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Document Control Branch (Document Control Desk)

SUBJECT: Forwards addl info in response to IE Bulletin 85-003,
 "Motor-Operated Valve Common Mode Failures During Plant
 Transients Due to Improper Switch Settings," per 870917
 commitment.

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September 29, 1987

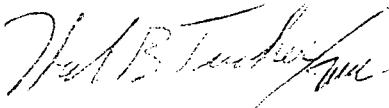
U. S. Nuclear Regulatory Commission
Attention: Document Control Desk
Washington, D. C. 20555

Subject: Oconee Nuclear Station
Docket Nos. 50-269, -270, -287

Dear Sir:

By letter dated August 18, 1987 the NRC Staff requested additional information to continue their review of Duke Power Company's (Duke) response to IE Bulletin 85-03. In a letter dated September 17, 1987 Duke committed to provide the requested information by October 15, 1987. Attached please find Duke's response to your request for additional information.

Very truly yours,



Hal B. Tucker

MAH/79/sbn

Attachment

xc: Ms. Helen Pastis
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Attachment

Duke Power Company
Oconee Nuclear Station

Response To The NRC Request For
Additional Information Concerning
Oconee's Responses To IE Bulletin 85-03
Dated September 17, 1987

Question 1:

Unlisted MOVs CF-1 and CF-2 in discharge lines of the core flooding tank safety injection system are shown normally open on FSAR Figure 6.0-2, Revision D2. The possible problem that the system would be inoperable if the MOVs were left closed inadvertently should be addressed. Based on the assumption of inadvertent equipment operations as required by Action Item a of the bulletin, revise pages 4 and 5 of the response of May 16, 1986 to include these valves.

Response to Question 1:

- References:
1. IEB 85-03, Page 4 "Actions for all Holders of Operating Licenses Construction Permits", Paragraph 1.
 2. Station Operation Procedures OP/1,2,3/A/1104/01, "Core Flooding System".

The core flood system is not considered to be part of the Oconee high pressure coolant/core spray system and therefore CF-1 and CF-2 are not part of the IEB 85-03 response. These two motor operated valves (MOVs), however, are being addressed in the overall MOV upgrade program at Oconee. This program is a comprehensive program to ensure all safety related and key station MOVs are correctly sized, set up and maintained in an operable condition. In addition, CF-1 and CF-2 are administratively controlled per operation procedures to be opened, visually verified to be opened and the breakers supplying power to these MOVs are locked open.

Question 2:

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

Response to Question 2:

- References: Lyons, J.L., Lyons' Valve Designer's Handbook, Chapter 36.

Water hammer contributions to piping differential pressures are significant where the valve closure time is less than or equal to the pressure wave propagation period through the piping network, T_c . Factors which tend to reduce the effects of water hammer during valve closure are valve closure times greater than T_c , pipe fittings, branch lines, parallel circuits, bends, and low flow velocities, all or many of which are present with the Oconee IEB 85-03 MOVs. In addition, the maximum pressure resulting from water hammer is not introduced until the point of complete fluid shut off and is therefore of more concern from a pipe stress standpoint than for valve differential pressure contributions.

In examination of the IEB 85-03 MOVs, 1HP 409 has the fastest closing time (less than 10 seconds), the greatest flow velocity (12.5 ft/sec.), and a long pipe run. By conservatively assuming a straight pipe run without branch lines, fittings, etc., the T_c for this case is 0.10 seconds and the differential pressure contribution due to water hammer effects is less than 8 psi. Since this is a bounding case for the IEB 85-03 MOVs, the effects of water hammer on differential

pressure is considered to be negligible and is therefore not included in the maximum expected differential pressure values.

Question 3:

Please explain on an individual basis why the 12 MOVs shown in discharge lines of the EFW pumps on FSAR Figure 10.4-13 for Oconee 1 are not listed in the response of 05-16-86. Assume inadvertent equipment operations as required by Action Item a of the bulletin, and consider the separation of EFW and normal FW Systems. As appropriate, revise the response of 05-16-86 to include these valves. This comment applies also to units 2 and 3.

Response to Question 3:

- References:
1. Oconee FSAR Section 10.4.7 "Emergency Feedwater System".
 2. Oconee FSAR Figure 10.4-7, "Flow Diagram of Main Feedwater System".
 3. Oconee FSAR Figure 10.4-13, "Flow Diagram of Emergency Feedwater System".
 4. Oconee Operation Procedure OP/1/A/1106/06, "Emergency Feedwater System".

FDW 36 - 'A' start up loop return to main FDW:

Valve Position: Open in normal FDW line up.

Reason(s) for NOT including in IEB 85-03 response:

1. MOV is not included in the Oconee IWV program.
2. MOV is not part of the technical specification safety system for emergency FDW.
3. MOV is used primarily for low power conditions to allow main FDW to be diverted through the start up header. Inadvertent closure and failure of this MOV would not affect the ability of the emergency FDW system from supplying both steam generators (S/Gs) through the normal line up for emergency operation. In addition, this MOV is closed to supply main FDW to the S/Gs through the emergency FDW header as an alternate flow path.

Although this MOV is not included in the IEB 85-03 response, it is included in the Oconee MOV upgrade program to ensure it is sized, set up and maintained in an operable condition.

FDW 45 - 'B' start up loop return to main FDW:

Valve Position: Open in normal FDW line up.

Reason(s) for NOT including in IEB 85-03 response:

1. Same as FDW 36.

FDW 33 - 'A' start up loop supply from main FDW:

Valve Position: Open in normal FDW line up.

Reason(s) for NOT including in IEB 85-03 response:

1. MOV is not included in the Oconee IWV program.
2. MOV is not part of the technical specification safety system for emergency FDW.
3. MOV is used primarily for low power conditions to allow main FDW to be diverted through the start up header. Inadvertent closure and failure of this MOV would not affect the ability of the emergency FDW system from supplying both S/Gs through the normal line up for emergency operation.

Although this MOV is not included in the IEB 85-03 response, it is included in the Oconee MOV upgrade program to ensure it is sized, set up and maintained in an operable condition.

FDW 42 - 'B' start up loop supply from main FDW:

Valve Position: Open in normal FDW line up.

Reason(s) for NOT including in the IEB 85-03 response:

1. Same as for FDW 33.

FDW 38 - 'A' start up loop supply to 'A' S/G emergency FDW header:

Valve Position: Closed in normal FDW line up.

Reason(s) for NOT including in the IEB 85-03 response:

1. MOV is not included in the Oconee IWV program.
2. MOV is not part of the technical specification safety system for emergency FDW.
3. MOV is used to provide an alternate flow path to the emergency FDW header from either the emergency FDW or main FDW pumps. For this alternate flow path to be used valve FDW 315 would need to fail closed. Failure of MOV FDW 38 to open would not affect the ability of the emergency FDW system from supplying both S/Gs through the normal line up for emergency operation.

Although this MOV is not included in the IEB 85-03 response, it is included in the Oconee MOV upgrade program to ensure it is sized, set up and maintained in an operable condition.

FDW 47 - 'B' start up loop supply to 'B' S/G emergency FDW header:

Valve Position: Closed in normal FDW line up.

Reason(s) for NOT including in IEB 85-03 response:

1. Same as for FDW 38.

FDW 372 - 'A' MDEFWP discharge to line 'A2':

Valve Position: Open in normal emergency FDW line up.

Reason(s) for NOT including in IEB 85-03 response:

1. MOV is not included in the Oconee IWV program.
2. MOV is used in the normal line up for emergency operation to supply emergency FDW from the 'A' MDEFWP to the 'A' S/G or to the 'B' S/G through the cross over header. Inadvertent closure and failure of this MOV would affect the ability of the emergency FDW system from supplying both S/Gs ONLY if another component failure occurred. With

this MOV failed closed, emergency FDW could still be supplied to both S/Gs using the TDEFWP or the 'B' MDEFWP. Both the TDEFWP and 'B' MDEFWP or another MOV would need to also fail to prevent the emergency FDW system from supplying both S/Gs.

Although this MOV is not included in the IEB 85-03 response, it is included in the Oconee MOV upgrade program to ensure it is sized, set up and maintained in an operable condition.

FDW 382 (misabeled as FDW 282 on FSAR Figure 10.4-13)- 'B' MDEFWP discharge to line 'B2':

Valve Position: Open in normal emergency FDW line up.

Reason(s) for NOT including in IEB 85-03 response:

1. MOV is not included in the Oconee IWV program.
2. MOV is used in the normal line up for emergency operation to supply emergency FDW from the 'B' MDEFWP to the 'B' S/G or to the 'B' S/G through the cross over header. Inadvertent closure and failure of this MOV would affect the ability of the emergency FDW system from supplying both S/Gs ONLY if another component failure occurred. With this MOV failed closed, emergency FDW could still be supplied to both S/Gs using the TDEFWP or the 'A' MDEFWP. Both the TDEFWP and 'A' MDEFWP or another MOV would need to also fail to prevent the emergency FDW system from supplying both S/Gs.

Although this MOV is not included in the IEB 85-03 response, it is included in the Oconee MOV upgrade program to ensure it is sized, set up and maintained in an operable condition.

FDW 374 - 'A' MDEFWP discharge to line 'A1':

Valve Position: Closed in normal emergency FDW line up.

Reason(s) for NOT including in IEB 85-03 response:

1. MOV is not included in the Oconee IWV program.
2. This MOV is opened to supply EFW to the 'A' start up loop. Once opened, EFW can be diverted to the 'A' S/G through the emergency or main FDW headers. However, this MOV is not part of the normal EFW line up for emergency operation and supply of EFW to the 'A' S/G would not be affected by failure in the shut position unless valves FDW 315 or both FDW 372 and 368 also failed shut.

Although this MOV is not included in the IEB 85-03 response, it is included in the Oconee MOV upgrade program to ensure it is sized, set up and maintained in an operable condition.

FDW 384 - 'B' MDEFWP discharge to line 'B1':

Valve Position: Closed in normal emergency FDW line up.

Reason(s) for NOT including in the IEB 85-03 response:

1. MOV is not included in the Oconee IWV program.
2. This MOV is opened to supply EFW to the 'B' start up loop. Once opened, EFW can be diverted to the 'B' S/G through the emergency or

main FDW headers. However, this MOV is not part of the normal EFW line up for emergency operation and supply of EFW to the 'B' S/G would not be affected by failure in the shut position unless valves FDW 316 or both FDW 382 and 369 also failed shut.

Although this MOV is not included in the IEB 85-03 response, it is included in the Oconee MOV upgrade program to ensure it is sized, set up and maintained in an operable condition.

FDW 368 - TDEFWP discharge to line 'A2':

Valve Position: Open in normal emergency FDW line up.

Reason(s) for NOT including in the IEB 85-03 response:

1. MOV is not included in the Oconee IWV program.
2. This MOV is used in the normal EFW line up for emergency operation to permit EFW to be supplied to the 'A' S/G from the TDEFWP. Supply of EFW to the 'A' S/G would not be affected by a failure of this MOV in the closed position unless the 'A' MDEFWP also fails.

Although this MOV is not included in the IEB 85-03 response, it is included in the Oconee MOV upgrade program to ensure it is sized, set up and maintained in an operable condition.

FDW 369 - TDEFWP discharge to line 'B2':

Valve Position: Open in normal emergency FDW line up.

Reason(s) for NOT including in the IEB 85-03 response:

1. MOV is not included in the Oconee IWV program.
2. This MOV is used in the normal EFW line up for emergency operation to permit EFW to be supplied to the 'B' S/G from the TDEFWP. Supply of EFW to the 'B' S/G would not be affected by a failure of this MOV in the closed position unless the 'B' MDEFWP also fails.

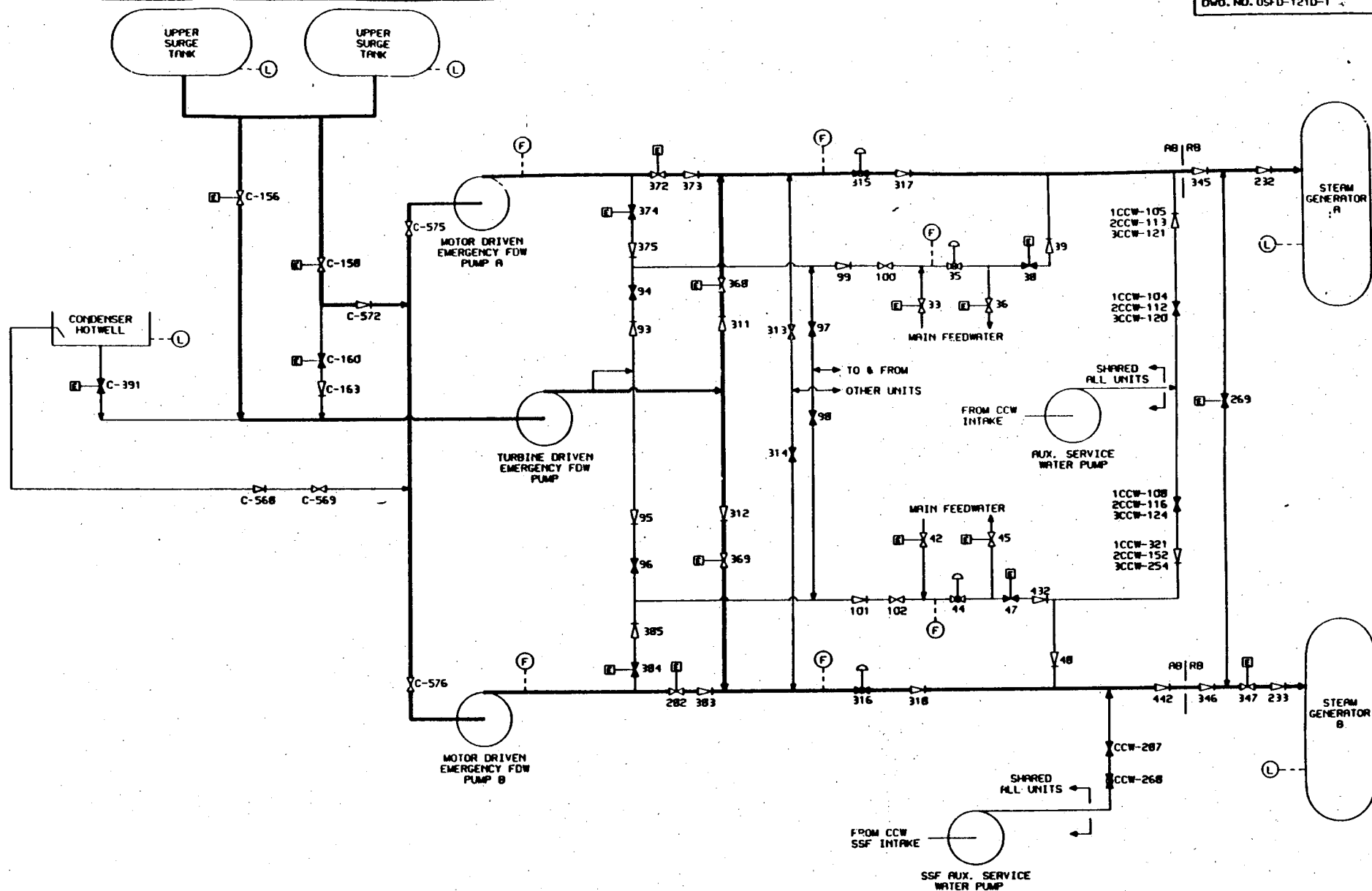
Although this MOV is not included in the IEB 85-03 response, it is included in the Oconee MOV upgrade program to ensure it is sized, set up and maintained in an operable condition.

Question 4:

We have been unable to locate MOV 1-FDW-347, which is identified in the response of 05-16-86. However, we are able to find MOV 1-FDW-47 on FSAR Figure 10.4-13, in a discharge line to Steam Generator 1B. Is this valve meant? This question applies in essence to units 2 and 3 also.

Response to Question 4:

FDW 347 is the second valve upstream from the 'B' S/G and is shown on the 1986 update of FSAR Figure 10.4-13. This valve is a standby shutdown facility valve and is included in the Oconee IWV program for surveillance testing. Inadvertent closure and failure of this MOV would prevent emergency FDW from being supplied to the 'B' S/G via the emergency FDW header.



TYPICAL FOR UNITS 1,2,3
ALL VALVES "FOW" EXCEPT AS NOTED



FLOW DIAGRAM OF
EMERGENCY FEEDWATER SYSTEM
OCONEE NUCLEAR STATION
FIGURE 10.4-13

1986 Update