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ENGINEERING OFFICE

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B. 3.2.1
WMY 79-138

November 20, 1979

United States Nuclear Regulatory Commission
Washington, D. C. 20555

Attention: Office of Nuclear Reactor Regulation
Darrell G. Eisenhut, Acting Director
Division of Operating Reactors

References: (a) License No. DPR-36 (Docket No. 50-309)
(b) NRC Letter to Maine Yankee dated October 18, 1979

Dear Sir:

Subject: NRC Requirements for Auxiliary Feedwater Systems at the Maine Yankee Atomic Power Station

The enclosed information is in response to your letter, Reference (b), regarding the auxiliary feedwater systems at Maine Yankee.

We trust this information adequately addresses your concerns; however, if you should desire additional information, please contact us.

Very truly yours,

MAINE YANKEE ATOMIC POWER COMPANY

E Jackson for
Donald E. Moody
Manager of Operations

RPB/dmp

Enclosures

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ENCLOSURE 1

X.4.3.1 SHORT TERM RECOMMENDATIONS

1. Recommendation GS-2 - The licensee should lock open single valves or multiple valves in series in the AFW system pump suction piping and lock open other single valves or multiple valves in series that could interrupt all AFW flow. Monthly inspections should be performed to verify that these valves are locked and in the open position. These inspections should be incorporated into the surveillance requirements of the plant Technical Specifications. See Recommendation GL-2 for the longer term resoluation of this concern.

Response

All manual valves in the AFW system necessary to assure flow from the primary water source to the steam generators, are currently locked in position. These valves have been added to the plant's ECCS locked valve checklist and as such are inspected monthly. It is currently anticipated that a Technical Specification change will be submitted by February 1, 1980 which will make this a formal requirement.

2. Recommendation GS-4 - Emergency procedures for transferring to alternate sources to AFW supply should be available to the plant operators. These procedures should include criteria to inform the operator when, and in what order, the tranfer to alternate water sources should take place. The following cases should be covered by the procedures:

- The case in which the primary water supply is not initially available. The procedures for this case should include any operator actions required to protect the AFW system pumps against self-damage before water flow is initiated; and,
- The case in which the primary water supply is being depleted. The procedure for this case should provide for transfer to the alternate water sources prior to draining of the primary water supply.

Response

The plant will upgrade existing emergency procedures to provide instructions for transferring to alternate sources of AFW supply. These procedures shall include criteria to inform the operator when, and in what order the transfer to alternate water sources should take place. The case in which the primary water supply is initially not available, as well as the case in which the primary water supply is being depleted, will both be covered. It is currently anticipated that these procedure modifications will be completed by January 1, 1980.

3. Recommandation GS-6 - The licensee should confirm flow path availability of an AFW system flow train that has been out of service to perform periodic testing or maintenance as follows:
   - Procedures should be implemented to require an operator to determine that the AFW system valves are properly aligned and a second operator to independently verify that the valves are properly aligned.

- The licensee should propose Technical Specifications to assure that prior to plant startup following an extended cold shutdown, a flow test would be performed to verify the normal flow path from the primary AFW system water source to the steam generators. The flow test should be conducted with AFW system valves in their normal alignment.

Response

The valves in the AFW system, by procedure, are placed in their operational configuration as part of restoring the system to service following maintenance or testing. The plant shall commit to providing an independent verification of this valve alignment.

It is currently anticipated that a Technical Specification change will be submitted by February 1, 1980 to require a flow test of the AFW system prior to plant startup following an extended cold shutdown.

4. Recommendation GS-8 - The licensee should install a system to automatically initiate AFW system flow. For the short-term, this system need not be safety-grade; however, it should meet the criteria listed below, which are similar to Item 2.1.7a of NUREG-0578. For the longer term, the automatic initiation signals and circuits should be upgraded to meet safety-grade requirements as indicated in Recommendation GL-1.

- The design should provide for the automatic initiation of the auxiliary feedwater system flow.

- The automatic initiation signals and circuits should be designed so that a signal failure will not result in the loss of auxiliary feedwater system function.
- Testability of the initiation signals and circuits should be a feature of the design.
- The initiating signals and circuits should be powered from the emergency buses.
- Manual capability to initiate the auxiliary feedwater system from the control room should be retained and should be implemented so that a single failure in the manual circuits will not result in the loss of system function.
- The alternating current motor-driven pumps and valves in the auxiliary feedwater system should be included in the automatic actuation (simultaneous and/or sequential) of the loads to the emergency buses.
- The automatic initiation signals and curcuits should be designed so that their failure will not result in the loss of manual capability to initiate the AFW system from the control room.

Response

Maine Yankee Atomic Power Station will, for the short-term install a control grade system to automatically initiate AFW system flow. It will meet the criteria listed below, which are similar to Item 2.1.7a of NUREG-0578.

- The design will provide for the automatic initiation of the auxiliary feedwater system flow.

- The automatic initiation signals and circuits will be designed so that a single failure will not result in the loss of auxiliary feedwater system function.
- Testability of the initiation signals and circuits will be a feature of the design.
- The initiating signals and circuits will be powered from the emergency buses.
- Manual capability to initiate the auxiliary feedwater system from the control room will be retained and will be implemented so that a single failure in the manual circuits will not result in the loss of system function.
- The alternating current motor-drive pumps and valves in the auxiliary feedwater system will be included in the automatic actuation (simultaneous and/or sequential) of the loads to the emergency bus.
- The automatic initiation signals and circuits will be designed so that their failure will not result in the loss of manual capability to initiate the AFW system from the control room

The control grade AFW initiation system will be installed during the upcoming refueling outage which is scheduled to commence on January 15, 1980 provided that the safety analysis gives assurance that no degradation of safety will occur.

It is Maine Yankee's intention to upgrade to safety grade equipment at the first scheduled outage following the receipt of equipment.

It is currently anticipated that the design change for automatic initiation of AFW will be submitted for NRC review on or before December 15, 1979.

5. Recommendation - The licensee should propose a revision to the Technical Specification to require periodic AFWS operability testing on a monthly frequency rather than quarterly in conformance with current Standard Technical Specifications.

Response

Proposed Change No. 67 to the Maine Yankee Technical Specifications, submitted March 28, 1979, would require inservice testing of valves and pumps classified as ASME Code Class 1, Class 2 and Class 3; in accordance with the approved edition of the Code. This would have the effect of requiring monthly operability testing of the AFW system.

6. Recommendation - A pneumatic-operated valve in the steam supply line to the turbine-drive AFW pump, and the three pneumatic-operated AFW flow control valves derive their power from the same AC vital instrument bus. Although these valves are designed to fail open upon the loss of air or power, thereby assuring auxiliary feedwater flow to the steam generators upon such losses, it cannot be concluded that all failures will result in opening the valves. The consequences of voltage degradation should be analyzed as well as other failures (e.g., restricted air flow) to assure that such events would not incapacitate the auxiliary feedwater system. Establish suitable emergency procedures to assure AFWS function for such events. (See Long-Term Recommendation Number 3.)

Response

The consequences of voltage degradation on the operation of the pneumatic-operated valve in the steam supply line to the turbine-driven AFW pump and the three pneumatic-operated AFW control valves will be to open the valve. The consequences of air flow restrictions or loss of air is to open the valve. These events would not incapacitate the auxiliary feedwater system.

7. Recommendation - The licensee should verify that the air accumulator will hold the containment isolation valve in the turbine driven pump steam supply line open for at least two hours following loss of all AC power.

Response

The plant shall conduct a test to confirm that the air accumulator will hold the air operated valve in the turbine driven pump steam supply line open for at least two hours following loss of the normal air supplies. It is currently anticipated that this test will be completed by January 1, 1980.

X.4.3.2 ADDITIONAL SHORT-TERM RECOMMENDATIONS

1. Recommendation - The licensee should provide redundant level indications and low level alarms in the control room for the AFW system primary water supply to allow the operator to anticipate the

need to make up water or transfer to an alternate water supply and prevent a low pump suction pressure condition from occurring. The low level alarm setpoint should allow at least 20 minutes for operator action, assuming that the largest capacity AFW pump is operating.

Response

Maine Yankee presently has on the control board a level indicator, a low level alarm and a low-low level alarm for the demineralized storage tank. In addition, there is a local gauge available at the tank which measures in feet of water. Since the low level alarm will alarm at approximately 100,000 gallons and the operator has six (6) hours of water left in the system at that time, we feel a redundant alarm or indication is unnecessary. The operator will also receive an additional low-level alarm at 10,000 gallons, which provides 30 minutes to line up to another source.

2. Recommendation - The licensee should perform a 72-hour endurance test on all AFW system pumps, if such a test or continuous period of operation has not been accomplished to date. Following the 72-hour pump run, the pumps should be shut down and cooled down and then restarted and run for one hour. Test acceptance criteria should include demonstrating that the pumps remain within design limits with respect to bearing/bearing oil temperatures and vibration and that pump room ambient conditions (temperature, humidity) do not exceed environmental qualification limits for safety related equipment in the room.

Response

The plant currently anticipates performing the 72-hour endurance test on the AFW system pumps prior to plant startup from the refueling outage presently scheduled to commence on January 15, 1980.

3. Recommendation - The licensee should implement the following requirements as specified in Item 2.1.7.b on page A-32 of NUREG-0578:

"Safety-grade indication of auxiliary flow to each steam generator should be provided in the control room.

"The auxiliary feedwater flow instrument channels should be powered from the emergency buses consistent with satisfying the emergency power diversity requirements for the auxiliary feedwater system set forth in Auxiliary Systems Branch Technical Position 10-1 of the Standard Review Plan, Section 10.4.9."

Response

A control-grade indication of auxiliary flow to each steam generator will be provided in the Control Room. This equipment will be installed during the refueling outage which will commence January 15, 1980. In the long-term, this indication will be provided using safety-grade equipment and will be powered from emergency buses consistent with satisfying the emergency power diversity requirements for Auxiliary Feedwater Systems set forth in Auxiliary Systems Branch Technical Position 10-1 of the Standard Revised Plan, Section 10.4.9.

It is Maine Yankee's intention to upgrade to safety grade equipment at the first scheduled outage following receipt of equipment.

4. Recommendation - licensee with plants which require local manual realignment of valves to conduct periodic tests on one AFW system train, and there is only one remaining AFW train available for operation should propose Technical Specification to provide that a dedicated individual who is in communication with the control room be stationed at the manual valves. Upon instruction from the control room, this operator would realign the valves in the AFW system train from the test mode to its operational alignment.

Response

Not applicable. Maine Yankee has three AFW pumps. Periodic testing of any one of these pumps does not affect the availability of the remaining two pumps.

X.4.3.3 LONG TERM RECOMMENDATIONS

1. Recommendation - GL-1 - Licensees with plants having a manual starting AFW system, should install a system to automatically initiate the AFW system flow. This system and associated automatic initiation signals should be designed and installed to meet safety-grade requirements. Manual AFW system start and control capability should be retained with manual start serving as backup to automatic AFW system initiation.

Response

Maine Yankee will install a system to automatically initiate the AFW system flow. This system and associated automatic initiation signals will be designed and installed to meet safety-grade requirements. Manual AFW system start and control capabilities will be retained with manual start serving as backup to automatic AFW system initiation.

It is Maine Yankee's intention to upgrade to safety grade equipment at the first scheduled outage following receipt of equipment.

2. Recommendation-GL-2 - Licensees with plant in which all (primary and alternate) water supplies to the AFW systems pass through valves in a single flow path should install redundant parallel flow paths (piping and valves).

Licensees with plants in which the primary AFW system water supply passes through valves in a single flow path, but the alternate AFW system water supplies connect to the AFW system pump suction piping downstream of the above valve(s) should install redundant valves parallel to the above valve(s) or provide automatic opening of the valve(s) from the alternate water supply upon low pump suction pressure. The licensee should propose Technical Specifications to incorporate appropriate periodic inspections to verify the valve positions.

Response

This problem is presently being evaluated, and the resolution will be submitted by March 1, 1980. Upon final resolution of this issue, appropriate Technical Specifications will be submitted for NRC review prior to January 1, 1981.

3. Recommendation - Modify the AFWS design to eliminate the potential for adverse response of the three AFW flow control valves and one of the steam admission valves to the turbine pump due to degradation of power of the Division IV vital bus, e.g. provide service to these valves from the different division.

Response

The AFW system design will be modified to eliminate the potential for adverse response of the three AFW flow control valves and one of the steam admission valves to the turbine pump due to degradation of power to these valves, e.g., provide service to these valves from different vital power supplies.

A design change which addresses this recommendation will be implemented by January 1, 1981.

4. Recommendation - The licensee should evaluate the following concerns:

a. A pipe break in the auxiliary feedwater system common discharge header could result in the loss of auxiliary feedwater system function even without a postulated single active failure. The licensee indicated that in such an event the auxiliary feedwater can be manually routed through the main feedwater lines to the steam generators.

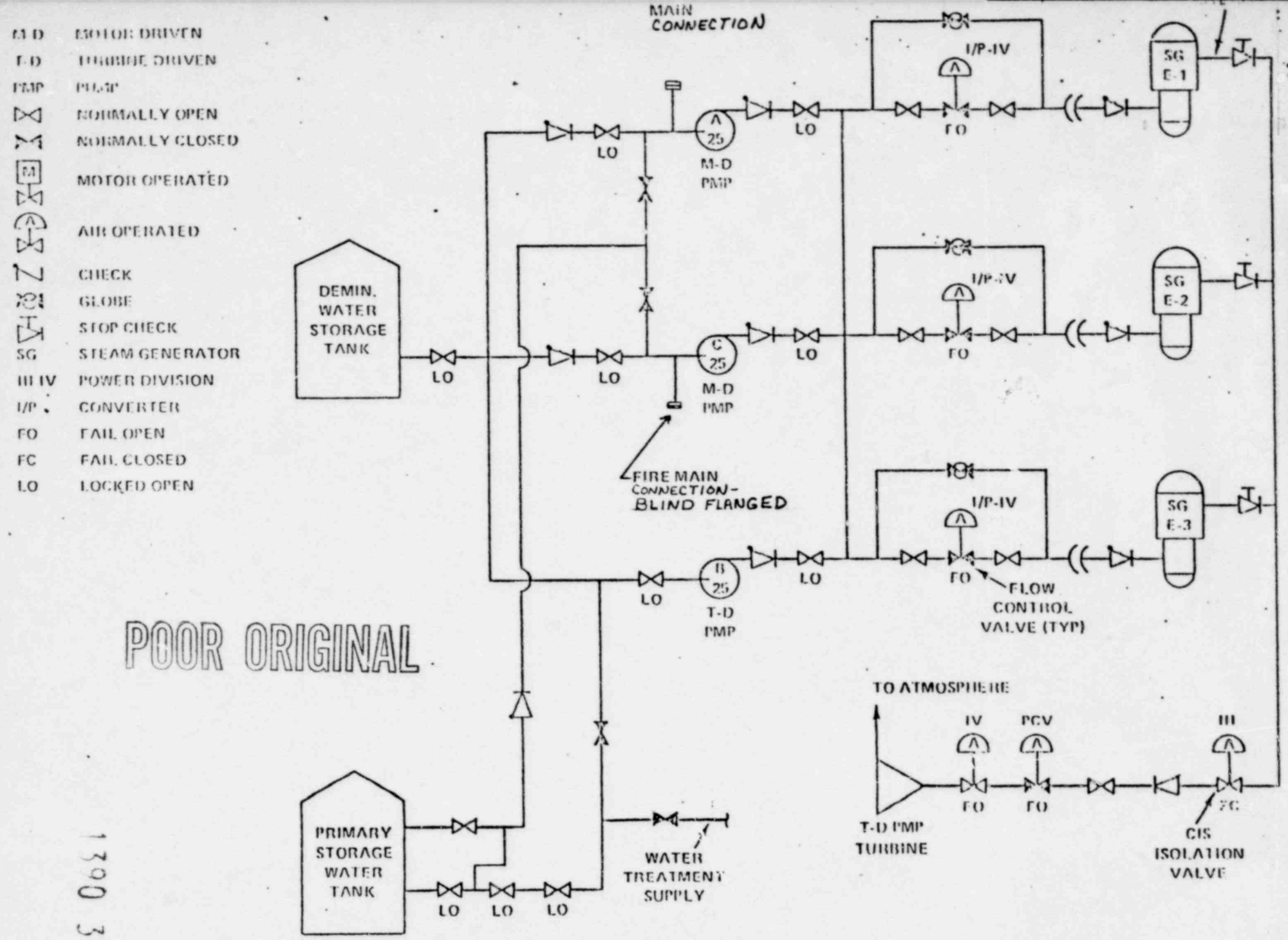
b. In the event of a steam or feedwater line break (main or auxiliary) the isolation of the auxiliary feedwater flow paths to the affected steam generator is accomplished manually. The licensee should evaluate the postulated pipe breaks stated above and (1) determine any AFW system design changes or procedures necessary to detect and isolate the break and direct the required feedwater flow to the steam generator(s) before they boil dry or (2) describe how the plant can be brought to a safe shutdown condition by use of other systems which would be available following such postulated events.

Response

This problem is presently being evaluated, and the resolution will be submitted for review by March 1, 1980.

GENERAL

The attached sketch submitted in Enclosure 1 of Reference (b), has been revised by Maine Yankee to reflect actual systems configuration.



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ENCLOSURE 2

The information requested in Enclosure 2 will be submitted at some later time.