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MAY 17 1982

MEMORANDUM FOR: Hugh L. Thompson, Jr., Acting Director
Division of Human Factors Safety

THRU: Original signed by Dennis L. Ziemann
Dennis L. Ziemann, Chief
Procedures and Test Review Branch
Division of Human Factors Safety

FROM: Samuel E. Bryan
Section A - Procedures
Procedures and Test Review Branch
Division of Human Factors Safety

SUBJECT: RECOMMENDATIONS BASED ON MY INVOLVEMENT IN THE SGTR TASK FORCE ACTIVITIES

My recommendations to improve safety resulting from involvement in the Ginna SGTR Task Force activities are as follows:

1. Reactor Coolant Pump Trip

   A. Leave a reactor coolant pump (RCP) run when a SGTR is the diagnosed event. Leaving a pump run uncomplicates the incident by making the pressurizer spray available for the depressurization to the faulted SG pressure. This also precludes the need for use of the PORV to depressurize. The PORV depressurization is much more difficult to control because the transient can be on the order of 400 psi per minute when the PORV is opened.

      Pump operation also prevents formation of significantly sized bubbles by distributing any that may form. Pump operation also provides forced cooling to the vessel and piping to achieve more uniform cooling. Further, the vessel head region gets forced cooling which it would otherwise not get with natural circulation. Without the forced cooling, its high temperature lags the rest of the vessel and on the ensuing depressurization local saturation temperatures are reached, causing bubbles to form.

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B. Licensees should select the pressure value for tripping pumps that Westinghouse Owners' Group recommends, if the pumps must be tripped. That value is significantly lower than Ginna's 1715 psi value selected because it was the lowest value from an environmentally qualified pressure transmitter. The lower trip value allows the pumps to continue to operate for a range of SGTR sizes for which the RCS pressure decrease can be reversed by makeup and SI pumps before the trip value is reached.

2. Restart of RCS Pump

The SGTR event procedure should specify the earliest time or plant conditions that a RCS pump can be restarted. Ideally that should precede depressurization. Pump operation makes pressurizer spray available. Its use ensures a more controlled depressurization and pump operation can prevent or collapse bubbles in the RCS.

3. Events Requiring Depressurization

There are clear needs to depressurize the RCS during certain operating events, i.e., events resulting in the inability to isolate small breaks such as SGTR or pump seal leaks. Procedures that cope with these events should ensure natural circulation is established if RCS pumps are tripped and should indicate that even though subcooling margins are maintained bubbles can form in the RCS. Guidance on how to identify their presence, how to eliminate them, and criteria for SI operation and termination should be included in these procedures.

4. A. SI Pump Termination and Restart

Both SI pump termination and restart criteria should contain a subcooling margin value, and this criteria should be included in EOP's.

B. Guidance and criteria on SI pump operation and termination should be provided in the procedure for coping with a SGTR for plant conditions of a bubble in the RCS and a SGTR.

5. Reset of Safety Injection and Containment Isolation

Operators at Ginna are instructed by procedure to wait for emptying of the boric acid storage tank (BAST) before resetting the SI signal because automatic switchover for SI pump supply

from BAST to the refueling water storage tank (RWST) will not occur if SI is reset. SI must be reset before containment isolation (CI) signal can be reset. Resetting CI allows operability of several pieces of equipment important to mitigating the event. Emptying BAST can take several minutes. The licensee should have the capability to reset SI and CI before the tank empties, perhaps by changing the logic circuitry that prevents automatic switchover from BAST to RWST if SI is reset.

6. Cooldown of the Faulted SG

The licensee's procedure contains no instructions for cooldown of the SG with the ruptured tube. The procedure should contain options for cooldown and include the preferred method. It should also provide guidance for cooling an overfilled SG with water in the steam line. The procedure should also prescribe any actions needed to maintain the integrity of a water filled steam line.

7. Procedure for SG With a Ruptured Tube and a Faulted Safety or Relief Valve

The licensee should develop a procedure for coping with a steam generator having a ruptured tube coupled with a failed safety or relief valve. This case appears to be potentially the worst SGTR case from the viewpoint of offsite releases. The Ginna SG safety valve opened five times and appears to have stayed open on the fifth for about 50 minutes, closing at a much lower pressure than the first reclosure. (The SG PORV was isolated by closure of its associated block valve.)

This procedure should contain instructions for running SI pumps and managing the borated water supply. The procedural goals should be to maintain adequate coolant inventory to keep the core covered, remove decay heat, conserve borated water and minimize offsite effects while cooling and depressurizing the RCS expeditiously.

8. EOP Clutter

The Ginna EOP for coping with SGTR's (E-1,4) contains a section on the first page under Subsequent Actions that provides guidance on correction of SG and pressurizer level indication errors caused by increased containment temperatures. Since SGTR's do not of themselves create high ambient temperatures, the guidance should be removed and placed in a generic instruction or on the panels.

Seven separate line items are placed on the fourth page of E-1.4 to provide update reports to offsite authorities when parameters reach certain values. I strongly recommend that all reporting requirements to authorities be removed from EOP's. The emphasis in these procedures must be on safety measures to protect the public and anything that detracts from this mission should be removed. Reporting requirements can be given in other documents.

Original signed by
Samuel E. Bryan
Section A - Procedures
Procedures and Test Review Branch
Division of Human Factors Safety

OFFICE	DHFS:PTRB	DHFS:PTRB	DHFS:PTRB				
SURNAME	SEBryan:ah	HBClayton	DLZiemann				
DATE	5/14/82	5/19/82	5/17/82				

MAY 19 1982

MEMORANDUM FOR: Richard H. Vollmer, Director
Division of Engineering

FROM: William V. Johnston, Assistant Director
for Materials & Qualifications Engineering
Division of Engineering

SUBJECT: GENERIC RECOMMENDATIONS BASED UPON REVIEW OF THE JANUARY 25, 1982 GINNA STEAM GENERATOR TUBE RUPTURE EVENT

As requested, the Inservice Inspection Section of the Materials Engineering Branch, Division of Engineering, has reviewed the NRC Ginna Task Force report (NUREG-0909), Rochester Gas and Electric Corporation's letter dated April 26, 1982 regarding the results of its steam generator examinations and investigations subsequent to the January 25, 1982 steam generator rupture incident, and a March 1, 1982 trip report submitted by the staff's consultant on eddy current matters (C. Dodd of Oak Ridge National Laboratory). We have prepared the attached generic recommendations based upon our review of the above documents.

William V. Johnston, Assistant Director for
Materials & Qualifications Engineering
Division of Engineering

Attachment:
Generic Recommendations

cc: R. Vollmer
D. Eisenhut
R. Purple
S. Pawlicki
G. Lainas
T. Ippolito
K. Wichman
R. E. Martin
J. Lyons
W. Hazelton
C. Cheng
E. Sullivan
E. Murphy

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Contact: E. Murphy
x-28589

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OFFICE ▶	DE:MTEB	DE:MTEB	DE:MTEB	DE:AD:MQE		
SURNAME ▶	ELMurphy:jar	C. Cheng	W. Hazelton	W. Johnston		
DATE ▶	5/17/82	5/17/82	5/17/82	5/19/82		

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ATTACHMENT

GENERIC RECOMMENDATIONS BASED UPON REVIEW

OF THE JANUARY 25, 1982 GINNA STEAM GENERATOR

TUBE RUPTURE EVENT

INSERVICE INSPECTION SECTION

MATERIALS ENGINEERING BRANCH

1. Secondary side inspections using an appropriate camera device should be performed on the entire periphery at the following frequencies for purposes of identifying any loose parts, foreign objects, or peripheral tube OD damage.

   A. NTOL Facilities

      During preservice inspection of each steam generator.

   B. Operating Plants

      (1) Each affected steam generator immediately after any secondary side modifications or repairs are made to the steam generator internals.

      (2) Each affected steam generator whenever eddy current indications are found in the free span portion of peripheral tubes, unless it has been clearly established that the indication did not result from damage by a loose part or foreign object.

2. Loose parts monitoring systems should be installed in each steam generator prior to initial startup (for NTOL facilities) and during the steam generator inspection outage for operating facilities. Sensors shall be located to allow detection of a loose part in the primary channel head or on the secondary side of the tubesheet.

3. Improved QA and QC procedures should be implemented by each facility to ensure no recurrence of foreign objects in the primary or secondary sides of steam generators such as those recently observed at Ginna, Zion 1, Prairie Island 1, and perhaps San Onofre 1.
4. Eddy current inspection should include inspections in the absolute mode in addition to inspections in the differential mode as required by the Code in order that long wear or fretting type defects such as those occurred at Ginna will produce an identifiable signal. Fretting wear calibration standards should be employed as an aide for eddy current data interpretation of signals for which fretting or wear represents a likely source of the signal in order to assure a conservative interpretation of the signal. Examples would include signals at the periphery of the tube bundle in the free span region, and signals at tube supports (particularly in the preheater region of Westinghouse Model D units). Use of such a fretting standard in conjunction with an absolute mode inspection would have resulted in the plugging of the ruptured tube (i.e., the tube which ruptured on January 25, 1982) in April 1981.