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MFN 02-033

June 13, 2002

U.S Nuclear Regulatory Commission
Document Control Desk
Washington, D.C. 20555-0001

Attention: Chief, Information Management Branch
Program Management
Policy Development and Analysis Staff

Subject: **Presentation Material on Results of Pipe Rupture Task Force for Meeting on June 19, 2002**
Re: Open Session (Non-Proprietary) & Closed Session (Proprietary)

Enclosed are the presentation slides for the June 19th meeting with the NRC staff on the results from the GE pipe rupture task force. Please note that there are both non-proprietary (Enclosure 1 – Open Session) and proprietary (Enclosure 2 - Closed Session) presentation slides. The closed session presentation slides supplement the information covered in the open session presentation slides.

Enclosure 2 contains proprietary information of the type, which GE maintains in confidence and withholds from public disclosure. The information has been handled and classified as proprietary to GE as indicated in the Enclosure 3 affidavit. GE hereby requests that this information be withheld from public disclosure in accordance with the provisions of 10CFR 2.790 and 9.17.

If you have any questions about the information provided here please contact, Terry McIntyre at (408) 925-1440, or myself.

Sincerely,

George Stramback
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Enclosures:

(1) *Hydrogen Detonation in BWRs – Results of the Pipe Rupture Task Force,* Open Session, June 19, 2002
(2) *Hydrogen Detonation in BWRs – Results of the Pipe Rupture Task Force,* Proprietary Supplement, Closed Session, June 19, 2002
(3) General Electric Proprietary Information Affidavit

cc: AB Wang – USNRC
CE Carpenter – USNRC
TR McIntyre
JF Klapproth

Hydrogen Detonation in BWRs

Results of the Pipe Rupture Task Force

(Open Session)

Terry McIntyre
Manager – Special Projects

16 June, 2002

Background

- Two serious (and similar) events in 2 months
  - *RHR/SCM Rupture – November 2001*
  - *Head Spray Rupture – Dec 2001*
  - *Sudden rupture of NSSS-attached piping*
  - *Both events attributed to detonation of radiolytic hydrogen in pipes*
  - *Root cause (ignition mechanism and location) not completely understood*
- RHR/SCM event contaminated plant areas, caused significant damage, and had potential for serious personnel injury
- Head Spray event characterized as a "near-miss LOCA"
  - *Single failure (check valve) would have resulted in a non-isolatable intermediate-break LOCA*

Plant and Event Info – SCM/RHR Rupture

- BWR-4 class plant
- Event Date: November 7, 2001
- Event occurred during routine surveillance test
- Automatic isolation and immediate manual plant shutdown
- Rupture occurred in steam supply line for the RHR Steam Condensing Mode

Plant and Event Info – Head Spray Rupture

- Non-GE BWR
- Event Date: December 14, 2001
- Event occurred during normal plant operation
- Event terminated by closing isolation valve
  - *Plant operated 2 months before inspection*
- Rupture occurred in head spray line

History & Status

- Task Force Established March 14, 2002
  - *Met ~ twice weekly*
  - *All short term/high priority technical evaluations complete*
- BWROG PIRT Briefing March 28, 2002
- Draft Task Force Report Completed
- Design Review May 1, 2002
- BWROG Meeting June 11, 2002
- SIL 643 Issued June 14, 2002
- NRC Review June 19, 2002

Task Force Charter & Results

- Establish confidence that the identified failure mode of radiolytic hydrogen/oxygen detonation is correct
  - *Very Likely Correct*
- Identify Potential Ignition Sources
  - *Indeterminate*
- Determine the extent of risk of future events within the BWR fleet
  - *Small, but not zero*
- Identify plant characteristics for potential detonation risk
  - *Identified in SIL 643*
- Identify remedial actions/modifications to reduce or eliminate risk of future events
  - *Identified in SIL 643*

Results Summary

- Risk is SMALL, but cannot be completely dismissed
  - Narrow range of geometry/pressure/temperature conditions required
    - Conditions rare, but not unheard of
    - There is no "magic bullet" in the GE design that makes events impossible
  - Any detonation event from 1000 psi will result in pipe rupture
    - Large overpressures possible
  - GE design is fundamentally sound
    - Avoidance of detonable mixtures part of GE design specification
  - PRA: CDF for small/intermediate steam LOCA increased slightly by addition of hydrogen detonation as a LOCA initiator

Conclusions – SIL 643 Recommendations

- Identify piping configurations susceptible to radiolytic gas accumulation
- Understand susceptibility and proceed appropriately
  - Consider effects of potential modifications
  - Be proactive on material condition issues
  - Consider effects of operational changes
  - Modifications may be appropriate in some situations