). The

TSC may also have responsibility for other emergency response activities, such as classifying events, recommending public protective actions, and notifying offsite authorities. During this time period, licensed operators remain responsible for controlling the plant in accordance with the plant procedures. After entry into SAMG (in accordance with Westinghouse Owners Group guidance, for example), the guidance on plant response will shift from the EOPs to the SAMG, and responsibility for accident response will transfer from the control room (senior licensed operator) to the TSC (Emergency Director). This is a fundamental change from current practice in that the TSC would be responsible for directing rather than advising the control room operators. This transfer of responsibility and authority may be appropriate under the conditions associated with entry into SAMG, i.e., the EOPs have been ineffective and the core has been severely damaged. However, it is important that such a transfer be clearly identified in the emergency plan, and that the process is thoroughly tested to ensure it is effective.

Operator Training and Evaluation on SAM

The staff disagrees with NEI's characterization that licensed operator training concerning broad knowledge of SAM duties and responsibilities is not testable in license examinations. NEI has indicated for PWRs that the licensed operator training programs and examinations should be limited to knowledge of the transition from the EOPs to the SAMG. Training for the period where SAMG is in effect should be limited to familiarization training consistent with a "systematic approach to training" rather than the "systems approach to training" as defined in 10 CFR 55.4 and should not be testable in licensed operator initial or requalification examinations. For BWRs, NEI cites the NRC position regarding licensed operator training and examination on severe accidents, set forth in the NRC's August 1, 1995, letter to the Boiling Water Reactor Owners Group as apparently supportive of the position summarized above. This citation mischaracterizes the NRC position and furthermore implies that the position is applicable only to BWRs.

For both PWRs and BWRs, the staff expects that the NRC initial operator licensing and requalification examinations will address, as appropriate, operator knowledge of SAMGs consistent with their responsibilities regarding the manipulation of facility controls for implementing the specific guidelines or procedures. SAMG procedures and guidance assign licensed operators duties and responsibilities in the implementation of the action steps. The training programs' evaluation component (operator testing) should focus on the knowledge and abilities required for the operators to safely execute SAMG actions, e.g., the ability to understand how their actions comply with the intent of the procedure or guideline and their effect on plant and system conditions. The depth of knowledge tested will be commensurate with the relative importance of severe accident knowledge as compared to other knowledge requirements for licensed operators. (The evaluation of the use of a "systematic approach to training" process is discussed later.) Should operator testing be identified as a deficient area, the NRC may reconsider the adequacy of the voluntary industry initiative, and the need for further guidance or regulatory action in this regard.

Inspections Versus Monitoring of Self-Assessments

It should be noted that the staff has not, at this time, changed its plans for inspection of accident management implementation. These plans are to: (1) participate in the industry-sponsored A/M demonstrations or site visits, (2) complete a temporary instruction (TI) using insights obtained through the demonstrations or site visits, (3) perform pilot inspections at about five plants using the TI, (4) develop an inspection procedure (IP) for use at remaining plants based on findings from the pilot inspections and feedback from industry, (5) evaluate implementation at remaining plants using the IP, and (6) in the longer term, evaluate A/M maintenance on a for-cause basis as a regional initiative. Although the demonstrations to date have been very informative, they have been limited to Westinghouse designs. We

believe it would be appropriate to visit additional sites (i.e., CE, B&W, and BWR sites) in order to gain an understanding of the implementation process for these NSSS designs prior to finalizing the TI. Such visits would preferably be organized as additional A/M demonstrations, but alternatively could be arranged as site visits separate from the demonstration process.

Application of a Systematic Approach to Training

NEI has stated that plants should utilize a "systematic approach to training" rather than a formal "systems approach to training" as defined in 10 CFR 55.4. NEI further states that a systematic approach to training involves the same elements - analysis, design, development, implementation and evaluation - as the systems approach. The contrast between a "systems approach" and a "systematic approach" consequently appears to be based on the former being defined by regulation and considered "formal" whereas the latter describes a process that is not defined by regulation and, by implication, less formal.

The staff has no objection to the term "systematic approach" solely to convey the fact that the approach is not required by regulation. However, the staff expects that the process activities of a "systematic approach" to training for severe accident management will involve the same elements and will be conducted with equivalent rigor and effectiveness that is associated with a "systems approach" to training, as defined in 10 CFR 55.4. Consequently, the staff intends that it will use the same criteria that it currently uses for reviewing implementation of a "systems approach" to training (i.e., NUREG-1220, Training Review Criteria and Procedures) when reviewing the implementation of the "systematic approach" to conducting severe accident management training.

NEI has stated that one or more of the elements of a systematic approach to training has been addressed on a generic basis by a combination of INPO and Owners Groups. NEI, while advising plants to review generic analysis and design activities for applicability to their plants, also states that plants should "develop supplemental material only for those elements which were not addressed by INPO and the cognizant Owners Group." Although licensees may substantially benefit from the use of these generic training-related materials, the NRC has not formally reviewed the adequacy of these products. It is the staff's position that licensees are responsible for ensuring that each element of a systematic training approach has been adequately addressed. Licensees that choose to use generic products should, in addition to evaluating the applicability of generic analyses and design activities to their plant, evaluate the adequacy and completeness of such products for meeting their site-specific needs. The generic materials should be modified or supplemented as needed.

In this document, NEI refers to a task list applicable to evaluators, decision-makers, and implementers. The staff is only familiar with a draft "accident management task training matrix." The training matrix does not address the tasks of implementers. The staff also believes that the task list and/or training matrix have not been widely disseminated to the industry. Consequently, licensees may be lacking material that would provide a basis for evaluating the generic analysis activities that NEI suggests can constitute largely, if not wholly, the analysis phase of a systematic approach to severe accident management training.

NEI states that "the simulator should not be modified to conduct this type of [severe accident management] training." The staff recognizes the limitations of current simulators for simulating plant response to severe accident phenomena. However, experience has shown that simulators are highly effective training and assessment tools. Consequently, the staff believes that simulators should be used, within their existing modelling and instructional capabilities, to support the training and evaluation of emergency response organization (ERO) personnel in severe accident management. The use of simulators for these purposes should be consistent with a systems approach to training and commensurate with the importance to safety of the severe accident knowledge and skills to be trained or evaluated.

Within the above guidelines, licensees should consider using dynamic simulation for severe accident management training and evaluation to the extent that these activities can be supported by simulators which meet the specifications of ANSI/ANS 3.5. Thereafter, licensees should consider using simulators in either a static or unpowered mode to support the training and evaluation of the ERO's implementation of the severe accident management process, including (1) the ability of the control room crew to transition from the EOPs to the severe accident management guidelines, (2) ability to transfer or change decision making responsibility, (3) the ability of ERO personnel to reliably and accurately communicate plant state data and severe accident mitigation strategies between the TSC and the control room, and (4) the ability of the control room crew to implement the severe accident management guidelines.

NEI states that a panel of experts selected tasks for which training would be necessary and considered classroom lesson plans, computer-based training, and simulator use. It would appear the expert panel did not consider part-task simulation, table-top exercises, or other low fidelity simulation techniques which could prove useful for severe accident management training. In addition, NEI was not explicit concerning the conclusions reached by the expert panel regarding the appropriate application of the methods that were considered. Each of these methods can have relative strengths and weaknesses for imparting the knowledge and abilities necessary for severe accident management. NEI 91-04, states that severe accident management training will "include training techniques proven successful with similar materials." It is the staff's position that successful training in severe accident management will ensure that decision-makers, evaluators, and implementors have the ability to reliably implement the severe accident management guidelines in real time under the performance conditions expected to be present during a severe accident. Consistent with a systematic approach to training it is incumbent upon licensees to select methods for training implementation and trainee evaluation which will ensure task proficiency on severe accident management tasks.

Applicability of "Safety-Related" and Appendix B to SAM Implementation

The staff generally agrees that severe accident management guidance (PWR severe accident management guidelines and BWR severe accident guidelines) is considered to be outside a plant's design and licensing basis, and should not be considered safety-related or subject to Appendix B requirements, unless the guidance scope is not exclusively limited to severe accident mitigation. For example, portions of the current BWROG Emergency Procedure and Severe Accident Guidelines which could be entered into during design basis LOCAs in certain BWR designs should continue to be treated as safety-related.

It should be noted that the accidents considered in the definition of safety-related SSCs in 10 CFR 100, Appendix A, Section III(c) are not limited to "only design basis (FSAR Chapter 15) accidents" as indicated in the NEI letter, but also include events such as fire, floods, storms, or earthquakes. These events are not explicitly considered in the review of anticipated operational occurrences and postulated accidents in Chapter 15 of the FSAR, but could result in potential offsite exposures comparable to the applicable guideline exposures set forth in §50.34(a)(1) or §100.11. In a similar vein, NEI should refrain from introducing definitions of terms (e.g., "safety function") which are not related to providing guidance to the industry on SAM implementation.

Finally, it should be stressed that severe accident management implementation does not obviate regulatory requirements applicable to safety-related SSCs or activities. Therefore, the staff disagrees with NEI's position that "Changes affecting the design or operation of safety related SSCs should not be treated as safety-related unless it is determined that the safety function of the SSC is impacted prior to the time the safety function is required." Accordingly, with the exception of plant procedures that only affect

SSC operation during the severe accident mitigation phase, i.e., beyond the design and licensing basis, any severe accident-related change (hardware, software, or procedural) affecting the design or operation of safety-related SSCs should be treated as "safety-related" and, thus, governed by Appendix B to 10 CFR Part 50 requirements.

Use of NUMARC 92-01 and IPE Insights

The staff believes that there is greater value to licensees using a systematic process for assessing their accident management response capabilities than alluded to in the NEI letter. The value of performing a systematic assessment, using a process such as provided in NUMARC 92-01, is not so much in identifying additional accident management strategies, as in identifying improvements in other areas important to accident response, such as: (1) plant-specific approaches or unique system alignments for implementing the generic strategies contained in the SAMG, (2) additional plant procedures, equipment pre-staging, or ERO training that could improve response capabilities, and (3) risk-significant component failures, recovery actions, and containment challenges that should be factored into A/M training and drill scenarios. Accordingly, we would encourage rather than discourage licensees to perform a systematic assessment of their capabilities to respond to accidents found to be important from their IPE and IPEEE studies.

SAM Implementation Closure

The staff does not believe that it can rely upon the voluntary industry initiative as a substitute for NRC regulatory action if it is optional for utilities to notify NRC when they have completed severe accident management implementation. In order for NRC to rely on an industry activity as a substitute for a regulatory action, it is necessary that: (1) the regulatory objectives and action be well understood and defined, (2) the alternative industry action be well understood and defined, and (3) the industry action be completed at each plant and documented. The regulatory objectives and approach related to accident management were established in SECY-89-012, and alternative industry actions to meet these objectives are set forth in Section 5 of NEI 91-04, Revision 1. Each licensee has committed to implement these actions as part of the voluntary industry initiative on severe accident management. The NRC has accepted the industry commitments in lieu of a regulatory action, but in order to reach regulatory closure on this issue requires confirmation from each licensee that the related commitments have been met. Accordingly, we consider it essential, rather than optional, for licensees to notify NRC when they have completed implementation.