



January 31, 1991

#CAN019102

U. S. Nuclear Regulatory Commission
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SUBJECT: Arkansas Nuclear One - Units 1 & 2
Docket Nos. 50-313 and 50-368
License Nos. DPR-51 and NPF-6
NRC Bulletin No. 88-08 Thermal
Stresses in Piping Connected to
Reactor Coolant Systems

Gentlemen:

NRC Bulletin 88-08, "Thermal Stresses in Piping Connected to Reactor Coolant Systems", addresses unisolable piping systems connected to the Reactor Coolant System (RCS) which could be subjected to temperature stratification or temperature oscillations. This stratification or oscillations could be induced by leaking valves and may not have been evaluated in the design analysis of the piping.

NRC Bulletin 88-08 requested the following actions be performed:

1. A review of all systems connected to the RCS to determine which, if any, meet the criteria and a report of these findings.
2. For any sections of pipe which meet the referenced criteria, perform a nondestructive examination of all welds and other high stress locations to provide assurance that no flaws exist.
3. Plan and implement a program that will prevent the occurrence of this thermal stratification problem. For instance, by redesign, instrumentation or by preventing higher than RCS pressure from occurring on the potentially leaking valve.

NRC Bulletin 88-08 also required the following submittals:

1. Within 30 days of completion of Action 1, a letter should be submitted confirming that the action has been completed and describing the results of the review. If the review performed under Action 1 indicates that a potential problem exists, the confirmatory letter shall include a schedule for completing Actions 2 and 3.

2. If it is determined that there are unisolable sections of piping that meet the criteria of the bulletin, a letter shall be submitted within 30 days of completion of Actions 2 and 3. The letter should confirm that Actions 2 and 3 have been completed and describe the actions taken.

Supplements 1, 2, and 3 to the bulletin were issued subsequent to the issuance of NRC Bulletin 88-08. No new actions or reporting requirements were requested in these supplements. The actions requested in the bulletin remained unchanged.

The purpose of this letter is to confirm that Action 3 has been completed for Arkansas Nuclear One, Unit 1 (ANO-1) and to describe the actions taken and to reconfirm that Action 3 is not applicable to ANO-2. Because of the difference in design and results, the ANO-1 and ANO-2 responses will be presented separately.

ANO-1

As identified in letter #CAN108806 (dated October 12, 1988), a review of twenty-three (23) different piping systems connected to the RCS was conducted. Four separate lines (three high pressure injection (HPI) and the pressurizer auxiliary spray) were identified to be potential lines of concern. The fourth HPI line (normal makeup) was not considered to be a concern in the original bulletin response since it has sufficient continuous makeup flow.

An additional evaluation of these twenty-three different piping systems was performed by Entergy Operations. This evaluation considered outleakage from the RCS as described in Supplement 3. Out of this review, the four HPI lines were again identified as a concern. These lines were chosen primarily because of our experience with backflow through them in the past. Modifications to the HPI system, implemented during 1R9 (as discussed in ICAN089002), addressed the cause of the previous major backflow event. Entergy Operations, however, considers it prudent to place instrumentation upstream of the first check valve on these lines. This instrumentation will not only confirm any backflow event in the future but will also be an invaluable tool in defining future thermal transient events.

For Unit 1, the implementation of a temperature monitoring program is considered to satisfy the Action 3 request for both the lines identified per the original bulletin and for the lines identified per Supplement 3. Top and bottom instrumentation has been provided for the detection of potential stratification at a total of nine locations. Two on each of the four HPI lines (upstream and downstream of the first check valve away from the RCS) and on the auxiliary spray line (between the main/auxiliary

spray tee and the first check valve). It is Entergy Operations' intent to establish appropriate limits on temperature distribution (delta-T) in these lines once baseline temperature ranges are established. These baseline temperature ranges will be determined before the next refueling outage as data is gathered and evaluated. Once these distribution limits are established, this information will be input into the temperature monitoring program.

Enough information currently exists to establish high temperature alarm setpoints for the resistance temperature detectors (RTDs) upstream of the HPI check valves MU-34A, B, C, and D. This value was set at 200° F. This temperature conservatively envelopes the normal operating temperature of the line but will detect a backflow of hot RCS fluid if present. If the alarm is activated, a preliminary evaluation of the significance of the problem will be performed. Also, a condition report shall be written for further evaluation. No other immediate action is required by the operator. Note that once the baseline data is gathered and evaluated, this setpoint may be lowered to reflect the high end of the actual operating temperatures.

ANO-2

As presented in letter 0CAN108806, none of the thirty-nine (39) RCS connected systems were determined to be subject to temperature distributions which would result in "unacceptable thermal stresses". Therefore, Actions 2 and 3 were determined to be not applicable. Likewise, Supplements 1 and 2 were determined to be not applicable since they were contingent upon the identification of piping sections meeting the referenced criteria.

Supplement 3 was addressed via Combustion Engineering Owners Group (CEOG) Task 626 "Evaluation of Thermal Stresses in Piping connected to C-E Designed Reactor Coolant Systems in Response to NRC Bulletin 88-08, Supplement 3". The results of that task revealed that only three piping systems - safety injection, shutdown cooling, and hot leg injection - could possibly be subject to excessive stresses due to outleakage from the RCS. Additional evaluations of these three systems were performed by Entergy Operations. The results of these evaluations determined that due to ANO-2's specific configuration and existing instrumentation, these systems will either not be subject to the outleakage type stratification as described in Supplement 3 or there is sufficient instrumentation and precautions in place to detect outleakage. Therefore, Actions 2 and 3 of the bulletin do not apply to ANO-2.

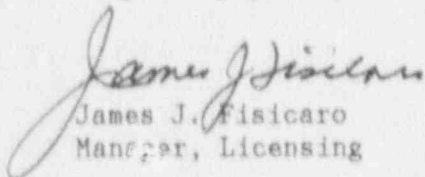
Future Program Actions

Additional efforts are ongoing to better define potential stratification problems in horizontal lines. Entergy Operations is currently participating in CEOG Task 588 to install temporary thermocouples on several systems (including the shutdown cooling line and safety injection) in a pilot plant to gather data for the validation of flow assumptions used in fatigue evaluations. In addition, both the CEOG and BWOOG (both of which Entergy Operations are members) are participants in the EPRI Research Program RP-3153 "Thermal Stratification, Cycling, and Striping Project (TASCS)". This effort is expected to be active through January 1993. The expected end product of the project is generic identification of unisolable systems where thermal stratification or oscillations are possible, as well as a set of screening criteria that may be utilized on the subject systems to aid in the determination of potential problems on a site specific basis. Data from this effort should also be helpful in defining the alarm setpoints for the instrumentation installed on the ANO-1 lines. It is Entergy Operations' intent to track the EPRI program and utilize the results of that effort to better identify potential problem systems.

This letter is being sent under affirmation as requested in NRC Bulletin 88-08.

Should you have any questions regarding this issue, please contact me.

Very truly yours,


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Manager, Licensing

JJF/RWC/sgw

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STATE OF ARKANSAS)
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 SS

I, James J. Fisicaro, being duly sworn, subscribe to and say that I am
Manager, Licensing AND for Entergy Operations, Inc.; that I have full
authority to execute this oath; that I have read the document numbered
ØCANØ191Ø2 and know the contents thereof; and that to the best of my
knowledge, information and belief, the statements in it are true.

James J. Fisicaro
James J. Fisicaro

SUBSCRIBED AND SWORN TO before me, a Notary Public in
and for the County and State above named, this 31st day of
January, 1991

Sandy Liebenmorgen
Notary Public

My Commission Expires:

May 11, 2000