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VISSING,G.S.

SUBJECT: Informs that util & NRC had conference call on 990816 to review approach in responding to questions,as result of questions re main steam check valve performance included in Insp 50-244/99-05,dtd 990806.

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ROBERT C. MECREDY
Vice President
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August 23, 1999

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

Reference: NRC #40500 Team Inspection 50.244/99-05 dated 8/6/99

Dear Mr. Vissing:

As a result of questions regarding main steam check valve performance included in the above reference, received August 16, 1999, RG&E and the NRC had a conference call on August 16 to review our approach in responding to these questions. A summary of the conference call is provided as Attachment 1.

As requested, we will formally respond to the questions within 30 days of receipt of that letter.

Very truly yours,

Robert C. Mecredy

xc: Mr. Guy S. Vissing (Mail Stop 8C2)
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ATTACHMENT 1: SUMMARY OF PHONE CONVERSATION W/NRC

DATE: 8-16-99
TIME: 10:00 AM

TOPIC: NRC 8 QUESTIONS ON Main Steam Check Valve

PARTICIPANTS: G. Wrobel (RG&E - Licensing)
J. Dunne (RG&E - Reactor Engineering & Analysis)
K. Muller (RG&E - Primary Systems)
G. Cranston (NRC - Region 1)

During the 8-16-99 phone conversation, RG&E reviewed its plan for responding to the 8 questions provided to RG&E by the NRC concerning the RG&E Design Analysis on Main Steam (MS) check valve closure on reverse flow following a MSLB. A synopsis of the information verbally discussed is summarized below.

Question 1

To respond to Question 1 on the need for a more sophisticated flow analysis, RG&E identified that it is planning to have a third party Independent Review of the issue. RG&E has had discussions with Duke Engineering & Services for performing the Independent Review. Duke has been provided with the RG&E Design Analysis (DA-ME-92-147, Rev.2) along with a copy of the valve drawing and the list of the 8 NRC questions. RG&E specifically has asked Duke to perform their review in terms of providing a response to both Question 1 and Question 7.

After obtaining the results of the Duke Independent Review and assessing their findings, RG&E will evaluate if any additional actions are believed to be warranted. This would include the need for a detailed 3D analysis to address the NRC concerns as well as the need to implement any changes to the present check valve configuration on a short term basis.

Question 2

The Design Analysis assumed that the change in steam density associated with the change in steam pressure was negligible for the pressure variations used in the analysis. Specifically, for an assumed steam pressure at the inlet of the check valve (e.g. 800 psia), the difference in density between static and stagnation conditions was negligible and could be ignored. This is based on the difference between static and stagnation conditions in the design analysis being on the order of a couple of psi. Attachment 1 of Design Analysis DA-ME-97-147 lists torques for various steam pressures of 700 psia, 800 psia and 900 psia. The incompressible assumption was not used to develop the pressure dependent torques listed in the Design Analysis; a curve fit was used for steam density as a function of the three assumed steam pressures.

Question 3:

The constant pressure assumption was only made to perform the analysis of the valve at the instant in time that valve closure is expected to occur. This time is the time when maximum flow from the intact SG to the break occurs. From the LOFTRAN analysis, the mass flow rate used was 603 lbm/sec and the corresponding main steam pressure was approximately 800 psia. Therefore, this flow rate and pressure were used for the analysis of closing torque on the check valve. The initial steady state Main Steam flow condition used in the LOFTRAN run was 914 lb/sec.

Actual reverse flow through the Main Steam check valve from the intact SG would be expected to occur following termination of flow to the turbine. Prior to the Turbine Stop Valve closure, the flow from the intact SG would be expected to flow primarily to the Turbine. The review of the LOFTRAN transient results indicated that the peak flow rate from the intact SG following the Turbine Stop Valve closure bounded the 603 lb/sec value used in DA-ME-97-147. The changes in steam flow and pressure subsequent to the initiation of check valve movement is not relevant to the DA-ME-92-147 analysis. Once the check valve begins to close, closure of the valve is ensured by its movement into the flow stream and the increase in drag force due to its movement. Therefore, the check valve calculation did not need to evaluate the impact of lower flows and pressures that would occur after check valve movement is assumed to have occurred.

Questions 4 & 5:

The 603 lb/sec flow past the check valve is based on choked flow occurring at the break location. The break flow is controlled by choked conditions. The flow rate out the break is a summation of the flow that reached the break from the two flow paths feeding the break location. The 603 lb/sec flow rate was the LOFTRAN flow for the flow path from the intact SG to the break location. This flow was added to the forward flow from the faulted SG to obtain the total break flow.

The flow from the faulted SG to the break is expected to be somewhat greater than the flow from the intact SG to the break location. The difference in flow results from the combined effect of the following two conditions which tend to off-set each other:

1) Increased hydraulic resistance from the intact SG to the break causes increased frictional losses which tends to decrease flow from the intact SG to the break.
2) The higher flow from the faulted SG to the break causes it to depressurize faster than the intact SG. This causes the faulted SG pressure to be lower than the pressure in the intact SG. This difference in SG pressures minimizes the difference in flow splits between the two SGs that results from Item 1.

Question 6:

The one second check valve closure time has minimal impact on the DA-ME-92-147 analysis. The one second time is used to assess what point in time the LOFTRAN transient analysis on SG blowdown is used to quantify the flow from the intact SG to the break and the corresponding MS pressure conditions. The one second closure time is the typical Chapter 15 accident analysis time used for Ginna for isolation of the intact SG from the break by closure of the MS check valves for the design basis large MSLBs.

Question 7:

As stated in the response to Question 1, RG&E will have the Independent Review assess the assumption of treating the valve disk as a flat circular disk. The NRC identified that a concern expressed within the NRC was the potential for the angled disk to act as an air foil. This combined with the effect of the disk hinge arm on the top side of the disk could result in flow patterns over the top disk surface which results in differential pressure across the disk to lift up the disk instead of closing it. RG&E stated that this concern would be addressed by Duke in their assessment.

Question 8:

RG&E stated that presently we do not have detailed drawings of the valve internals that would allow us to quantify the flow areas and volumes requested by this concern. We are pursuing this information with Atwood Morril.