

POLICY ISSUE (Information)

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SECY-03-0124

FOR: The Commissioners

FROM: William D. Travers
Executive Director for Operations /RA/

SUBJECT: SUMMARY OF ACTIVITIES RELATED TO GENERIC SAFETY ISSUES

PURPOSE:

To provide the annual summary of activities related to generic safety issues (GSIs).

BACKGROUND:

It has been the practice of the staff since 1983 to provide the Commission with an annual update of the progress made in resolving GSIs. This practice was reinforced by the Commission in a staff requirements memorandum (SRM) of May 8, 1998, in response to SECY-98-030, "Implementation of DSI-22, Research." In the SRM, the Commission directed the staff to provide an annual summary of activities related to open reactor and non-reactor GSIs.

DISCUSSION:

The NRC program for addressing reactor and non-reactor generic issues is delineated in Management Directive (MD) 6.4, "Generic Issues Program." MD 6.4 was issued in December 2001. The program described in MD 6.4 consists of seven stages: (1) identification, (2) initial screening, (3) technical assessment, (4) regulation and guidance development, (5) regulation and guidance issuance, (6) implementation, and (7) verification. Candidate generic issues may be identified by organizations or individuals internal or external to the NRC. Generally, safety

Contact:
Ronald C. Emrit, RES
(301) 415-6447

concerns associated with operating events, research results, or risk assessments form the basis for the identification of GSIs by the staff, the ACRS, industry, or the public. After an issue is identified, initial screening is performed to determine whether it should be processed as a GSI, excluded from further analysis, or sent to another NRC program for review. In the technical assessment stage, a determination is made as to whether the issue involves adequate protection, safety enhancement, or burden reduction. Technical findings are used as the basis for developing or revising rules, guidance, and programs. In the final three stages, regulation or guidance is issued by the NRC, implemented by licensees or certificate holders, and verified by the NRC. GSIs identified after March 1999 have been processed in accordance with MD 6.4. The Office of Nuclear Regulatory Research (RES) tracks the status of all generic issues in the agency-wide Generic Issue Management Control System (GIMCS) and documents the technical assessments and dispositions of all issues in NUREG-0933, "A Prioritization of Generic Safety Issues."

REACTOR GSIs

For generic issues associated with nuclear reactor power plants, RES is responsible for screening all new generic issues and performing the technical assessments of GSIs. The Office of Nuclear Reactor Regulation (NRR) is responsible for the development and issuance of regulation or guidance that may be recommended in the technical assessments, and staff verification of the resultant regulation or guidance. An adequate protection evaluation is conducted for each new GSI identified to determine whether plants should continue operating while the issue is being resolved. The following is a summary of the activities related to reactor GSIs since the last report to the Commission in SECY-02-0148 on August 2, 2002.

Identification

Three new GSIs were identified for initial screening:

- 193 BWR ECCS Suction Concerns: This issue addresses the concern for the possible failure of ECCS caused by unanticipated, large quantities of entrained gas in the suction piping from BWR suppression pools. The issue applies to MARK I or II containments during LOCAs, and could potentially cause pump failure or degraded performance caused by gas binding, vapor locking, or cavitation.

- 194 Implications of Updated Probabilistic Seismic Hazard Estimates: This issue addresses the concern for the seismic design bases of all nuclear power plants in and around the East Tennessee Seismic Zone, based on the new composite seismicity model for the region.

- 195 Hydrogen Combustion in Foreign BWR Piping: This issue addresses the accumulation of combustible gas mixtures in piping. In several foreign events, hydrogen and oxygen gases apparently accumulated to a combustible level, which then damaged the piping systems.

Initial Screening

Initial screening of the following two GSIs was completed:

- 80 Pipe Break Effects on Control Rod Drive Hydraulic Lines in the Drywells of BWR MARK I and II Containments: This issue addresses the concern for the likelihood and effects of a LOCA that could cause interactions with the control rod drive hydraulic lines in such a way as to prevent rod insertion, creating the potential for recriticality when the reactor core is reflooded. Initial screening of the issue was completed in February 2003 and the staff is currently developing an action plan for a technical assessment.
- 192 Secondary Containment Drawdown Time: This issue addressed the concern for the adequacy of the calculations, testing, and acceptance criteria associated with the creation of a vacuum in the reactor building of a BWR, following an engineered safeguards actuation signal. Initial screening of the issue was completed in June 2002 when a staff panel found that existing regulations are adequate to address the safety concern, and the issue was dropped from further pursuit.

The following four GSIs are currently undergoing screening:

- 186 Potential Risk and Consequences of Heavy Load Drops: This issue resulted from a staff review of licensees' programs for handling heavy loads, which revealed a substantially greater potential for severe consequences to result from the drop of a heavy load than was previously envisioned. In pursuing the issue, the staff is preparing a report on crane operating experience through 2002. This report will serve the dual purpose of completing both the initial screening and technical assessment of this GSI.
- 193 BWR ECCS Suction Concerns: The staff has completed a probabilistic screening analysis of the issue and is in the process of forming a review panel. The ongoing reevaluation of 10 CFR 50.46, "Acceptance Criteria for Emergency Core Cooling Systems for Light-Water Nuclear Power Plants," will be considered in the screening of this GSI.
- 194 Implications of Updated Probabilistic Seismic Hazard Estimates: A staff panel has completed its review of the issue and found that existing NRC programs have adequately addressed the safety concern. The panel has recommended that the issue be dropped from further pursuit.
- 195 Hydrogen Combustion in Foreign BWR Piping: The staff is currently performing a probabilistic screening analysis of the issue for review by a panel.

Technical Assessment

The following is the status of the ongoing technical assessment of five GSIs:

- 80 Pipe Break Effects on Control Rod Drive Hydraulic Lines in the Drywells of BWR MARK I and II Containments: This issue was screened as described above and an action plan is being developed by the staff for pursuit of a technical assessment.
- 156.6.1 Pipe Break Effects on Systems and Components: This issue addresses the safety concern of whether the effects of pipe breaks inside the containment have been adequately addressed in the designs of some plants. A risk analysis performed by the staff showed the issue to have some safety significance but with large uncertainty. A more comprehensive study was undertaken to review pipe failure rate data and pipe break methodologies. The staff is presently conducting a comparison of the findings of two studies used in the initial screening of the issue, and the Task Action Plan for pursuing the issue is scheduled to be revised in July 2003. The ongoing reevaluation of 10 CFR 50.46, "Acceptance Criteria for Emergency Core Cooling Systems for Light-Water Nuclear Power Plants," will also be considered in the technical assessment of this GSI.
- 163 Multiple Steam Generator Tube Leakage: This issue addresses the safety concern associated with multiple steam generator tube leaks during a main steam line break that cannot be isolated. The issue is an integral part of the NRC Steam Generator Action Plan, the status of which was presented to the Commission in SECY-03-0080 on May 16, 2003, and discussed at a Commission meeting on May 29, 2003.
- 185 Control of Recriticality Following Small-Break LOCA in PWRs: This issue addresses small-break-LOCA scenarios in PWRs that involve steam generation in the core and condensation in the steam generators, causing deborated water to accumulate in part of the RCS. Restart of the RCS circulation may cause a recriticality event (reactivity excursion) by moving the deborated water into the core. Specific recommendations on the proposed course of action are scheduled to be completed in October 2003.
- 188 Steam Generator Tube Leaks/Ruptures Concurrent with Containment Bypass: This issue addresses the effects on the validity of steam generator tube leak and rupture analyses of resonance vibrations in steam generator tubes during steam line break depressurization. The issue is an integral part of the NRC Steam Generator Action Plan, the status of which was presented to the Commission in SECY-03-0080 on May 16, 2003, and discussed at a Commission meeting on May 29, 2003.

Regulation and Guidance Development

Regulation and guidance development continued on the following three GSIs:

- 168 Environmental Qualification of Electrical Equipment: Accelerated-aging tests on electrical equipment showed that some of the environmentally qualified cables either failed or exhibited marginal insulation resistance. Failure of the cables during or following a design basis event could affect the performance of safety functions. (The results of Okonite's testing of its single conductor, bonded-jacket cables were specifically considered by the staff as it explored voluntary industry initiatives to resolve the issue.) Regulatory Issue Summary 2003-09 was issued on May 2, 2003. After review and analysis of six LOCA tests, condition-monitoring tests on instrument and control (I&C) cables, and information provided by the nuclear industry, the staff concluded that the existing equipment qualification process is adequate for assuring that I&C cables will perform their intended function. The staff is in the process of closing out this issue by August 2003.
- 189 Susceptibility of Ice Condenser and MARK III Containments to Early Failure from Hydrogen Combustion During a Severe Accident: This issue was identified with the issuance of NUREG/CR-6427, "Assessment of the Direct Containment Heat (DCH) Issue for Plants with Ice Condenser Containments," when it was discovered that the early containment failure probability in ice condensers is dominated by non-DCH hydrogen combustion events. The issue was extended to include BWR MARK III containments since their relatively low free volume and strength are comparable to PWR ice condensers. The staff concluded that further action to provide back-up power to one train of igniters is warranted for plants with ice condenser or MARK III containments. The staff is currently engaging the affected stakeholders in developing additional information related to implementing various alternatives, including an option of using the severe accident management guidelines. A stakeholders meeting was held on June 18, 2003, and the staff is evaluating comments received from licensees to determine whether rulemaking should be pursued.
- 191 Assessment of Debris Accumulation on PWR Sump Performance: This issue addresses the possibility of debris accumulating on the emergency core cooling system (ECCS) sump screen, resulting in the loss of net positive suction head (NPSH) margin. This loss of NPSH could impede or prevent the flow of water from the sump necessary to meet the criteria of 10 CFR 50.46. In its technical assessment, the staff concluded that additional actions may be warranted to ensure an adequate NPSH margin for PWR ECCS pumps taking suction from containment sumps. The PWR industry, with NRC oversight, is developing technical guidance for plant-specific analyses to determine whether debris accumulation will impede or prevent ECCS operation. Following meetings with stakeholders on March 5 and April 29, 2003, NRC Bulletin 2003-01 was issued to PWR licensees on June 9, 2003, to (1) confirm their compliance with 10 CFR 50.46(b)(5) and other existing applicable regulatory requirements, or (2) describe any compensatory measures that have been implemented to reduce the

potential risk due to post-accident debris blockage, as evaluations to determine compliance proceed.

Since the inception of the generic issues program in 1976, the staff has closed 833 of the 845 reactor generic issues identified. The scheduled completion dates of the various stages of initial screening, technical assessment, or regulation and guidance development for the 12 open reactor GSIs are summarized in the Attachment.

NON-REACTOR GSIs

NMSS has the primarily responsibility for processing non-reactor GSIs through all stages of MD 6.4. The status of the unresolved non-reactor GSIs is tracked by RES in the quarterly updates of GIMCS. The following is a summary of the activities related to non-reactor GSIs since the last report to the Commission in SECY-02-0148:

Identification

No new GSIs were identified for screening.

Technical Assessment

The following is the status of the ongoing technical assessment of two GSIs:

- NMSS-7 Criticality Benchmarks Greater than 5% Enrichment: The staff is developing and confirming the adequacy of tools for validating criticality calculations, including requests to process higher enrichments, to be used in licensing nuclear facilities. This GSI has temporarily been placed on hold due to the need to fund higher priority tasks while plant-specific aspects of the issue are being pursued. The staff expects to meet the current completion date for its technical assessment by building on the plant-specific efforts being performed.
- NMSS-14 Surety Estimates for Groundwater Restoration at In-Situ Leach Facilities: This issue addresses the development of methodologies to (1) calculate surety for ground-water restoration activities at in situ leach uranium extraction facilities, and (2) monitor post-restoration ground-water quality stability.

Regulation and Guidance Development

Regulation and guidance development continued on the following GSI:

- NMSS-16 Adequacy of 0.05 Weight Percent Limit in Part 40: Options on how to proceed with jurisdictional and technical issues on the regulation of source material were forwarded to the Commission in SECY-00-0201 in September 2000. In accordance with the SRM issued for SECY-00-0201, the transfer provision rule was published for public comment in the Federal Register on August 28, 2002. The staff is currently evaluating the comments received.

The scheduled completion dates of the technical assessment or regulation and guidance development stages for the three open, non-reactor GSIs are summarized in the Attachment.

CONCLUSION:

Since the last report to the Commission on August 2, 2002, one reactor GSI was closed and 15 GSIs remain to be resolved as the staff continued to implement the process of MD 6.4 to identify and resolve reactor and non-reactor GSIs. The staff will continue to provide an annual update to the Commission on activities related to GSIs and will inform the Commission of any significant developments.

/RA by Patricia Norry Acting For/

William D. Travers
Executive Director
for Operations

Attachment: Completion Schedule for Open GSIs as of July 8, 2003

CONCLUSION:

Since the last report to the Commission on August 2, 2002, one reactor GSI was closed and 15 GSIs remain to be resolved as the staff continued to implement the process of MD 6.4 to identify and resolve reactor and non-reactor GSIs. The staff will continue to provide an annual update to the Commission on activities related to GSIs and will inform the Commission of any significant developments.

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Attachment: Completion Schedule for Open GSIs as of July 8, 2003

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DATE	07/01/03*		06/25/03*		07/09/03*		07/23/03		072403	

Completion Schedule for Open GSIs as of July 8, 2003

GSI Number	Title	Lead Office	Identification Date	Completion Date		
				Initial Screening	Technical Assessment	Regulation Guidance
80	Pipe Break Effects on Control Rod Drive Hydraulic Lines in the Drywells of BWR MARK I and II Containments	RES	03/1998	02/2003	TBD	-
156.6.1	Pipe Break Effects on Systems and Components	RES	02/1991	07/1999	TBD	-
163	Multiple Steam Generator Tube Leakage	NRR	06/1992	01/1997	09/2005	-
168	Environmental Qualification of Electrical Equipment	NRR	04/1993	04/1993	06/2002	TBD
185	Control of Recriticality Following Small-Break LOCA in PWRs	RES	01/1999	07/2000	09/2005	-
186	Potential Risk and Consequences of Heavy Load Drops in Nuclear Power Plants	RES	04/1999	08/2003	08/2003	-
188	Steam Generator Tube Leaks/Ruptures Concurrent with Containment Bypass	RES	06/2000	05/2001	09/2004	-
189	Susceptibility of Ice Condenser and MARK III Containments to Early Failure from Hydrogen Combustion During a Severe Accident	NRR	05/2001	05/2002	12/17/2002	TBD
191	Assessment of Debris Accumulation on PWR Sump Performance	NRR	09/1996	09/1996	09/2001	03/2007
193	BWR ECCS Suction Concerns	RES	05/2002	07/2003	-	-
194	Implications of Updated Probabilistic Seismic Hazard Estimates	RES	06/2002	07/2003	-	-
195	Hydrogen Combustion in Foreign BWR Piping	RES	02/2003	08/2003	-	-
NMSS-07	Criticality Benchmarks Greater than 5% Enrichment	NMSS	05/1998	06/1998	06/2005	-

Completion Schedule for Open GSIs as of July 8, 2003

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				Initial Screening	Technical Assessment	Regulation Guidance
NMSS-14	Surety Estimates for Groundwater Restoration at In-Situ Leach Facilities	NMSS	06/1998	07/1998	08/2003	-
NMSS-16	Adequacy of 0.05 Weight Percent Limit in Part 40	NMSS	06/1998	07/1998	03/2002	TBD