NORTHEAST UTILITIES

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May 15, 1984

Docket No. 50-423
B11169

Director of Nuclear Reactor Regulation
Mr. B. J. Youngblood, Chief
Licensing Branch No. 1
Division of Licensing
U. S. Nuclear Regulatory Commission
Washington, D. C. 20555

Reference: (1) B. J. Youngblood to W. G. Counsil, Draft SER for Millstone Nuclear Power Station, Unit 3, dated December 20, 1983.

Dear Mr. Youngblood:

Millstone Nuclear Power Station, Unit No. 3
NRC Auxiliary System Branch (ASB) Review Meeting

A meeting was held between the NRC-ASB, Northeast Nuclear Energy Company and Stone & Webster in Bethesda, Maryland on April 9, 1984 to discuss two Draft SER open items (Reference 1) concerning the fire protection features which assure safe shutdown capability of Millstone 3. It was agreed that a letter would be transmitted to the NRC providing a summary of discussion on each of the above Draft SER open items. The attached summaries of discussion to the open items should fully resolve the staff's concerns regarding the open items.

If there are any questions, please contact our licensing representative.

Very truly yours,

NORTHEAST NUCLEAR ENERGY COMPANY ET AL
By Northeast Nuclear Energy Company
Their Agent

W. G. Counsil

W. G. Counsil
Senior Vice President

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STATE OF CONNECTICUT)
) ss. Berlin
COUNTY OF HARTFORD)

Then personally appeared before me W. G. Counsil, who being duly sworn, did state that he is Senior Vice President of Northeast Nuclear Energy Company, an Applicant herein, that he is authorized to execute and file the foregoing information in the name and on behalf of the Applicants herein and that the statements contained in said information are true and correct to the best of his knowledge and belief.

Marjorie J. Bolles
Notary Public

My Commission Expires March 31, 1988

Open Items

Chemical Engineering Branch - Fire Protection

FP-7 Safe Shutdown Capability (Draft SER Section 9.5.1.4)

The applicant has not provided an analysis of the fire protection features which assure safe shutdown capability. We will require the applicant to follow the fire protection guidance for safe shutdown contained in BTP CMEB 9.5-1, C.5.b. This is an open item.

Summary of Discussion (4/84)

A discussion on the fire protection features which assure safe shutdown capability of Millstone Unit No. 3 was provided at the April 9, 1984 Auxiliary Systems Branch (ASB) meeting. The discussion included:

(1) The evaluation of two specific systems (auxiliary feedwater and service water systems) that are required to achieve and maintain safe shutdown.

(2) An electrical division separation study that was performed as part of the safe shutdown analysis to ensure that at least one train of the above equipment is available in the event of a fire in areas that might affect these components.

Also, a drawing package consisting of electrical schematics, raceway drawing, cable schedules for the aux feed water and service water systems was provided to the staff at the meeting.

For additional information, refer to the revised sections 6, 7, 8, and 9 of the Fire Protection Evaluation Report.

Open Items

Chemical Engineering Branch - Fire Protection

FP-8 Alternate Shutdown (Draft SER Section 9.5.1.4)

Alternate shutdown capability is provided for the control room and cable spreading room by a remote shutdown panel located in the west switchgear area on elevation 4 feet - 6 inches of the control building. We have not completed the review of the alternate shutdown capability. We will report the results of our evaluation in a subsequent safety evaluation report. This is an open item.

Summary of Discussion (4/84)

During the April 9, 1984, Auxiliary Systems Branch Meeting, it was indicated that alternative shutdown measures were required for the control room, the instrument rack room, or the cable spreading room to ensure the availability of the safe shutdown system because these areas contain more than one division of safe shutdown system cabling. If a fire disables the control room, instrument rack room or cable spreading room, the Auxiliary Shutdown Panel (together with a fire transfer panel) which is located in a separate fire area in west switchgear area, provide an alternate to providing fire protection separation. The control functions and the indications provided at the Auxiliary Shutdown Panel and the fire transfer panel are described in Section 7.9 and 8.3 of the Fire Protection Evaluation Report and FSAR Section 7.4. The Branch Technical Position (BTP) CMEB 9.5-1, position C.5.c(d) requires provision for direct readings of the process variables necessary to perform and control the reactor shutdown function. The minimim monitoring capability (except reactor coolant cold leg temperature) has been provided on the Auxiliary Shutdown Panel (ASP) to meet the guidelines of BTP CMEB9.5-1 and Attachment I, item IX to IE Information Notice No. 84-09 dated February 13, 1984. The justification for not providing the reactor coolant cold leg temperature indication on the ASP is provided in the ATTACHMENT FP8-1.

ATTACHMENT FP8-1

Position Statement on Instrumentation Necessary for Alternative Shutdown

Introduction

In order to comply with the requirements of BTP CMEB 9.5-1, an auxiliary shutdown panel has been designed for Millstone Unit No. 3. The panel provides the following indication:

a) Steam Generator Pressure

b) RCS Pressure

c) Hot Leg Temperature

d) Pressurizer Level

e) Steam Generator Level

f) AFW Flow Rate

g) Source Range Monitor

However, the NRC staff has concluded that cold leg temperature indication is also required. The basis for this conclusion has been reviewed. NNECO disagrees with this conclusion and believes the current design of the Auxiliary shutdown panel meets the requirements of BTP CMEB 9.5-1.

Evaluation

The NRC staff has concluded that cold leg temperature indication is required for two concerns:

(1) Natural Circulation and

(2) Pressurized Thermal Shock and Appendix G of 10CFR50.

These concerns are addressed in the following paragraphs.

Natural Circulation

The geometry of the Millstone Unit No. 3 reactor coolant system is designed to ensure that natural circulation of the reactor coolant between the lower elevation heat source (core) and the higher elevation heat sink (steam generators) will be set up if a temperature difference exists between them. Thus, unless there is a major failure, it is proper for the operator to infer that natural circulation will occur if there is a sufficiently large ΔT between the core (hot leg temperature) and the steam generator (saturation temperature at the steam generator secondary pressure). The procedure for cooldown from the auxiliary shutdown panel can be developed using these indications to ensure that the plant will develop natural circulation flow.

Similarly, hot leg temperature and the saturation temperature at the steam generator secondary pressure can be used to monitor natural circulation. While there will be a time lag between the steam generator temperature and the RCS cold leg temperature, the procedure can be developed to take this into account. Since there is no immediate need to perform a cooldown (i.e., a design basis accident), the time delay required for equilibration of steam generator temperature and RCS cold leg temperature is not significant.

It is true that there are some accident scenarios where natural circulation may not develop even though a sufficiently large Δ T between the core and steam generator is developed. However, these scenarios represent design basis accidents. BTP CMEB 9.5-1 does not require that the plant be designed to withstand a combination of a design basis accident in addition to a fire that requires removal of the operators from the control room.

Even though loss of natural circulation with a sufficiently large ΔT between the core and steam generator is not a design basis for the auxiliary shutdown panel, the panel does provide instrumentation that would detect these conditions. With loss of natural circulation and consequently loss of heat removal, the following list provides possible indications available on the panel that would indicate these conditions:

(1) Steam Generator Level Increasing

(2) Hot Leg Temperature Increasing

(3) Pressurizer Level Increasing

(4) RCS Pressure Increasing

The procedures for cooldown using the auxiliary shutdown panel can be developed to cover this possibility.

Based upon these arguments, it is concluded that using the saturation temperature at the steam generator secondary pressure is adequate to monitor a natural circulation cooldown with no major equipment failures.

Pressurized Thermal Shock and Appendix G Concerns

Because of the lag between the RCS cold leg temperature and the saturation temperature at the steam generator secondary pressure, the cold leg temperature will be higher than the steam generator temperature during a cooldown. Thus, to monitor compliance with the Tech. Spec. limit on cooldown rate for thermal shock concerns and cold overpressurization using steam generator temperature is conservative. Using steam generator temperature in place of RCS cold leg temperature for these concerns is acceptable.

Conclusions

The design of the auxiliary shutdown panel for Millstone Unit No. 3 meets the requirements of BTPCMEB 9.5-1. Specifically, the saturation temperature of the steam generator can be used by the operator to perform a cooldown that meets the requirements for:

a) Natural Circulation

b) Pressurized Thermal Shock and Appendix G Concerns.

SECTION 6

SAFE SHUTDOWN EVALUATION

6.1 BASIS AND ASSUMPTIONS

A catastrophic fire at Millstone 3, which could include damage to a fire area or prevent the plant's ability to achieve or maintain safe shutdown conditions, was the basis for this evaluation.

Major assumptions in addressing safe shutdown capabilities were as follows:

1. While operating at power, the unit develops a fire in any one fire area or zone which could affect safe shutdown equipment or systems.

2. The unit is brought to hot standby immediately and is capable of achieving cold shutdown conditions in 72 hours.

3. Loss of offsite power is assumed coincident with the fire. For the hot short analysis, offsite power is assumed to be available as it represents the worst case with respect to spurious operation of the equipment.

4. Safe shutdown is achieved using only onsite-powered equipment.

5. No additional, single, or multiple failures or events are considered, other than those generated by the fire area.

6. All equipment required for hot standby either fail in a safe position or is protected to the extent that at least one method of shutdown will be undamaged by the postulated fire.

7. Mechanical equipment (e.g., pipe, heat exchangers, pumps, valves with manual operators/overrides) are assumed to be operable after the fire.

8. Systems required for cold shutdown are protected to the extent that any required fire damaged components can be repaired within 72 hours using onsite resources. Materials required for repairs will be from a dedicated supply on the site. Procedures will be available documenting the method of intended repairs. Repair crews will not utilize members of the fire brigade.

9. Systems not required for immediate use (≤30 minutes) will be protected to the extent that safe shutdown can be accomplished with only minor operator actions (e.g., local manual control of valves). Adequate operations personnel are available to complete manual actions outside the control room within the necessary time interval.

6.2 SYSTEMS REQUIRED FOR SAFE SHUTDOWN

Each function required to achieve and maintain safe shutdown was evaluated by fire area. These functions (Figures 6-1 through 6-10) are as follows:

Figures 6-1, 6-5 - Reactor coolant system decay heat removal/ pressure control

Figure 6-2 - Reactor coolant system letdown

Figure 6-3 - Auxiliary feedwater injection

Figure 6-4 - Auxiliary feedwater supply

Figure 6-6 - Reactor coolant system boration

Figure 6-7 - Reactor coolant system depressurization

Figure 6-8 - Residual heat removal system

Figure 6-9 - Component cooling water system

Figure 6-10 - Service water system

In addition to the above functions, the systems required to support these functions were also evaluated. Safe shutdown functions analysis (Section 6.3) provides detailed information on systems and methods required to achieve and maintain cold shutdown conditions.

Inherent in the design of Millstone 3 is the system flexibility to allow accomplishment of shutdown functions by more than one method. This flexibility is such that, in most cases, if equipment in one area is damaged by fire, equipment located within another area can accomplish the shutdown function. The system flexibility, identified in Figures 6-1 through 6-10, forms the fundamental philosophy for achieving safe shutdown following fires.

6.2.1 Decay Heat Removal/Pressure Control (Figures 6-1 and 6-5)

Following a postulated transient exposure fire, the plant could reject decay heat either by dumping steam to the condensers or by dumping steam to the atmosphere, via the steam safety valves. If the fire is located within the main steam valve building and all electrical controls on valves were lost, heat will be rejected by releasing steam to the atmosphere through the main steam safety valves. Cold shutdown may be achieved via manual local operation of the steam safety valves.

6.2.2 Reactor Coolant System Letdown (Figure 6-2)

Reactor coolant letdown can be accomplished by Method A, the normal letdown path through the chemical volume control system (CHS), or Method B, through the reactor vessel head vent system to either the pressurizer relief tank (PRT) or excess letdown heat exchangers in

the CHS system. Method B is used when a fire could affect the ability of the valves in Method A to be improperly positioned. Because of redundant safety grade paths in Method B, control of reactor coolant letdown is always available to achieve safe shutdown.

6.2.3 Auxiliary Feedwater Injection (Figure 6-3)

The auxiliary feedwater system supplies water to the secondary side of the steam generator, thus maintaining a secondary heat sink for decay heat removal. Method A consists of two Class 1E motor-driven pumps and redundant valves and piping. Method B consists of one turbine-driven feed pump and associated piping and valves to each steam generator. In most of the postulated fires, Method A is available to provide two or more steam generators with auxiliary feedwater. When Method A becomes unavailable, Method B can provide auxiliary feedwater injection to two or more steam generators. It should be noted that for fires in the control building, additional flow for Method A can be provided upon manual valve operations.

6.2.4 Auxiliary Feedwater Supply (Figure 6-4)

The auxiliary feedwater pumps take suction from the demineralized water storage tank (DWST). Additional auxiliary feedwater is available from the condensate storage tank (CST). If Millstone 3 were required to stay at hot standby for 72 hours followed by a 6-hour cooldown, water is available through the city domestic water supply into the DWST. This arrangement assures Millstone 3 the capability of supplying auxiliary feedwater to achieve and maintain safe shutdown.

6.2.5 Reactor Coolant Boration (Figure 6-6)

Following a fire, the charging pump suction would be diverted from the volume control tank (VCT) to the boric acid tank (BAT). Boric acid would then be provided through gravity feed lines to the charging pumps. This is illustrated in Method A. If the three charging pumps were lost due to a fire, boration could be accomplished by using the safety injection pumps and borated water from the refueling water storage tank (RWST), shown as Method B. Method B must be accomplished in conjunction with RCS depressurization because of the low pressure safety injection pumps' head capabilities.

6.2.6 Reactor Coolant System Depressurization (Figure 6-7)

To aid in achieving safe shutdown, the reactor coolant system (RCS) must be depressurized by one of two methods. In Method A, the charging pumps provide borated water to the pressurizer via the auxiliary spray line. This water cools the steam bubble in the pressurizer, causing the RCS pressure to decrease. If Method A is unavailable, Method B then depressurizes the RCS. With Method B, reactor coolant is vented to the pressurizer relief tank (PRT) via the power operated relief valves (PORV). This method provides a second safety grade method ensuring the plant's safe shutdown capabilities.

6.2.7 Residual Heat Removal (Figure 6-8)

Once the RCS is below 425 psig, the residual heat removal system (RHR) cools and maintains the plant at safe shutdown. The Millstone 3 plant is designed so that one method of RHR is always available in the event of a postulated fire. RHR is required only for cold shutdown, which provides a sufficient time interval for manual valve operations, if required.

6.2.8 Component Cooling (Figure 6-9)

This function provides cooling water to the RHR heat exchangers to remove decay heat from the RCS. The pipes and valves of this system are designed for maximum versatility. Flow from any one of the three pumps may be diverted to any or all of the heat exchangers within the system. Flow may also be provided to cool either methods of RHR. The valves in the component cooling water system (CCP) are all equipped for local manual operation. If all three component cooling water pump motors were damaged due to fire, the plant is able to safely remain at hot shutdown until the system is repaired (Section 9.2).

6.2.9 Service Water (Figure 6-10)

The service water system (SWP) provides the ultimate heat sink for the CCP system and the emergency diesel generators. The piping and valving of this system allow flow from any one of the four emergency bus powered pumps to be diverted to any of the CCP heat exchangers. Method A provides cooling water for the orange diesel generator, while Method B provides cooling water for the purple diesel generator. This design assures the availability of one method of service water. All automatic valves in the service water system are normally open and can be positioned by local manual action if they were to close spuriously. Spurious operation of equipment will be addressed in the post-fire shutdown procedures to ensure operator awareness of required compensatory measures.

6.2.10 Reactor Coolant System High/Low Pressure Interface

A review was conducted to identify low-pressure system interfaces with the RCS. Interface points which consist of passive pressure boundary barriers (reactor coolant pump thermal barriers and seals, manually operated normally closed valves), were not considered; such boundaries are designed with sufficient margin to ensure that the design conditions of the reactor coolant pressure boundary are not exceeded during any condition of normal operation, and are not subject to spurious actuations. The remaining interface points were examined from a fire protection viewpoint to determine whether spurious valve actuations due to a fire could result in loss of RCS pressure or inventory control.

These latter interface points, a description of their isolation provisions, and an assessment of their impact on safe shutdown following a fire are provided as follows:

a. Residual Heat Removal System Suction Lines

The isolation valve arrangement for these two lines is shown in Figure 5.4-5. Each line has three motor-operated isolation valves in series. The valves are interlocked to prevent opening and to automatically close at RCS pressures which are high enough to damage the RHR system. These interlocks are described in Sections 5.4.7.2.4 and 7.6.2 of the FSAR. The outermost isolation valve in each suction line is on a different safety-related power train from the two innermost isolation valves. Valve position indication and control for all six valves is provided at the main control board and at the auxiliary shutdown panel.

The RCS pressure boundary is located at the second valve from the RCS (MV8701A, 8702B) during normal operation. The two valves just outside containment (MV8701B, 8702A) provide additional assurance of containment isolation during power operation.

During shutdown cooling, overpressure protection of the RHR system is provided by relief valves on the suction lines (RV870A, B) and administrative controls. The relief valves are designed to protect the RHR system from the inadvertent start of two charging pumps or two high pressure safety injection pumps. Should RCS pressure increase above RHR design pressure, despite the relief valves, the RHR suction valves will automatically close.

The spurious opening of two series motor-operated valves due to a fire could result in overpressurization of the low pressure RHR piping. To preclude this possibility, the power to valves MV8701A and MV8702C will be removed at the MCC breakers during power operation. The subject MCCs are located in the auxiliary building in the vicinity of the rod drive control center and are accessible should RHR operability be required after an accident (FSAR Table 12.3-3).

b. Pressure PORV Discharge Lines

The two parallel pressurizer PORVs (PCV-455A, 456) form the RCS pressure boundary during power operation. These are normally closed, fail-closed solenoid-actuated valves on separate emergency power trains, with hand switches and indication at the main control board and auxiliary shutdown panel (Figure 5.1-1, Sheet 3). In series with each PORV is a normally open, motor-operated block valve (MV8000A, B). The block valves are also on emergency power trains, with hand switches and indication in the control room and at the auxiliary shutdown panel.

Spurious operation of the PORVs during a fire is not an issue with respect to overpressurizing connected piping, since the system is designed for automatic PORV opening on

high RCS pressure transients. Spurious opening of the PORVs would, however, result in rapid decrease of RCS pressure and inventory. To compensate for this, the operator will close the PORV block valves manually whenever spurious opening of the PORVs occurs, or if it becomes necessary to evacuate the main control room because of a fire.

c. Reactor Coolant System Letdown Line

The letdown line isolation valve arrangement consists of two series valves (LCV-459, 460) at the RCS (Figure 5.1-1, Sheet 2) two series valves at the containment penetration (CV-8152, 8160) and three parallel valves at the letdown orifices (SV-8149A, B, C) (Figure 9.3-8, Sheet 1).

All of these valves are air-operated and are designed to fail-closed on loss of air or loss of electrical signal. Valve position indication is provided in the control room. Valves LCV-459, 460 and SV-8149A, B, C also have hand switches and controls on the auxiliary shutdown panel. The two containment isolation valve control circuits are on separate emergency power trains.

Although the piping between the two containment isolation valves is of a lower design pressure than RCS pressure, a relief valve, which discharges to the pressurizer relief tank (RV-8117), protects this section of piping from overpressure, should the downstream isolation valve (CV-8152) close while the upstream valves remain open. The CVCS letdown orifices restrict letdown line flow so that relief valve capacity is not exceeded.

Should the failure of four series valves to fail-closed occur, the discharge rate from the RCS to the PRT will be compensated for by makeup from the charging pumps.

d. Reactor Vessel Head Vent System

This system is depicted on Figure 5.1-1, Sheet 3. It contains two parallel flow paths, each of which has three normally closed, fail-closed solenoid-operated valves in series (SV8095A, 8096A, HCV442A on the orange train, and SV8095B, 8096B, HCV442B on the purple train).

Between SV-8096A, B and HCV442A, B, there is a connection to the CVCS which is isolated by a normally closed motor-operated valve on the orange emergency power train (MV8098). All of these valves have control and indication in the control room. In addition, valves SV8095A, B, SV8096A, B and MV8098 also have control and indication at the auxiliary shutdown panel.

Should the spurious opening of three series normally closed, fail-closed valves occur, any loss of reactor coolant will be compensated for by the makeup from the charging pumps.

e. Excess Letdown Lines

There are four drain line connections for excess letdown on the RCS cold legs (Figure 5.1-1, Sheet 3). Each of these has a normally closed, fail-closed isolation valve (AV-8037A, B, C, D). These are headered together, and further isolated from the low pressure portion of excess letdown piping by normally closed, fail-closed series valves AV-8153 and HCV-123. AV-8153 is controlled by a safety grade control circuit, and HCV-123 by a nonsafety grade control circuit. All of the isolation valves have position indication and hand switches in the control room.

Should the spurious opening of two series normally closed, fail-closed valves on separate power trains occur, any loss of reactor coolant inventory by such an occurrence would be compensated for by the operation of the charging pumps.

f. Sample System

The sample system is connected to the RCS at the hot legs, the cold legs, and the pressurizer liquid and vapor spaces (Figure 9.3-2, Sheet 2). The low pressure portion of the sampling system is normally isolated from RCS pressure by a normally closed, fail-closed solenoid valve, and a back pressure, actuated pressure regulating valve. The solenoid valve is actuated by a nonsafety grade power source and is controlled at the sample panel.

Additional overpressure protection is provided by a flow restricting orifice upstream of the pressure regulating valve, and a relief valve downstream of the pressure regulating valve. Finally, additional isolation capability is provided for each sample line by two series normally open, fail-closed solenoid valves. These valves are powered by diverse safety-related power supplies and have hand switches and position indication in the control room. They are located between the normally closed solenoid valve and the pressure regulating valve.

The backpressure controlled valve is not subject to spurious electrical faults; therefore, a fire which affects the RCS isolation valve, will not cause a sample line to be unisolated. Should unisolation occur, the flow through the sample line would be very small compared to charging pump capacity.

g. Charging Line Connection

The CVCS charging line connects to the RCS at the Loop 1 and Loop 4 cold legs and at the auxiliary spray line at the pressurizer (Figure 9.3-8, Sheet 1). The charging line downstream of the charging pumps is designed to the same pressure at the RCS and normally operates at a slightly greater pressure than the RCS.

The boundary between the RCS cold legs and the CVCS charging lines consists of two series check valves on each line (V-31, 32 on Loop 1; V-147, 148 on Loop 4). The boundary between the CVCS and the pressurizer consists of a check valve (V-175) in series with a normally closed, fail-closed air-operated valve (AV-8145). AV-8145 has main control board and auxiliary shutdown panel indication and control, and its control circuit is connected to a safety-related train.

Any backflow through the check valves would be insignificant.

h. ECCS Discharge Line Connections

The ECCS discharge lines connect to RCS at the following locations:

- Interface between the LPSI/HPSI systems and the RCS cold legs (four points).
- Interface between the charging pumps and the RCS cold legs (four points).
- Interface between HPSI/LPSI systems and the RCS hot legs (four points).

These interface points are shown on Figure 5.1-1, Sheets 1 and 2. At least two series check valves separate the RCS from the ECCS at the above points. A leakage detection line is connected between the check valves to allow periodic monitoring of any leakge past the check valve closest to the RCS. The leakage detection lines are headered together and discharge to the reactor plant gaseous drains system (Figure 6.3-2, Sheet 1). Isolation between the high and low pressure portions of the leakage detection line is achieved by two series normally closed, fail-closed air-operated valves (CV8871, 8964). These valves have hand switches and position indication in the control room. The control signal for each valve comes from a separate safety-related train, and both valves close automatically on a CIA signal.

Any backflow through the check valves would be insignificant.

No. of Isolation Valves in Series

System	Line Size	MOVs
Residual heat removal	12 inches	3

These valves are all powered from safety grade power sources of opposite trains. The Millstone 3 design is such that the motor-operated valves which isolate the RHR from RCS are designed so that

Delete.

Delete

there are three valves in series, with one valve powered from the opposite safety bus.

Cables for the three valves are located in a common area in the control building (switchgear rooms, cable spreading room, and instrument rack room). However, the valves are controlled by 3-phase motors of which a spurious operation is considered improbable. Further, three spurious actions by hot short would be required to open all three valves, which is not considered probable. Thus, the three isolation valve interface is considered acceptable.

6.2.11 Loss of Offsite Power

Paragraph III.L.3 of Appendix R to 10CFR50 requires:

> "the alternate shutdown capability shall be independent of the specific fire area(s) and shall accommodate postfire conditions where offsite power is available and where offsite power is not available for 72 hours."

A fire event coincident with a loss of offsite power is the limiting scenario and it represents a "worst case" approach. For this reason, safe shutdown capability is maintained in the event of a fire occurring in any one fire area coincident with a loss of offsite power. This position is more limiting than any other scenarios wherein offsite power remains available. In the fire scenario where offsite power remains available, maximum flexibility is afforded in the selection of systems unaffected by the fire which could be used to reach safe shutdown conditions.

For a fire in the control room, instrument rack room, or cable spreading room, the emergency diesel generator load sequencers may be lost. For a fire in either of these areas, plant control is transferred to the switchgear rooms. In this event, the orange train emergency generator would be manually loaded.

6.3 ELECTRICAL EVALUATION

6.3.1 Associated Circuits and Hot Short Evaluation

The following criteria from Paragraph III.G.2 of Appendix R to 10CFR50, were used to evaluate circuits:

Associated Circuits

Associated circuits are those circuits that could prevent operation or cause maloperation of the alternative method of a particular function to achieve and maintain hot standby condition due to fire-induced hot shorts, open circuits, or shorts to ground.

6.3.1.1 Power Cable Faults (Shorts)

Phase-to-phase or phase-to-ground faults on energized power cables of all types and voltages are a likely consequence of cable fire damage. In power circuits, two concerns arise, either of which impacts safe shutdown capability.

The first of these is the possibility that the fault may result in the deenergization of a power supply (bus) which is required to support the operation of safe shutdown equipment. This would occur if the branch protective device for the faulted circuit fails to operate to clear the fault before it is cleared via the bus supply protective device. Since Appendix R specifically precludes the consideration of single failures which are not induced by the fire event, the failure of the branch protective device is not assumed. Coordinated protection is a design feature of Millstone 3, thus the integrity of the required supply would be preserved throughout the event. The breaker coordination study was done in accordance with industry practice. In the highly unlikely event of a multiple impedance fault which could result in a deenergization of the required bus, operator action will be taken to trip the non-required loads and reenergize the bus.

The second concern relates to the potential for an electrical fault, which is not properly cleared to damage adjacent or nearby circuits which are required in the safe shutdown situation. This potential failure mode relates to associated circuits which derive their power from nonsafety supplies. Properly applied protective devices are included in all Millstone 3 power and control circuits; thus this failure mode would not surface.

Based on the above, it is evident that the Appendix R review has revealed no concern with regard to the proper removal of an electrical fault condition.

6.3.1.2 Open Circuits

Open circuits on cables of all types and voltages are a conceivable consequence of cable fire damage. Shorts to ground, phase-to-phase

shorts, and hot shorts establish themselves ultimately as open circuits.

6.3.1.3 Hot Shorts

Hot shorts can have major impact on the orderly maintenance of a hot standby or cold shutdown condition. It is logical to conclude that the establishment of a hot short condition has less adverse impact the farther into the cooldown cycle that it occurs. As decay heat removal requirements decrease, allowable operator response time during which the hot short condition can be overridden or compensated for increases. A detailed review of hot short failure potential was required.

The ground rules which were used to determine which circuits were in need of a detailed review of hot short susceptibility are as follows:

1. The spurious start of a station motor load not required in the shutdown scenario (i.e. hot shutdown/cold shutdown) will be compensated for by the selective tripping of the non-required loads.

2. The spurious start of a station safety-related motor load required in the shutdown scenario (i.e., hot shutdown/cold shutdown) was considered.

3. Electrically operated valves (MOVs, SOVs, and AOVs) whose open or closed position is required to be maintained were reviewed to ensure that:

    a. Required flow paths are not blocked.

    b. Non-required flow paths, which could divert cooling supplies from required flow paths, are not established.

    c. Isolation between high and low pressure systems is not compromised.

4. A hot short which results in the tripping of a required load (usually a pump motor) was not reviewed as the control circuits for these are specifically protected from those of their redundant or diverse counterparts.

5. Where cables which could result in spurious signal generation/equipment actuation via hot shorts are in the same fire area, up to two such spurious signals were assumed to be credible in guaranteeing the success path. For instances of spurious valve operation in high/low pressure interfaces, refer to Section 6.2.10.

6. Due to the unlikelihood of matching phases in 3-phase circuits without incurring faults, which automatically remove power by breaker tripping, hot shorts in these circuits were not considered credible.

Following the identification of circuits requiring a review, the appropriate cable routings were analyzed to determine which, if any, cables are connected to the circuit in a manner which renders the circuit vulnerable to spurious maloperation caused by a hot short of the required voltage being established on one or more of the cable's conductors.

6.3.2 Electrical Evaluation Methodology

6.3.2.1 Systems

System functions required for safe shutdown are identified in Section 6.2. System functions, including supporting systems, were evaluated by developing the system function availability matrix Table 6-1. By using this matrix, justification is demonstrated that the ability for Millstone 3 to achieve safe shutdown conditions will be maintained in the event of a postulated fire.

The attached matrix describes which functions are available following a postulated fire in any fire area. Figures 1 through 10 detail the flowpaths required for each method in each function. When used in conjunction, a complete path for each function to achieve and maintain safe shutdown is developed.

The symbol legend for the functional matrix is as follows:

(X) - Preferred available method for that function.

(O) - Available to perform function (when both paths are indicated with A, both are available with no preference).

(-) - This path is not available.

6.3.2.2 Controls and Electrical

The instrumentation and control evaluation of required systems and support systems is directed at determining:

1. What controls are required by the operator for essential control functions ensuring that control stations are available outside the fire area.

2. That spurious signals could not be generated from within any fire area which could inhibit shutdown.

3. Whether the equipment can be manually operated, is in an accessible area, and whether sufficient time and information are available to the operator to diagnose the failure and take corrective action.

Where an option exists regarding power trains, the orange train is the preferred method when plant shutdown is to take place from the main control room. When plant shutdown is to take place from the remote shutdown facility, the orange train only is used. The remote

shutdown facility consists of the purple emergency switchgear room containing the auxiliary shutdown panel (ASP) and the orange emergency switchgear room containing fire transfer panels and the emergency switchgear with manually loading capability.

The remote shutdown facility is used whenever control cannot be assured from the main control board. Loss of control from the main control room is assumed when a fire occurs in the cable spreading room, instrument rack room, or main control room proper. A fire affecting the control building air conditioning system will also cause loss of normal control room control by permitting ambient air temperature to rise beyond the maximum capabilities of instrumentation.

6.3.3 Electrical Evaluation of Safe Shutdown Functions

By review of the appropriate cable routing documents, the electrical evaluation was performed for the safe shutdown functions identified in Section 6.2.

6.3.3.1 Decay Heat Removal/Pressure Control (Figures 6-1 and 6-5)

Refer to Section 6.2.1. A fire in any fire area can disable only two steam generator flowpaths leaving the remaining two available from the main control room.

Electrical power cables run in common fire areas within the reactor containment. However, the valves are normally in the open position. No actuation to close is required, and the valves' actuators are 3-phase motors not subject to spurious movement. Therefore, no cable protection is required in the containment.

Control locations for valves 3MSS*MOV18A, B, C, D and 3MSS*MOV74A, B, C, D are at both the main control board and at the ASP with control transfer switches located on existing panels in their respective emergency switchgear rooms.

Electrical cables are routed in separate fire areas to prevent loss of essential function.

6.3.3.2 Reactor Coolant System Letdown (Figure 6-2)

Refer to Section 6.2.2. Control stations for valves 3RCS*SV8095A and B, 3RCS*SV8096A and B are available at both the main control board and auxiliary shutdown panel (ASP) with control transfer at existing transfer panels in each emergency switchgear rooms.

Control stations are also at the ASP for 3RCS*HCV442A and B with control board/ASP transfer switches on the ASP. To ensure control over one path from the main control room with a fire in the purple switchgear room, the control transfer function on 3RCS*HCV442A is located on the fire transfer panel located in the orange switchgear room. Non-safety related support, electronics, and signal transfer switch are provided on the fire transfer panel in the purple switchgear room for 3RCS*HCV442B. The transfer switches block

spurious signals from the CR, IRR, cable spreading room and associated fire areas and permit positioning of the valve from its normal station on the ASP.

Cables for achieving a success flowpath for one method will always be available through train separation. Valve 3CHS*CV8152 may be manually opened for fire in fire area CB-1 and EG-4 when method A is to be used for letdown.

6.3.3.3 Auxiliary Feedwater Injection (Figure 6-3)

Refer to Section 6.2.3. All required controls are available at both the main control board and auxiliary shutdown facility, with circuit independence provided by transfer switches on existing orange and purple transfer panels in the respective emergency switchgear rooms.

Electrical cables are run so that no single fire can result in loss of required auxiliary feedwater. Therefore, no cable protection is required.

6.3.3.4 Auxiliary Feedwater Supply (Figure 6-4)

Refer to Section 6.2.4. Controls and cable separation/protection is acceptable, as alignment of valves is done manually within the time available.

6.3.3.5 Reactor Coolant Boration (Figure 6-6)

Refer to Section 6.2.5. The control switches for valves 3CHS*MV8507A and B, 3CHS*AV8146, and 3CHS*MV8116 are located on the main control board and at the auxiliary shutdown facility with disassociation of circuits provided by existing control transfer switches on the existing transfer panels in the emergency switchgear rooms. Control of valve 3CHS*HCV190A is at both the MCB and ASP with its transfer switch on the fire transfer panel in the orange switchgear room.

Valve 3CHS*HCV190A also utilizes power supplies in the instrument rack room which are lost in the IRR fire or fires in associated areas. In this case, an additional non-safety related power supply is provided in the orange emergency switchgear room which, when connected to the existing hand loading station on the ASP by a switch on the fire transfer panel, permits operation of the valve from its usual location on the ASP independent of the main control room, IRR, and spreading room. Control valve 3CHS*MV8105 is controlled from both the main control board and the fire transfer panel in the purple switchgear room.

6.3.3.6 Reactor Coolant System Depressurization (Figure 6-7)

Refer to Section 6.2.6. Control valve 3RCS*AV8145 is operable from both the main control room and the ASP with control transfer existing on the switchgear room transfer panel as are the valves associated with depressurization Method B. Control protection of 3CHS*MV8105 in Method A is provided with a control switch on the new fire transfer

panel which will ensure a controllable flow path for depressurization spray. This is the same valve required in Figure 6-6 for boration.

Loss of control of valve 3RCS*MV8000B from a fire in the orange emergency switchgear room or orange cable tunnel is prevented by a local key lock switch for control at the MCC and rod control area MCC. Cables that are protected to support the methods of depressurization shown on the matrix include 3RCS*PCV455A in the auxiliary building (orange MCC and rod control area), and 3RCS*PCV456 in the auxiliary building (purple MCC and rod control area).

6.3.3.7 Residual Heat Removal (Figure 6-8)

Refer to Section 6.2.7. Valves on both trains outside the containment are operable manually if required within the time constraints for this system. Valves inside the containment may be operated from their MCCs, if required, within the time available.

6.3.3.8 Reactor Plant Component Cooling (Figure 6-9)

Refer to Section 6.2.8. Motor starters and associated controls for the component cooling water pumps are redundant and located in separate fire areas with the exception of the main control room, instrument rack room, and cable spreading room. Electrical and controls have adequate separation except for in the vicinity of the component cooling pump motors. Repair to the pump motor and power cable is discussed in Section 9.2.

6.3.3.9 Service Water (Figure 6-10)

Refer to Section 6.2.9. Control of the service water pumps is from the main control room or from the switchgear cubicles in the emergency switchgear room. Power for motorized valve 3SWP*MOV50B in the purple switchgear room is removed to ensure a flow path for service water when a fire occurs in the main control room, instrument rack room, or cable spreading room.

SECTION 7

SUPPORT SYSTEMS

The active support systems required for the functions shown in Figures 6-1 through 6-10 are:

1. 125 V dc and 120 V ac

2. Diesel generators

3. Emergency switchgear room ventilation

4. Reactor coolant pump seal cooling

5. Instrument air

6. Emergency lighting/communications

7. Control room air conditioning

7.1 125 V DC AND 120 V AC POWER SUPPLY

The 125 V dc and 120 V ac vital systems supply uninterrupted power to safety-related components necessary for safe shutdown and to maintain a safe shutdown condition.

Normally, 125 V dc power is supplied to the dc buses through a battery charger. With a loss of offsite power, batteries supply 125 V dc to the dc buses and to the vital buses through the inverters for 2 hours or until an onsite ac supply reestablishes the normal ac powered charger and rectifier inputs.

The Class 1E 125 V batteries are located in the control building in physically separate battery rooms. The loss of any battery room by fire will not affect safe shutdown capibility.

7.2 EMERGENCY DIESEL GENERATORS

One emergency diesel generator is required for safe shutdown subsequent to a fire in any fire area. Diesel engine cooling water is provided by service water which has been demonstrated, by the function matrix, to be available (Figure 6-10). The ventilation fans and dampers for both diesel generator rooms are controlled from the ventilation panel (VP-1) in the main control room. To mitigate the potential consequences of a main control room disabling fire, the control fuses will be removed in the respective emergency switchgear room to remove power from the dampers, causing them to fail open and to run the ventilation supply fans in each of the diesel generator rooms.

7.3 EMERGENCY SWITCHGEAR ROOM VENTILATION

Emergency switchgear room ventilation fans are controlled from the VP-1 panel in the main control room. Control of fans 3HCV*ACU4A, B

and 3HVC*ACU3A and B are operational from their power source in the switchgear room independent of the main control room, instrument rack room, and cable spreading room.

Manual alignment of service water to the ventilation unit cooling coils maintains space temperatures within allowable limits to support equipment and personnel. Service water availability is assured by redundancy (Figure 6-10).

7.4 COOLING TO THE REACTOR COOLANT PUMP (RCP) SEALS

To prevent the RCP seals from failure due to overheating, cooling water is supplied from either the component cooling water system (CCP) and/or the chemical and volume control system (CHS). Normally, both of these systems supply cooling water to the RCP seals, although only one source is needed when the reactor coolant pumps are not in operation. Both the CCP pump and the CHS pumps are located in the same fire area AB-1, auxiliary building elevation 24 feet-6 inches. The charging pumps are located within individual cubicles with a labyrinth access way. The CCP pumps are located at the other end of the auxiliary building (greater than 50 feet apart). In addition, the area is provided with automatic fire suppression and detection. Failure of the three charging pumps coincident with the failure of the three component cooling water pumps due to fire is considered an incredible event. Therefore, the loss of either the charging pumps or the component cooling water pumps will not affect the safe shutdown capability of Millstone 3.

7.5 INSTRUMENT AIR SYSTEM

Normally, the instrument air system supplies air to the valves required to operate for safe shutdown (e.g., letdown, depressurization).

This air is supplied by two safety powered air compressors. In the event that both of these compressors are damaged due to the fire, Millstone 3 is designed so that the required function of the letdown and depressurization is accomplished by other safety grade methods (i.e., reactor head vent system, venting to the PRT). Therefore, the loss of the instrument air system due to fire does not affect the plant's ability to achieve and maintain safe shutdown conditions.

7.6 EMERGENCY LIGHTING

10CFR50, Appendix R, Paragraph IIIJ requires emergency lighting with at least an 8-hour battery power supply for all areas needed for the operation of safe shutdown equipment and in access and egress routes to these areas. The present design of Millstone 3 provides 8-hour self-contained battery packs for all areas identified in Paragraph IIIJ of Appendix R.

7.7 COMMUNICATION

A fixed sound powered communication system with magneto call signaling is installed to comply with BTP APCSB 9.5.1. The system

contains self-powered units which do not require any outside source of electrical power to operate. This is a fire fighting communication system which is independent of the normal plant communications system. The system contains one master station and eight substations. The master station is located at the auxiliary shutdown panel and the substations are located in the main control room, the emergency generator rooms 1 and 2, emergency switchgear rooms 1 and 2, the charging pump control cubicle, the engineering safety features building, and the service water pump area.

7.8 CONTROL BUILDING AIR CONDITIONING

The air conditioning located in the emergency switchgear room areas (elevation 4 feet-6 inches) of the control building provides cooling to the switchgear room area and remote shutdown facility located in the west switchgear room. The remote shutdown facility is required in the event of the main control room evacuation. Air conditioning units are served normally by chilled water from the chilled water systems. Should a fire destroy the chilled water system, manually operated valve connections are provided from the service water headers into the switchgear air conditioner chilled water headers. This provides the required heat sink to the air-conditioning units.

7.9 PROCESS VARIABLE MONITORING

General

The orange channel of the required instrumentation is available at the main control board for fires in all areas of the plant except for the orange switchgear room, orange cable tunnel, orange MCC and rod control area, and orange diesel generator room. For fires in each of these areas, the purple train indicators will be available in the main control room.

A fire in the instrument rack room, main control room, cable spreading room or supporting equipment rooms may disable both trains of indication at the auxiliary shutdown panel (ASP) through the loss of their supporting electronics and power supplies in the instrument rack room. For this event, additional safety/nonsafety-related instrumentation is located in the orange switchgear room to replace those components lost by fire.

The additional safety/nonsafety instrumentation is located on the instrument process panel located in the orange emergency switchgear room. All replacement instrumentation is powered from safety-related sources to ensure its operability during a fire with the assumed loss of offsite power.

Existing indicators on the ASP will be utilized by transferring them into the new indication circuitry in the fire transfer panel through the transfer switches by means of transfer devices at the fire transfer panel.

Controls and Electrical

Source and intermediate range neutron detectors have primary electronics located in the control room with indicators in the main control board and on the ASP. Two additional detectors will be powered from associated electronics located in each of the orange and purple switchgear rooms. Power is provided from a safety-related bus. The new indicators for these detectors will be mounted in the NIS cabinets in the main control room and also near the ASP.

The existing indicators on the ASP to be used are as follows:

Pressurizer pressure	3RCS*PI455B
Pressurizer level	3RCS*LI459C
Reactor coolant hot leg temperature	3RCS*TI413C
	3RCS*TI423C
	3RCS*TI433C
	3RCS*TI443C
Steam generator level	3FWS*LI501A
	3FWS*LI529A
	3FWS*LI539A
	3FWS*LI548A
Auxiliary feed water flow	3FWA*FI33B2
	3FWA*FI33C2
	3FWA*FI51A2
	3FWA*FI51D2
Steam generator pressure	3MSS*PI514A
	3MSS*PI524A
	3MSS*PI534A
	3MSS*PI544A
Reactor coolant pressure	3RCS*PI405B
Neutron source range	3NMS*NI31C
Neutron intermediate range	3NMI*NI35C

Demineralized water storage tank level will be verified either through normal indication channels or post-accident monitoring channels at the control room/auxiliary shutdown panel or by tank head indication located in the auxiliary feedwater pump suction lines in the ESF building.

SECTION 8

RESOLUTION OF SAFETY SHUTDOWN EVALUATION PROBLEM AREAS

8.1 ALTERNATIVE SHUTDOWN CAPABILITY

In order to assess compliance with the requirements of BTP CMEM 9.5-1, maximum credit was taken for alternative shutdown capability with the functional flexibility of Millstone 3 system design. The alternative shutdown methods are summarized below:

Function	Alternative Method A	Alternative Method B
Reactor Coolant Letdown (Figure 6-2)	Normal Letdown Path	Reactor Head Vent
Auxiliary Feedwater Injection (Figure 6-3)	Motor-Driven Pump(s)	Turbine-Driven Pump
Steam Release (Decay Heat Removal) (Figure 6-5)	Atmospheric Dump Valves	Code Safety Valves
Boration (Figure 6-6)	Charging Pumps from Boric Acid Tank	High-Head Safety Injection Pump from RWST
Reactor Coolant System Depressurization (Figure 6-7)	Auxiliary Spray Line	Pressurizer Power Operated Relief Valves

The methods are described in more detail in Section 6.2.

8.2 LONG TERM (72-HOUR) HOT SHUTDOWN

To maintain secondary heat sink, the auxiliary feedwater system supplies water to the steam generators. This allows removal of heat from the reactor coolant system.

A minimum of 800,000 gallons must be made available to the auxiliary feedwater system in order to provide the required water volume for 72 hours of hot standby followed by a 6-hour cooldown.

The auxiliary feedwater and condensate makeup and drawoff system designs provide 340,000 useable gallons in the DWST and 200,000 gallons in the condensate storage tank. The two tanks are normally supplied from the water treating storage tank (3WTS-T1) using the water treating supply pumps (3WTS-P1A, B). Since these pumps are nonsafety-related, it is conceivable that they will be unavailable during a fire, which could result in loss of normal ac power.

An additional 260,000 gallons is supplied directly to the DWST from the domestic water system via a 2-inch line to the DWST fill line.

This 2-inch line will pass 127 gpm, supplying the additional 260,000 gallons in approximately 34 hours.

8.3 CONTROL SYSTEM ISOLATION FOR CONTROL ROOM/SPREADING ROOM/IRR FIRES

In evaluating the consequences of fires in the control room, instrument rack room, and cable spreading room, it was determined to be necessary to add a controls system to transfer signals from the affected areas to the switchgear rooms. This control system, along with certain manual actions (Section 9), allows the plant to be brought to cold shutdown without the use of the control room, instrument rack room, or cable spreading room. A summary of these additions follows:

1. A new fire transfer panel, located in the orange emergency switchgear room, is provided. This panel contains the required number of control transfer switches, power supplies, and signal conditioning electronics required for safe shutdown of the plant.

   The transfer switch function is to disassociate the ASP controls and indicators from their normal support components, which may be lost by fire, and replace those signals with signals from the new transmitters. Block diagrams of transfer schemes are provided in Figure 8-1.

2. Transfer switches 3RCS*HCV442A/B and 3CHS*MV8105 are relocated from the auxiliary shutdown panel to the fire transfer panel.

3. Additional instrumentation for monitoring plant process variables is provided. These include six pressure transmitters, five level transmitters, four flow transmitters, two neutron sensors, neutron flux processing racks, and four temperature transmitters.

   Two environmentally qualified neutron detectors will be installed in the spare wells in the neutron shield tank. Two qualified electronic channels will be installed and powered from a vital instrument bus.

4. Key lock control switches at the local motor control centers are added for the following: 3RCS*MV8000B, 3HVC*ACU3A,B and 4A,B. These are provided for local administrative control at the MCCs in the event of fire in the main control room.

8.4 FIRE PROTECTION OF CABLE

As the safe shutdown functions were evaluated, cabling which supplied power to all required components was also considered (e.g., motor valves and equipment). The analysis of the plant design concluded that only a few cables needed protection. Cables for 3RCS*PCV455A and 3RCS*PCV456 will be protected by a 1-hour fire barrier inside the auxiliary building.

8.5 AUXILIARY BUILDING ELEVATION 24 FEET-6 INCHES

Major components of the two systems considered in the safe shutdown evaluation are located at auxiliary building elevation 24 feet-6 inches These are the three charging pumps (CHS) and the three component cooling pumps (CCP).

Normally, both of these systems supply cooling water to the reactor coolant pump seals during the hot shutdown period. However, only one source of cooling is needed when the pumps are not in operation. In addition, CCP is required for cold shutdown to remove heat from the residual heat removal system. Because these systems are within the same fire area, Millstone 3 has installed automatic suppression and detection in this area.

The CCP pumps are approximately 60 feet from the charging pump cubicle. In addition to this separation, manual hose stations are located throughout the area at elevation 24 feet-6 inches If all of the component cooling water pumps were damaged, Millstone 3 has the onsite capability to repair a train of component cooling within 72 hours. These precautions and modifications strengthen the position that both the charging pumps and the component cooling pumps will not be simultaneously damaged by a fire.

8.6 REACTOR CONTAINMENT

Although the design of Millstone 3 containment does not meet the letter of Appendix R requirements, sufficient design features exist to support a request for an exemption in the area, based upon the following consideration:

> The Millstone containment structure is subatmospheric, normally unmanned, and equipped with both fire detection and suppression. Manually initiated suppression consists of a water sprinkler system for the electrical penetration area. The reactor coolant pumps are equipped with a seismic oil collection system which is capable of collecting the entire reactor coolant pump motor lubrication system oil volume. Additional suppression is provided by fire hose stations and portable dry chemical extinguishers. Electrical cables are separated in orange and purple cable trays; these trays are approximately 16 feet apart with a low quantity of combustibles between the trays.

The Applicant has concluded that the above described protection features provided is equivalent to the requirements of Appenndix R.

SECTION 9

OPERATOR ACTIONS AVAILABLE FOLLOWING A FIRE

9.1 OPERATOR GUIDELINES

Following a fire, equipment normally used to bring the plant down to cold shutdown conditions may be inoperable. The last column of Table 9-1 delineates the primary control station for a fire in the specified fire area. Any additional manual actions required by the fire will be addressed in the station emergency shutdown procedures.

9.2 REPAIR OF EQUIPMENT

After a fire, some equipment may have to be repaired before achieving and maintaining cold shutdown. The safe shutdown evaluation concluded that there is only one area of the Millstone 3 plant where any major repairs could be required. This would occur if all three of the component coolant water pumps were damaged by fire in Area AB-1, Auxiliary Building, elevation 24 feet-6 inches.

The Millstone 3 plant has the capability to repair or replace one pump motor in either train of component cooling water using onsite material (e.g., spare motor and cables) and still achieve cold shutdown conditions within 72 hours of reactor trip using only onsite power. This capability allows Millstone 3 to fully comply with Appendix R, III.G.1.b. Other minor repairs, such as replacement of fuses or circuit breakers, can be accomplished well within the 72-hour requirement. No repairs are necessary to achieve hot standby or hot shutdown. This is a semi-automatic function which does not require any manual actions outside of the control room or emergency operating facility.