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SUBJECT: Responds to NRC 870824 request for addl info re IE Bulletin
 85-03, "Motor-Operated Valve Common Mode Failures During
 Plant Transients Due to Improper Switch Settings." Encl info
 consistent w/Owners Group position. Util commitments listed.

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NOV 05 1987

U.S. Nuclear Regulatory Commission
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Gentlemen:

In the Matter of the Application of)
Tennessee Valley Authority)

Docket Nos. 50-438
50-439

BELLEFONTE NUCLEAR PLANT (BLN) - REQUEST FOR ADDITIONAL INFORMATION CONCERNING
BLN'S RESPONSE TO INSPECTION AND ENFORCEMENT BULLETIN (IEB) 85-03,
"MOTOR-OPERATED VALVE COMMON MODE FAILURES DURING PLANT TRANSIENTS DUE TO
IMPROPER SWITCH SETTINGS"

Enclosure 1 is TVA's response to NRC's August 24, 1987 request for additional
information concerning IEB 85-03. TVA has coordinated this response with the
other Babcock & Wilcox Owners Group members and determined the response to be
consistent with the Owners Group position on these issues. On October 23,
1987, a seven-day extension was granted to allow coordination within TVA.
This was discussed in a telephone conference call between R. Auluck, Office
of Special Projects Staff, and W. T. Watters, BLN Site Licensing Staff.
Enclosure 2 identifies the commitments made in enclosure 1.

If there are any questions regarding this subject, please call
Dennis L. Terrill at (205) 574-8820.

Very truly yours,

TENNESSEE VALLEY AUTHORITY

R. Gridley
By RLL
R. Gridley, Director
Nuclear Licensing and
Regulatory Affairs

Enclosures
cc: See page 2

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NOV 05 1987

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ENCLOSURE 1

TVA RESPONSE TO NRC REQUEST FOR ADDITIONAL INFORMATION IEB 85-03

Question 1

Unlisted MOVs IFCV-076-A and IFCV-079-B in discharge lines of the core flooding tank safety injection system are shown normally open (fail locked) on FSAR figures 6.3.1-2 (Amendment 22, 03-15-82, Drawing 2GW0900-NL-1R4) and 6.3.2-1. According to Note 9, "Power will be removed from these motor starters at any time reactor coolant press is above 650 psig." Based on the assumption of inadvertent equipment operations as required by action item a of the bulletin, revise the list of affected MOVs in the response to include these valves. Otherwise, please state what controls are placed on these valves to ensure that they will not be left closed inadvertently after (say) maintenance.

Response

The following controls will be in place to ensure that MOVs IFCV-076-A and IFCV-079-B will not be left closed inadvertently. These controls are sufficient to preclude this type of occurrence and therefore these valves are not included in response to action item a of IEB 85-03.

- a. As described in the FSAR section 7.6.1.2, "Each of the two core flood tank isolation valves are automatically opened when the reactor coolant pressure exceeds 750 psig. The interlocks and controls are a part of the Engineered Safety Features Actuation System."
- b. As described in the FSAR section 7.6.1.2.1, "The controls open the core flood tank isolation valves and prevent closing when reactor coolant pressure exceeds 750 psig."
- c. As described in FSAR section 7.6.1.2.2, (1) "Each core flood tank isolation valve receives an additional open command from the ECCI digital channels. (2) Upon loss of power in the logic system, automatic open signals are continuously applied."
- d. Operating instructions will require second party verification that each valve is open before increasing pressure.
- e. Once each valve is open, technical specifications and operating instructions will require that the 480 volt power breaker be racked out and tagged with a hold order. This action will also require second party verification. This removes any possibility that the valves will close with the reactor at power.
- f. Indication in the main control room will also be provided by the following:
 1. Indication of valve position
 2. Separate alarms based on valve position is provided
 3. Valve position is noted on the core flood mimic

Question 2

Has water hammer due to valve closure been considered in the determination of pressure differentials? If not, please explain.

Response

Water hammer caused by valve closure has been considered in the determination of pressure differentials. Water hammer contributions to differential pressures are significant where the valve closure time is less than or equal to the pressure wave propagation period through the piping network. Factors which tend to reduce the effects of water hammer during valve closure are valve closure times greater than the wave propagation period, pipe fittings, branch lines, bends, elbows, and low flow velocities.

To produce a shock wave of short duration that would significantly affect the differential pressure the valve must close very rapidly. Please note that the stroke time of the valves identified to comply with the bulletin are of sufficient length to produce a negligible shock wave. Therefore, to include water hammer in the analysis for determining differential pressure is considered inappropriate and is insignificant.

Question 3

Note 2 following the listing of affected valves in the response of 05-13-86 indicates that switch settings of these valves were set properly by B&W and tested by them at listed differential pressures before shipment to the site. We do not agree with the statement that "this testing will preclude the need for further operability testing as discussed in item c of IE Bulletin 85-03." What will be done to assure that installation and preoperational maintenance do not affect operability adversely? Please clarify whether Note 2 refers to valves of both the auxiliary feedwater and high pressure injection systems.

Response

The purpose of preoperational testing is to ensure that the operability of installed equipment has not been compromised or inappropriately designed. Therefore, installation or preoperational maintenance that could adversely affect the operability of these valves would be detected during preoperational testing. The intent of our previous submittal was to establish the fact that a representative valve of each type supplied by Babcock and Wilcox had been tested to the maximum design pressure of their respective system and no additional testing to verify this was necessary. However, we are following the industry programs in this area and are participating in a Babcock & Wilcox (B&W) Owners Group Program to develop a comprehensive methodology for ensuring that MOVs are properly tested and maintained. We expect this program to recommend that testing in combination with diagnostic equipment be utilized to ensure MOV operability is maintained. The industrial experience and standards developed before preoperational testing at BLN will be considered to develop a testing program and maintain the integrity of the MOVs.

Response (Continued)

This will ensure that TVA incorporates the "state of the art" in our MOV program. To summarize, a testing program will be implemented that exceeds simple differential testing of these valves and will confirm that operability is maintained.

In response to the last part of this question, Note 2 only applied to those valves which contained this notation beside the differential pressure listing and, therefore, does not apply to the auxiliary feedwater system valves or valve NV-IFCV-452-A of the high pressure injection system.

Question 4

The following statement is included in the response to items b, c, and d: "As noted in our response to item a the valves supplied by the NSSS vendor have been previously tested at differential pressure greater than or equal to the maximum differential pressure that could occur and therefore, no further testing of these valves will be performed." For the reason given in comment 3 above, we do not agree with this statement.

Response

As stated in our response to comment 3, we concur that further operability testing must be performed to determine that the subject valves are maintained properly in order to perform their required safety and operational functions. TVA will develop a program in cooperation with the B&W Owners Group and other industry efforts to confirm proper switch settings on the installed valves and that the valves will perform their intended function throughout the life of the plant.

Question 5

As indicated by comments 3 and 4 above, we feel that the program for high pressure injection valves set and tested by the NSSS supplier is deficient. Further, we feel that the program for AFW valves should be clarified and expanded.

Response

The program for testing the high pressure injection valves by the vendor was not deficient. This program tested a representative valve of each type supplied by B&W to the maximum differential pressure that the system was designed for. However, confirmation of the valves operability should be performed during preoperational testing to confirm that no detrimental effects to the valve have occurred during installation or functional testing. In addition this testing will confirm the previous vendor test data and provide for an inplant baseline data base that will be utilized for long-term maintenance and operability testing on the MOVs.

Response (Continued)

In response to the second part of this comment, TVA believes it is inappropriate to clarify or expand on the BLN program for the MOVs at this time, since this testing will not need to begin for several years. It appears to be more prudent for TVA/BLN to delay the full development of this program until it is required for preoperational testing activities. This will allow TVA to develop a "state of the art program" and utilize the lessons learned within the industry. TVA expects this program to utilize system operational testing and diagnostic equipment similiar to the programs being implemented at other facilities. As stated in our previous submittal, the full scope of the program will be developed and submitted in conjunction with the preoperational testing program.

Question 6

In addition to resolving comments 3, 4, and 5 above, please expand the proposed program for action items b, c, and d to include the following details as a minimum:

- (a) commitment to a training program for setting switches, maintaining valve operators, using test equipment and interpreting test results,
- (b) justification of a possible alternative to testing at maximum differential pressure at the plant, and
- (c) description of a method possibly needed to extrapolate valve stem thrust determined by testing at less than maximum differential pressure.

Response

- (a) In response to comment (a) TVA already performs training for switch settings and maintenance of valve operators, however, training will be expanded to include the use of test/diagnostic equipment when this area of the program is developed. As stated earlier, TVA is participating with the B&W Owners Group to develop a MOV testing and maintenance program, utilizing the lessons learned from the testing being performed at various facilities. It has already been identified to TVA that additional training will be required to utilize test equipment and interpret test results. TVA will ensure that the appropriate training programs are developed and provided to perform these tasks adequately.
- (b) At this time TVA has not developed the testing program for BLN and therefore, has not identified the need for possible alternatives to testing at maximum differential pressure. If this need arises, TVA will prepare and submit justification as required by IEB 85-03.

Response (Continued)

- (c) As stated in item (b) above TVA has not identified to date any valves which cannot be tested at maximum differential pressure. Therefore, a need to extrapolate valve stem thrust loads is not presently anticipated. If this need arises, TVA will prepare and submit a methodology.

ENCLOSURE 2

LIST OF COMMITMENTS IN ENCLOSURE 1

1. Operating instructions will require second party verification that each valve is open before increasing pressure.
2. Indication in the main control room will also be provided by (1) indication of valve position, (2) separate alarms based on valve position is provided, and (3) valve position is noted on the core flood mimics.
3. From response to question 6(b) - If the need arises for testing at maximum differential pressure, TVA will prepare and submit justification as required by IEB 85-03.
4. From response to question 6(c) - If the need arises, TVA will prepare and submit a methodology for testing valves at maximum differential pressure.
5. TVA will ensure that appropriate training programs are developed and provided to perform the task of utilizing test equipment and interpreting results. Training will be expanded to include the use of test/diagnostic equipment when this area of program is developed.