

February 6, 2002

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SUBJECT: SUMMARY OF NOVEMBER 29, 2001, PUBLIC MEETING WITH
NUCLEAR ENERGY INSTITUTE (NEI), BOILING WATER
REACTOR OWNERS' GROUP (BWROG) AND OTHER
INTERESTED STAKEHOLDERS REGARDING POTENTIAL
CHANGES TO 10 CFR 50.46 (LOCA-LOOP REQUIREMENT)

The NRC staff hosted a public meeting on November 29, 2001, in order to discuss BWROG interest in the staff's recommended changes to 10 CFR 50.46, specifically changes to the current requirement to postulate a loss of offsite power (LOOP) when performing thermal-hydraulic calculations to demonstrate meeting the emergency core cooling system (ECCS) acceptance criteria stipulated in 10 CFR 50.46. This meeting was a follow-on to the public meeting held on October 17, 2001, and the public teleconference held on August 30, 2001. Industry, which included representatives from NEI, the BWROG, the Westinghouse Owners' Group (WOG) and the Electric Power Research Institute (EPRI), led the discussions for the meeting, which addressed the following agenda items:

1. Benefits of implementing proposed improvements
2. LOOP data and topics
3. Action items from meeting on October 17, 2001
4. Break size frequency and NUREG data update
5. Schedule and action items

A summary of the discussions on each of these areas is provided below. The viewgraphs for the industry presentations are available under ADAMS accession number ML013370171. Attachment 1 contains the list of attendees.

Benefits of Implementing Proposed Improvements

As in the previous meeting, industry indicated that the potential safety benefits associated with relaxing the loss of coolant accident (LOCA)-LOOP requirement include better industry and NRC focus on risk-significant structures, systems and components (SSCs), improved diesel generator (DG) reliability (due to slower DG start times, more risk-informed DG load sequencing, and less challenging DG load sequencing and testing), and improved ECCS equipment reliability and performance (e.g., slower valve stroke times). Potential areas of unnecessary burden reduction identified by industry include increased analytical margin leading to greater operational control with respect to peaking factors; power uprates; engineered safety feature (ESF) equipment assumptions (e.g., valve stroke times and pump flow rates); and technical specification allowed outage times, surveillances, and DG start times.

The NRC staff questioned how long the DG start time would have to be delayed in order to see significant reliability improvement. Industry responded that the rate of loading (in the first minute) is a big concern. Also, many wear-and-tear failures are due to lack of lubrication for parts of the DG that are splash lubricated (i.e., not pump lubricated), and bringing the DG to idle speed first allows for adequate splash lubrication.

Industry indicated that the majority of benefits to be obtained from relaxation of the LOCA-LOOP requirement would be in terms of impact on equipment, not on ECCS analysis margin. Rough numbers provided by industry indicated savings of approximately \$1M/yr/unit from decreased costs associated with testing, maintenance, design and operation of DGs and ECCS motor-operated valves (MOVs). Much of the cost savings would come from avoiding retests and failure analyses when the initial test failed to meet the 10-second start time. Industry indicated that relaxation of the LOCA-LOOP requirement would allow MOV stroke times to be extended, since they would not have to make up for the delay associated with starting the DGs.

NRC staff posed the question of what would be the impact on peak cladding temperature (PCT) if the DG start was delayed, but a large-break LOCA (LBLOCA) with conditional LOOP actually occurred (regardless of how unlikely). A BWROG representative indicated that no analysis had been performed regarding this question, but 3 minutes was provided as a guess as to how long the DG start delay could be before exceeding a PCT of 2200°F (for typical BWRs). The BWROG took as an action item to look into what would be the allowable DG start delay if the acceptance criterion was maintaining a coolable core geometry, as opposed to keeping PCT below 2200°F.

LOOP Data and Topics

An EPRI representative provided an update of the conditional LOOP data, which included data from 1994-2000. EPRI and the NRC staff are in good agreement as to the classification of conditional LOOP events. However, the issue of how to aggregate the surrogate LOCA-LOOP data (i.e., the data on conditional LOOPS following reactor trips and following ECCS actuations), which significantly impacts the conditional LOOP probability, remains as a difference between the EPRI methodology and that envisioned by the NRC staff and its contractor (Brookhaven National Laboratory [BNL]). The NRC staff indicated that they hope to meet internally to discuss this issue shortly, and engage in public discussion on this issue early next year (2002).

With respect to industry efforts to prevent degraded grid conditions, EPRI stated that all but three BWRs have already signed transmission provider agreements, and the remaining three are in progress. According to EPRI, these agreements typically call for nuclear power plants to be the last load dropped and the first load restored given a degraded grid condition. EPRI indicated that many systems have contingency analysis software, and that the agreements call for adequate power to nuclear power plants even under contingency conditions. EPRI noted that while there is significant variability in terms of system capability, and that many systems still have to do offline contingency calculations, in general, systems are upgrading as a result of Institute for Nuclear Power Operations (INPO) significant operating event report (SOER) 99-1.

EPRI indicated that in the last two years, they are aware of only two instances where a transmission provider has notified a nuclear power plant that it was unable to (briefly) meet contractual conditions (regarding voltage maintenance). The EPRI data was based on canvassing all BWRs and a few pressurized water reactors (PWRs). EPRI also acknowledged that not all plants had protocols (i.e., transmission agreements) in place for the entire two-year period.

Action Items from Meeting on October 17, 2001

At the October 17, 2001, LOCA-LOOP public meeting, industry agreed that there is a need to assess additional equipment impact issues associated with a delayed LOOP. A BWROG representative indicated that following the previous meeting a survey was taken of the BWRs to identify the potential consequences of a delayed LOOP. Approximately one half of the sites responded to the survey. All respondents stated that their plants are designed to handle double-sequencing of loads. The BWROG representative also indicated that the General Electric Company (GE) had submitted a report to the NRC in 1995 on potential water hammer effects. The conclusions of that report were that water hammer only presented a concern if the plant was in the suppression pool cooling mode of operation at the time of the water hammer (i.e., at the time of the delayed LOOP). Even in this very low probability case, the industry representative indicated that there would not necessarily be significant consequences. With respect to the issue of quick restarting of ECCS pumps, industry indicated that the motors are designed to start twice in quick succession. NRC staff questioned whether this conclusion accounted for the impact of degraded grid voltage during the initial pump start (i.e., increased current draw and equipment heat-up). Industry responded that this specific question was not included in the survey, and industry took an action item to get this information from the motor manufacturers. The staff also questioned the impact on the batteries from successive start attempts. Industry responded that this had not been addressed yet. An NRC contractor also identified a number of other electrical performance issues associated with a delayed LOOP, and referred industry to the list of issues included in NUREG/CR-6538.

The NRC staff noted that the degraded voltage issue, especially in light of deregulation of the electric power industry, remains a potential concern, as evidenced by the Callaway event in 1999. Both the staff and industry agreed that plant-specific features or conditions (e.g., geographic locations) can make some plants more susceptible to degraded voltage concerns. Given the current lack of data on plant operation with degraded grid voltage, the possibility of a performance-based rule was briefly discussed, wherein limits could be set for the amount of time a plant could operate in a degraded grid voltage condition.

Break Size Frequency and NUREG Data Update

The NRC staff indicated that they are in the process of reviewing the LOCA frequencies and methodology in NUREG/CR-5750, and plan to hold internal meetings to arrive at a consensus position for LOCA frequencies to be used for the LOCA-LOOP effort. After a staff consensus is reached, a public meeting will be scheduled to obtain stakeholder feedback.

Schedule and Additional Action Items

Industry indicated that there is a plant that might be interested in serving as a pilot for this activity. The plant would like to begin the pilot process in January, but would first like to know what values the staff would propose to use for LOCA frequencies and conditional LOOP probabilities. The staff noted that it intends to have these values sometime in the early part of 2002, but not likely by early January. The staff indicated that if it were to use any of the information presented by industry during this series of meetings, documentation to support the information would need to be formally submitted by industry. The BWROG stated that it is pursuing an assessment of non-pipe-break LOCAs, and it would be prepared to share information on this category of LOCA initiators at the next public meeting. The industry also indicated a desire to hold a separate public meeting to discuss the Option 3 framework document and other potential Option 3 activities. The NRC staff and industry agreed to contact each other shortly to determine appropriate meeting dates.

Attachment: List of Attendees

Project No. 689

cc: See next page

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LIST OF PARTICIPANTS
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NOVEMBER 29, 2001
NEI, BWROG, OTHER STAKEHOLDERS

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