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VISSING,G.S.

SUBJECT: Forwards response to teleconference RAI re licensee response to NRC GL 95-07, "Pressure Locking & Thermal Binding of Safety-Related Power-Operated Gate Valves." Calculation encl.

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ROBERT C. MECREDY
Vice President
Nuclear Operations

June 22, 1999

U.S. Nuclear Regulatory Commission
Document Control Desk
Attn: Guy S. Vissing
Project Directorate I-1
Washington, D.C. 20555

Subject : Response to Teleconference Request for Additional Information Regarding Licensee Response to NRC Generic Letter 95-07

Ref.(a): Letter from R. C. Mecredy, RG&E, to A. R. Johnson, NRC, "60 Day Response per NRC Generic Letter 95-07, Pressure Locking and Thermal Binding of Safety-Related Power-Operated Gate Valves," dated October 17, 1995

(b) Letter from R. C. Mecredy, RG&E, to A. R. Johnson, NRC, "Response to Generic Letter 95-07, Pressure Locking and Thermal Binding of Safety-Related Power-Operated Gate Valves," dated November 16, 1995

(c) Letter from R. C. Mecredy, RG&E, to A. R. Johnson, NRC, "180 Day Response to Generic Letter 95-07," dated February 16,1996

(d) Letter from R. C. Mecredy, RG&E, to G. S. Vissing, NRC, "Request for Additional Information – Generic Letter 95-07, Pressure Locking and Thermal Binding of Safety-Related Power-Operated Gate Valves," dated September 4, 1996

Dear Mr. Vissing:

During a teleconference between representatives from the NRC and RG& E held on February 25, 1999 regarding RG&E's responses to NRC Generic Letter 95-07, the NRC representatives requested updated information reflecting RG&E's current status of the potential susceptibility of Ginna Station's safety-related power-operated gate valves to pressure locking and/or thermal binding. RG&E had aggressively pursued the gate valve pressure locking/thermal binding issue which resulted in the

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completion of significant valve upgrades, as well as a complete re-evaluation of gate valve potential susceptibility as part of the closeout of the Generic Letter 89-10 MOV program.

References (a) through (d) document a series of responses to Generic Letter 95-07 provided by RG&E. The following information supplements those responses by providing a summary of the modifications that have been implemented to reduce or eliminate the potential for pressure locking of power-operated gate valves:

PCR 96-085 for MOVs 852A/B replaced the original 3.9 hp, 1720 rpm, 60 ft-lb starting torque motors with 7.8 hp, 3405 rpm 60 ft-lb starting torque motors.

PCR 96-086 for MOVs 852A/B modified the flex wedge discs to install pressure-relieving vent holes.

PCR 96-107 for MOVs 857A/B/C modified one of the double discs for each MOV to install pressure-relieving vent holes.

PCR 97-006 for MOVs 813 and 814 replaced the original 1700 rpm, 2 ft-lb starting torque motors with 1700 rpm, 5 ft-lb starting torque motors.

PCR 97-080 for MOVs 871A/B installed strain gauges to improve accuracy of diagnostic test data acquisition.

PCR 98-049 for MOVs 857A/B/C replaced the original 1700 rpm, 7 ½ ft-lb starting torque motors with 1700 rpm, 10 ft-lb starting torque motors.

PCR 98-049 for MOVs 860A/B/C/D replaced the original 1700 rpm, 7 ½ ft-lb starting torque motors with 1700 rpm, 15 ft-lb starting torque motors.

Considering the preceding list of modifications, RG&E currently credits analysis for acceptability of motor-actuator capability to preclude a potential pressure-locked bonnet occurrence for the following MOVs:

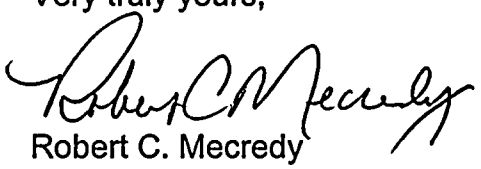
313	Reactor coolant pump seal or excess letdown return
749A/B	CCW supply to reactor coolant pumps
759A/B	CCW return from reactor coolant pumps
813/814	CCW supply/return to reactor support coolers (available margin increased due to motor upgrade)
871A/B	Safety Injection Pump C discharge
9629A/B	Service water supply to standby auxiliary feedwater pumps

A copy of the analysis methodology employed for the evaluation of MOVs 871A/B is enclosed as Attachment 3 as an example of the pressure locking analytical approach utilized by RG&E (also in support of the specific response for a comment by the NRC included in Attachments 1 and 2).

A list of questions was provided by the NRC regarding RG&E responses to Generic Letter 95-07 (References (a) through (d)). These are enclosed as Attachment 1 to this correspondence. The responses provided by RG&E to each item on Attachment 1 are enclosed as Attachment 2. These items were discussed in detail during the teleconference held on February 25, 1999 among representatives from the NRC and RG&E.

Since RG&E and the NRC have reached agreement on the closure of the Generic Letter 89-10 MOV Program and RG&E has instituted a living MOV Program with active participation in the utility Joint Owners Group (JOG) effort to address the concerns identified by NRC Generic Letter 96-05, "Periodic Verification of Design-Basis Capability of Safety-Related Motor-Operated Valves," RG&E will continue to monitor the condition and capability of safety-related power-operated gate valves through the various preventive and predictive maintenance programs in place at Ginna Station.

Very truly yours,



Robert C. Mecredy

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USNRC Ginna Senior Resident Inspector

ATTACHMENT 1

Ginna GL 95-07 response

1. Their submittal dated September 24, 1996, states that a modified industry gate valve thrust equation (double disk area) was used to demonstrate that valves MOV 857A,B,C and containment spray valves 860A,B,C,D would operate during a pressure locking condition.

   Pressure locking tests sponsored by the NRC were conducted by Idaho National Engineering and Environmental Laboratory on a double disk gate valve. The results of this testing are documented in NUREG/CR-6611, "Results of Pressure Locking and Thermal Binding Tests of Gate Valves." Test data demonstrated that the modified industry gate valve thrust equation trended with the pressure locking test results but generally underestimated the thrust required to open a pressure-locked valve. The NRC staff finds that the modified industry gate valve thrust equation provides reasonable assurance that valves susceptible to pressure locking are capable of performing their intended safety-related function provided that the margin between calculated pressure locking thrust and actuator capability exceeds 40 percent. 20% of this is based on valve degradation and the other 20% based on the fact that the INEEL calculation consistently underestimated the required thrust to overcome pressure locking.

   The margins for the 857 valves is 8%. The margins for the 860 valves is 24%. These margins are too low. The double disk calculation that the licensee is using is similar but different than the calculation that INEEL used. The licensee needs a margin of at least 40% or if the licensee can demonstrate that their calculation consistently tracks INEEL test results then we can back of the 20% margin. If licensee is unable to increase the margin then a different solution to pressure locking is needed. Also the licensee used their own methodology for calculating actuator capability in lieu of the standard Limitorque equation. Verify that this methodology was approved for use in the GL 89-10 program. Verify the licensee used GL 89-10 valve factors and stem factors.

2. Valves RH-720, RH-721, are not considered to be in the scope of GL 95-07. Is Ginna a hot standby or hot shutdown plant? If not , these valves need to be included in the scope of GL 95-07 in order to complete a normal cooldown.

3. The September 24, 1996 submittal states that calculations were used to demonstrate that component cooling water isolation valves, 813/814, for the reactor support coolers have adequate thrust to overcome pressure locking. Need to review pressure locking and actuator capability calculations to verify that methodology and margins acceptable. The February 13, 1996, submittal states that these valves are not susceptible to pressure locking. Which submittal is correct.

4. The February 13, 1996 submittal stated that the RHR supply to the reactor vessel deluge valves, 852A/B, are susceptible to thermal binding and that analysis has demonstrated that the actuators can develop adequate thrust to overcome thermal binding. In our RAI we requested the thermal binding analysis/calculations and in the September 24 submittal, the licensee stated that Attachment 3 contained the thermal binding information. Attachment 3 only discussed pressure locking. We need to review the thermal binding calculations. Since there has not been a thermal binding

methodology approved by the NRC, this will be interesting to see how the licensee validated the methodology.

The licensee used the ComEd pressure locking methodology to demonstrate that these valves were operated during a pressure locking event. The ComEd methodology requires a 20% margin between actuator capability and the thrust required to open the pressure locked valve. The calculations provided to the NRC indicate a 10% margin. This is unacceptable. When reviewing the calculation, verify that the licensee used GL 89-10 valve and stem factors and that the actuator capability calculation was the same as used in GL 89-10.

5. The licensee used a calculation to demonstrate that 871A/B would operated during a pressure locking event. I think they used a modified version of the Grand Gulf pressure locking methodology to demonstrate that the valves would operate. This methodology has not been approved. Verify what methodology is being used and why the licensee modified the methodology.

6. The September, 1996, submittal states that valves 704A/B, 871A/B,1815A/B and 4615/4616 are not susceptible to pressure locking during testing because TS are followed to ensure one train is operable. What does this mean? If a valve is shut to perform surveillance testing, then the system must be declared inoperable unless it is able to automatically open.

ATTACHMENT

Ginna Response to NRC Comments Concerning Original Ginna GL 95-07 Submittal

1. Since the original GL 95-07 response was submitted by RG&E, corrective action was taken to install a pressure relieving hole in one disc of each of the double-disc gate MOVs 857A, 857B and 857C in November, 1996 and the original 7½ ft-lb starting torque motors were replaced with 10 ft-lb starting torque motors during the period between November, 1998 and January, 1999.

   The potential susceptibility of MOVs 860A, 860B, 860C and 860D for bonnet pressure locking was re-evaluated in June, 1997 and, in accordance with Emergency Operating Procedure ES-1.3, the containment spray pumps are stopped prior to closing these valves and these valves are reopened prior to restarting the pumps, therefore, the potential to trap pump shutoff head pressure in the valve bonnet does not exist.
   (Reference: Altran Technical Report No. 94108-TR-01, Rev. 2)

   Additionally, MOVs 860A, 860B, 860C and 860D have had the original 7½ ft-lb starting torque motors replaced with 15 ft-lb starting torque motors during the Spring 1999 Refueling Outage resulting in approximately 90% open available thrust margins.

2. Ginna is a hot shutdown plant (RHR MOVs 720 and 721).

3. Although MOVs 813 and 814 are not required to open for accident recovery, the potential susceptibility of MOVs 813 and 814 for bonnet pressure locking was re-evaluated in June, 1997 since these MOVs receive containment isolation signals to isolate CCW to the reactor support coolers and the need may exist to re-open these MOVs. Calculation No. 96190-C-71, Rev. 2 was performed to calculate the thrust required to overcome bonnet pressure locking forces. The 2 ft-lb starting torque motors originally installed on these MOVs were replaced with 5 ft-lb starting torque motors in November, 1997. The current open available thrust margins under bonnet pressure locked conditions for MOVs 813 (7826 lb. vs 3124 lb.) and 814 (7913 lb. vs 3124 lb.) exceed 150%.

4. Ambient and system heat absorption for MOVs 852A and 852B has been evaluated in a study performed May 8, 1992. This evaluation considered known check valve seat leakage and the potential transmission of heat from the reactor vessel to the MOVs. The conclusion was reached that under the practically stagnant conditions present in the affected lines over the distance of 16.4 feet, no increase in temperature at the MOV would occur, thus precluding thermal binding of the wedge or externally heating the fluid in the valve bonnet. Subsequent seat leakage testing for check valves 853A and 853B have confirmed the continued presence of little or no seat leakage for these check valves.

   The potential susceptibility for pressure locking of MOVs 852A and 852B has been mitigated due to the installation of pressure relieving holes in each MOV's flexible wedge during the Spring 1999 Refueling Outage.

5. During the GL 89-10 closeout effort at Ginna, the pressure locking analysis for MOVs 871A and 871B was revised. Revision 1 to Calculation No. 96190-C-68 employs the Commonwealth Edison pressure locking methodology as adapted by Altran Corporation with review/comment from Kalsi Engineering. This calculation is enclosed as Attachment 3.

6. When a specific MOV is closed due to periodic testing, the affected train is declared out of service until the testing is completed and the MOV is re-opened. During that time, since the unaffected train is maintained operable, the entire system is not declared inoperable. The appropriate Technical Specifications are followed to ensure system, train and component operability until periodic testing is complete.