Northeast
Nuclear Energy

Rope Ferry Rd. (Route 156), Waterford, CT 06385

Millstone Nuclear Power Station
Northeast Nuclear Energy Company
P.O. Box 128
Waterford, CT 06385-0128
(860) 447-1791
Fax (860) 444-4277

The Northeast Utilities System

JAN 26 2001

Docket No. 50-423
B18313

RE: 10 CFR 50.90

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

Millstone Nuclear Power Station, Unit No. 3
Additional Information and Response to Five Questions Regarding
Installation of a New Sump Pump System in
the Engineered Safety Features Building (PLAR 3-00-2)

The purpose of this letter is to provide the Nuclear Regulatory Commission (NRC) with additional information and a response to five questions regarding a proposed license amendment request dealing with changes in the Millstone Unit No. 3 Final Safety Analysis Report (FSAR) due to the installation of a new sump system in the Engineered Safety Features Building (ESFB).

By a letter dated June 30, 2000,(1) (initial submittal) Northeast Nuclear Energy Company (NNECO) informed the NRC that the installation of a new sump pump system in the ESFB, involves an unreviewed safety question (USQ) and proposed a license amendment request that changes the Millstone Unit No. 3 FSAR. Additionally, by a letter dated September 22, 2000,(2) NNECO provided the NRC with a revised answer to question 2 in the Significant Hazards Consideration and by a letter dated November 20, 2000,(3) NNECO provided the NRC with responses to the request for additional information containing response to three questions.

(1) Raymond P. Necci letter to the Nuclear Regulatory Commission, "Millstone Nuclear Power Station, Unit No. 3, License Amendment Request - Unreviewed Safety Question, Proposed Revision to Final Safety Analysis Report, Installation of a New Sump Pump System in the Engineered Safety Features Building (PLAR 3-00-2)," dated June 30, 2000.

(2) Raymond P. Necci letter to the Nuclear Regulatory Commission, "Millstone Nuclear Power Station, Unit No. 3, License Amendment Request - Unreviewed Safety Question, Proposed Revision to Final Safety Analysis Report, Installation of a New Sump Pump System in the Engineered Safety Features Building (PLAR 3-00-2), Revised Answer to Question 2 in the Significant Hazards Consideration," dated September 22, 2000.

(3) Raymond P. Necci letter to the Nuclear Regulatory Commission, "Millstone Nuclear Power Station, Unit No. 3, Response to Request for Additional Information, Installation of a New Sump Pump System in the Engineered Safety Features Building (PLAR 3-00-2)," dated November 20, 2000.

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The purpose of this letter is to provide the NRC with additional information and responses to five questions received from the NRC staff during a conference call on January 12, 2001.

The proposed design, as described in the initial submittal dated June 30, 2000,[1] stated that the high level alarm shall be set such that approximately 4 days capacity remains in the collection sump prior to reaching the elevation of the containment steel liner, elevation (-)27'-3". Due to the change in the inleakage rate following the completion of the core boring and seal injection operations in ESFB, the 4 day capacity is reduced to approximately 54 hours. NNECO has given careful consideration to the issue of the inleakage rate and how it may affect the operability of the system. As a result, if inleakage increases, the system will be considered operable until the capacity of the system is reduced to 32 hours. This will be controlled by a new requirement in the Millstone Unit No. 3 Technical Requirements Manual, described in detail in Attachment 1. The 32 hours capacity still provides a sufficient time to replace the sump pump under post accident conditions (24 hours after a Loss of Coolant Accident). The actual replacement time is conservatively anticipated to be approximately 8 hours, of which 4 hours would be actually spent on the ESFB roof.

Attachment 1 contains responses to the five questions. Attachment 2 contains the revised safety summary reflecting the change from 4 days capacity to 32 hours capacity of the collection sump and revised Millstone Unit No. 3 FSAR pages. The revised safety summary and FSAR pages replace the corresponding pages in the initial submittal dated June 30, 2000.[1]

The information provided in this letter will not affect the conclusions of the safety summary or the significant hazards consideration contained in the letter dated June 30, 2000,[1] and revised by the letter dated September 22, 2000.[2]

There are no regulatory commitments contained within this letter.

If you should have any questions on the above, please contact Mr. Ravi Joshi at (860) 440-2080.

Very truly yours,

NORTHEAST NUCLEAR ENERGY COMPANY

Raymond P. Necci
Vice President - Nuclear Technical Services

Subscribed and sworn to before me

this 26th day of January, 2001

Notary Public

Date Commission Expires:

SANDRA J. ANTON
NOTARY PUBLIC
COMMISSION EXPIRES
MAY 31, 2005

Attachments (2)

cc: H. J. Miller, Region I Administrator
V. Nerses, NRC Senior Project Manager, Millstone Unit No. 3
A. C. Cerne, Senior Resident Inspector, Millstone Unit No. 3

Director
Bureau of Air Management
Monitoring and Radiation Division
Department of Environmental Protection
79 Elm Street
Hartford, CT 06106-5127

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Attachment 1

Millstone Nuclear Power Station, Unit No. 3

Installation of a New Sump Pump System in
the Engineered Safety Features Building (PLAR 3-00-2)
Responses to Five Questions

Response to Five Questions
Installation of a New Sump Pump System in the Engineered Safety Features Building (ESFB)(PLAR 3-00-2)

Question No. 1

Establish criteria for monitoring inleakage rate in the sump.

Response

A Technical Requirement is being added to the Millstone Unit No. 3 Technical Requirements Manual (TRM) in the form of a Limiting Condition for Operation (LCO), Applicability, Action, and Surveillance sections.

The criteria for monitoring the inleakage rate is addressed in the LCO, which requires pump 3SRW-P5 to be OPERABLE. OPERABLE shall mean running in normal operating mode (automatically) with sufficient pump capacity to keep up with the groundwater inleakage rate and be able to reduce the level in collection sump 3SRW*SUMP6. Pump 3SRW-P5 shall also be considered OPERABLE when placed in Manual Off position for the purpose of preparation and discharge of tank 3SRW-TK1. If pump is not OPERABLE, restore pump to OPERABLE within 8 hours or otherwise enter ACTION Statement of Specification 3.6.1.6. The LCO also requires the groundwater inleakage rate to be less than 2209 gallons per day. With groundwater inleakage rate greater than 2209 gallons per day and pump 3SRW-P5 is OPERABLE, restore inleakage rate within 6 days or otherwise enter ACTION Statement of Specification 3.6.1.6. The 6 days are based on engineering judgment. An inleakage rate of 2209 gal/day shall be the design basis inleakage rate established for the new sump system. This inleakage rate is based on the rate of inleakage required to fill the mitigation capacity of new collection sump 3SRW*SUMP6 (2946 gallons) in 32 hours. Additionally, procedural requirements will be in place to start appropriate corrective actions if a substantial increase in inleakage rate occurs (an increase of 10% or higher).

Question No. 2

Explain how the surveillance to monitor inleakage rate will be conducted.

Response

The TRM will include surveillance requirements which call for verifying pump 3SRW-P5 is OPERABLE once per 24 hours, and verify groundwater inleakage rate to be less than 2209 gallons per day based on level change in tank 3SRW-TK1 once per 24 hours.

Monitoring of the sump pump system will be incorporated into daily operations rounds. The necessary parameters needed to determine the inleakage rate will be monitored. The inleakage rate will be calculated and recorded on a daily basis. The inleakage rate will then be compared with the value established in the TRM.

Operator response to high level alarm in the sump will be developed to troubleshoot and repair pump 3SRW-P5, if necessary, such that the design basis capacity of 32 hours is not challenged.

Question No. 3

Outline the required Emergency Operating Procedure (EOP) changes to ensure alternative ways of monitoring the various levels in case of failure of the non safety related level indication instruments.

Response

EOP 35 ES-1.3 will be revised to monitor the new sump system during the transfer to cold leg recirculation.

If this particular pump failed on the onset of a Design Basis Accident (DBA) and the 32 hour clock to restore to operation were to start, the following would occur:

> The Control Room (Manager of Control Room Operations) would notify the Technical Support Center letting them know of the failure and the required time frame to return to service. The Manager, Operational Support Center (OSC), located in the Technical Support Center would organize a repair team, brief the team and dispatch the team from the OSC Assembly area. The OSC Assembly area has repair teams on call (electricians, mechanics, etc.) who are available to trouble shoot and perform any repairs as required during an emergency.
>
> An Out of Service status board is maintained in the Technical Support Center and the progress of the pump repair would be tracked.

The EOPs provide a process to ensure failures are addressed and corrected. For example, in case of level instrumentation failure the following typical actions are used:

1. Level Instrumentation for 3SRW*SUMP6 Fails:

   Under Normal Plant Operating conditions

   Based on trending of in-leakage rate, manually operate pump 3SRW-P5, as necessary, to ensure sump level remains below normal operating range. Ensure that pump is operating appropriately by observing level of tank 3SRW-TK1.

Troubleshoot and repair level instrumentation and return to automatic operation after problem is fixed.

Under Post Accident conditions

Based on trending of in-leakage rate, manually operate pump 3SRW-P5, as necessary, to ensure sump level remains below normal operating range. Ensure that pump is operating appropriately by observing level of tank 3SRW-TK1.

2. Level Instrumentation for 3SRW-TK1 Fails:

Under Normal Plant Operating conditions

Based on trending of in-leakage rate into sump 3SRW*SUMP6, and last known level in tank 3SRW-TK1, estimate new tank level in 3SRW-TK1 once per day based on number of pump cycles for pump 3SRW-P5 and known volume of water between level setpoints in sump 3SRW*SUMP6. Troubleshoot and repair level instrumentation. Proceed with normal tank level monitoring and operation once level instrumentation is repaired.

Under Post Accident conditions

Same as normal operation scenario.

Question No. 4

Explain what sources of power will be available if the only safety related power source becomes unavailable due to bus failure (Orange Bus).

Response

The sump pump 3SRW-P5 is being powered by Motor Control Center (MCC) 32-4T which is located in ESFB elevation 34'-6". An MCC powered by the other safety train (MCC 32-3U) is also located in the same area. Should the MCC 32-4T lose power from both the offsite and its associated Emergency Diesel Generator (EDG), a temporary connection from MCC 32-3U will be provided to power the sump pump. A procedure for establishing this connection will be in place prior to release of the modification to Operations. If the procedure identifies any special materials and tools, they will be staged onsite. This area will be accessible for establishing the connection under normal and post accident conditions.

Question No. 5

Justify the qualifications of non safety pump power and control cable regarding temperature and radiation dose under post-accident condition.

Response

The power and control cables associated with this design are located in the areas which are considered to be "Harsh" environments per the Environmental Qualification (EQ) program guidelines for radiation only. The worst case radiation environment for these cables is estimated to be 1.3 x 10E7 rads TID. Although these cables are not qualified as class 1E cables, they are of the same construction as the cables used for the class 1E applications and the rating of these cables is estimated to be 2 x 10E7 rads TID. Therefore, it is reasonable to expect these cables to perform their intended function adequately.

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Attachment 2

Millstone Nuclear Power Station, Unit No. 3

Installation of a New Sump Pump System in
the Engineered Safety Features Building (PLAR 3-00-2)
Revised Safety Summary and FSAR Pages

Revised Safety Summary

Safety Summary

This license amendment request deals with changes in the Millstone Unit No. 3 FSAR due to the installation of a new sump pump system in the ESFB. The new sump design will be provided with a new safety grade sump 3SRW*SUMP6, which will be isolated from the RSS cubicle and will operate during normal, abnormal and post accident conditions. The sump will be provided with instrumentation and provides for a 32 hour capacity beyond the normal operating sump levels to provide adequate time to implement corrective actions, such as replacement of a failed 3SRW-P5 pump.

Only one non safety related electric sump pump will be provided. A spare pump will be maintained onsite. Monitoring of the sump pump can be initiated 8 hours after the accident and once per day thereafter. If the sump pump fails, it can be accessed from the ESFB roof 24 hours after a LOCA. Replacement activities are expected to last no more than 8 hours. Since operation of the pump is not required for 32 hours, there is sufficient time available to perform maintenance evolutions. EOP 35 ES-1.3 will be modified to reflect use of the new system.

Although the sump pump is classified as non-safety related and is provided with a non Class 1E circuit, it is connected to a safety related Class 1E MCC and can be operated with power supplied by the Train A EDG. It has been determined that addition of the sump pump to the Train A EDG would not affect operation of the EDG. Two Class 1E breakers have been added as isolation devices. As such, this change would not affect any vital bus. Upon failure of the Train A electrical system, there is sufficient time (32 hours) to repower the sump pump from another source.

The design change will result in a change in the SLCRS boundary in the ESFB. Modifications and surveillance of the SLCRS boundary will be performed in accordance with SLCRS design requirements and Technical Specification 3/4.6.6. As such, these changes will not affect the SLCRS.

The groundwater from the sump will be transferred by the sump pump to a new non safety tank adjacent to the ESFB. Since the new sump is separated from the RSS cubicle, the groundwater is expected to be non radioactive. However, measures will be taken to sample the groundwater, and, if found radioactive, disposition it accordingly. The new tank is installed in the location of the previously abandoned-in-place CAT, attached to the RWST. It has been confirmed through calculation that the new tank will pose no impact on the seismic qualification of the RWST. As such, operability of the RWST is not impacted.

Sump pump 3SRW-P5 will not be added to our plant Inservice Test (IST) Program due in part to the fact that the pump operates during normal operation (about once per day) and this normal pump use confirms the pump operability.

Therefore, the proposed changes will not affect the RSS, the RWST [which provides water to the Emergency Core Cooling System (ECCS) and the containment Quench Spray System (QSS)], the SLCRS, the containment, the Train A EDG or any vital bus. As such, probability and consequences of malfunction to these systems are not affected.

drain tanks, waste bottoms hold tank, low level waste drain tanks, spent resin dewatering tank, disposable waste shipping container.

9.3.3.2.3 Reactor Plant Gaseous Drains System

Gaseous drains (Figure 9.3-5) originate from systems containing reactor coolant or from systems which potentially could contain reactor coolant and are collected in the pressurizer relief tank, the containment drains transfer tank, and the primary drains transfer tank.

The pressurizer relief tank is located in the containment structure and receives gaseous drains from the pressurizer safety valves (Section 5.4.11). (97-405)

The containment drains transfer tank is located inside the containment structure and collects gaseous drains from the reactor coolant pumps seal leakoffs (Section 9.3.4), valve stem leakoffs, reactor vessel flange leak detection line (Section 5.2.5), and from the safety injection accumulator tanks (Section 6.3). The reactor coolant loops can be drained to the containment drains transfer tank directly or via the excess letdown heat exchanger in the chemical and volume control system.

The primary drains transfer tank is located in the auxiliary building (Section 3.8.4) and receives drains from the reactor plant sampling system hydrogenated contaminated liquid purge header (Figure 9.3-2); valve stem leakoffs outside the containment structure; relief valve discharges from the radioactive gaseous waste system, chemical and volume control system, and high and low pressure safety injection systems (Chapter 6); and drains from the volume control tank.

The containment drains transfer tank, pressurizer relief tank, and primary drains transfer tank each has two full capacity drain transfer pumps to transfer gaseous drains to the degasifier recovery exchangers (Figure 11.3-1) in the radioactive gaseous waste system or the cesium removal ion exchangers (Figure 9.3-9) in the boron recovery system. The pumps are started manually and stopped automatically.

9.3.3.2.4 Reactor Plant Aerated Drains System

INSERT (A)

Aerated drains are collected in sumps located inside the containment structure (incore instrument room sump, unidentified leakage sump, and containment drains sump); caps engineered safety features building (two residual heat removal cubicle sumps, two containment recirculation cubicle sumps, and engineered safety features building sump); auxiliary building; pipe tunnel; fuel building; waste disposal building (two sumps); and turbine building (two turbine plant component cooling drain sumps and turbine building floor drain sump). The aerated drain system also contains three underdrain sumps that collect drainage from under the engineered safety features, fuel, waste disposal, auxiliary, service, control, and pumps these uncontaminated sumps directly to the yard storm sewer system. There is no connection between the underdrain sumps and the contaminated section of the aerated drains system.

Except for the containment drains sump, each sump collects aerated drains from equipment, filters, and the floor drains in their respective areas. The containment drains sump collects aerated drains directly from equipment and systems inside the containment structure. Depending on the activity level, all aerated drains except the turbine building floor drain sump are transferred by sump pumps through either the high or low level waste

drain header (Figure 9.3-6) to the high or low level waste drain tank, respectively (Figure 11.2-1) in the radioactive liquid waste system.

The turbine building floor drain sump is monitored for radioactivity. It is normally pumped to the yard drainage system, but is directed to the liquid radioactive waste system via the turbine plant component cooling drain sump on a predetermined radioactivity level.

The neutron shield tank cooling system (Section 9.2.2.3) uses potassium dichromate as a corrosion inhibitor. Whenever this system is drained to the containment drains sump, the sump is pumped directly, under administrative control, to the high level waste drain header. Drainage from the radioactive solid waste system (Figure 11.4-1) flows directly to the high level waste drain header.

INSERT (B)

9.3.3.2.4.1 Safety-Related Containment Recirculation Cubicle Sump

The containment recirculation cubicle sumps are located in the engineered safety features building. These sumps collect non-radioactive, non-contaminated discharges from equipment via aerated drains. In addition, these sumps also serve to collect (via an underdrain and porous concrete media) any significant amounts of groundwater seepage which has circumvented the non-safety-related waterproof membrane. During normal operation, non-safety-related pumps transfer the contents of the sumps to the waste disposal building via the engineered safety features building sump pumps. Following a LOCA or during extended losses of normal power, the removal of groundwater seepage will
99-47 be performed by safety-related air driven pumps also located within the containment recirculation cubicle sumps.

Each sump contains one safety related air driven sump pump. Air inlet and outlet lines and water discharge lines are run from each pump to the outside yard at grade elevation outside of the engineered safety features building. The pumps were sized to remove water from the sumps and deliver the contents to temporary storage containers and the operating time for the pumps will be approximately 20 minutes per day. The pump out frequency was determined based upon daily groundwater inflow rates and sump volumes to avoid sump overflow. The frequency required for sump pump out is approximately twice a day as stated in the system operating procedure. The air supply for each pump is supplied by its own dedicated portable air compressor. The compressors were selected based upon the pump air supply requirements. The permanently installed portion of the system ends with closed isolation valves outside of the engineered safety features building wall. Prior to operation of the system, a spool piece containing a filter, oiler and relief valve is attached to each air supply line. The associated air supply is attached to each spool piece. The system is safety related with the exception of the air compressors, which are non safety related.

The air driven pumps will discharge water to temporary storage tanks also located outside of the engineered safety features building when needed. The tank contents will be sampled and processed as directed by the Chemistry Department. Liner extensions and hoods have been installed for the sumps to prevent the accidental introduction of contaminated fluids. These modifications are safety-related to ensure that water transferred from the sumps during post-LOCA conditions remains radiologically uncontaminated. Equipment accessible for repair (such as the portable diesel compressors), is non-safety related.

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9.3.3.2.5 Containment Isolation Valves

Containment isolation valves are provided in all lines penetrating the containment structure (Section 6.2.4). Both containment isolation valves in the gaseous vents system are open during normal operation. During normal operation for both the gaseous and aerated drains systems, the containment isolation valve inside the containment structure is closed and the one outside the containment structure is open. A containment isolation, phase A (CIA) signal overrides all other signals and closes the containment isolation valves.

9.3.3.3 Safety Evaluation

The reactor plant vent and drain systems are designed and sized to handle the maximum flow rate of vents and drains expected during unit operation.

Austenitic stainless steel piping and tubing is used to transfer all fluids in the reactor plant vent and drain systems.

The containment drains transfer pumps, pressurizer relief tank drains transfer pumps, and primary drains transfer pumps drain their respective tanks in the reactor plant gaseous drain system. Two pumps are provided for each tank. The pumps are started manually and stop automatically.

On receipt of a high level alarm for the containment drains transfer tank or the primary drains transfer tank, one of the pumps associated with the alarming tank is started by remote manual control. If the level does not decrease, the second pump is started remote manually. The pumps are stopped automatically on receipt of the tank low level signal.

Upon receipt of the pressurizer relief tank high level alarm, the normally closed air-operated valve in the suction line from the pressurizer relief tank to the pressurizer relief tank drains transfer pumps is opened remote manually and one of the pumps is started remote manually. If the level does not decrease, the second pump is started remote manually. The pressurizer relief tank drains transfer pumps stop automatically on receipt of a pressurizer relief tank low level signal. The air-operated valve in the suction line to the pumps is closed remote manually.

A CIA signal closes the containment isolation valves in the reactor plant gaseous drain system, which stops the pressurizer relief tank drains transfer pumps and containment drains transfer pumps. This CIA signal terminates any potential radioactive release from containment by this pathway.

A duplex pump arrangement is provided for each of the following reactor plant aerated drains system sumps (Figure 9.3-6): containment drains sump, turbine building floor drain sump, auxiliary building sump, fuel building sump, two waste disposal building sumps, and three underdrain sumps. One pump is in automatic service and the other on standby, and each pump is independently controlled. When the water level in a sump reaches a specified height, the associated sump pump starts automatically. If the water in the sump reaches a specified higher level, the associated standby sump pump also starts automatically. The sump pumps stop automatically when the water has decreased to a specified level in the associated sump. A CIA signal closes the containment isolation valves in the reactor plant aerated drain system, which stops the containment drains sump pumps terminating any potential radioactive release from containment by this pathway.

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Single pumps are provided in the following sumps (Figure 9.3-6): incore instrument room sump, unidentified leakage sump, two turbine plant component cooling drains sumps, pipe tunnel sump, two residual heat removal cubicle sumps, two containment recirculation cubicle sumps, and engineered safety features building sump. Each pump starts automatically when the water level in the associated sump reaches a specified level, and stops when the level drops to a specified level. Alarms are activated if the level rises above a specified level, except for the unidentified leakage sump. The unidentified leakage sump alarm (KA) initiates if P10 restarts too soon after stopping or if P10 runs too long. The frequency of operation of the unidentified leakage sump pump is monitored as one method of detecting excess leakage inside the containment structure (Section 5.2.5).

INSERT (E)

99-47 In addition to the pumps mentioned above, each containment recirculation cubicle sump is equipped with one safety-related air driven pump which is designed to provide for (following a LOCA or during extended losses of normal power) the removal of groundwater seepage which has circumvented the non-safety related waterproof membrane. Each sump pump and its associated air and water piping are completely independent of the other and are located in separate cubicles within the engineered safety features building. Portable air compressors are dedicated to each train. This provides independence of the two trains. The sumps communicate via the underground porous concrete, therefore, if one sump pump or it's associated system should fail, the other is capable of removing the contents of both sumps. This provides redundancy of the two trains assuring that the two safety functions; preventing containment recirculation cubicle flooding which could result in the loss of both trains of the recirculation spray system and preventing the development of undesired hydrostatic buoyancy forces from forming on the containment steel liner are maintained. The air compressors are non-safety-related and are dedicated to their associated trains, but can be interchanged if necessary. A third, spare air compressor is available on site and is dedicated to this system. For these reasons, use of the non-safety-related compressors supports safe operation of the containment recirculation cubicle safety-related sump pumps. Because the area may be inaccessible due to high radiation following a LOCA, the system has been designed such that no components within the system require maintenance or replacement for up to one year post LOCA.

The residual heat removal cubicle sumps and pumps are located in safety related areas, although they are not safety related themselves. The cubicles are completely separate from one another. Furthermore, drain piping is run to an elevation high enough to prevent back flooding from the engineered safety feature building back to these cubicles. The other pumps are in nonsafety related areas.

All lines in the systems penetrating the containment structure have two containment isolation valves in series (Figure 9.3-4 through 9.3-6). The power to each solenoid-operated pilot valve for the redundant containment isolation valves is supplied from a separate emergency bus. All of these containment isolation valves fail closed on loss of actuating air, loss of actuating signal, or loss of power.

When systems or components containing potassium dichromate are drained, the affected sump is pumped directly, by administrative control, to the high level waste drain tanks via the high level waste drain header for processing in the waste evaporator (Figure 11.2-1). This administrative control procedure ensures that drained potassium dichromate inhibitor is not released to the environment.

9.3.3.4 Tests and Inspections

Periodic testing of the reactor plant vent and drain systems is not necessary because they are used in normal operation. Inspection is performed in accordance with normal maintenance procedures. Containment isolation valves are tested in accordance with the procedures in Section 6.2.4. INSERT D

The safety-related containment recirculation sump pump systems were tested after installation to confirm the system's ability to remove the accumulated groundwater from the sumps. This testing confirmed that the two sumps communicate hydraulically even though they are not directly linked via the underdrain system. The sump pumps were qualified for seismic loading and post accident conditions and performance testing was performed to confirm that the pumps would operate as required post LOCA without maintenance. The air compressors will be run periodically to assure they remain operable. The sub-systems will periodically be demonstrated as operable. 99-47

9.3.3.5 Instrumentation Requirements

9.3.3.5.1 Reactor Plant Gaseous Vent System

The reactor plant gaseous vent system operating parameters are monitored, indicated, and controlled, locally or remotely as follows:

Main Control Board

1. The main control board has pushbuttons with open and close indicating lights for the inside and outside containment isolation valves in the reactor plant gaseous vent system.
2. Status windows monitor the inside and outside containment isolation valves, in reactor plant gaseous vent system, closed position.
3. Computer inputs are for the inside and outside containment isolation valves, in the reactor plant gaseous vent system, open and closed positions.

A pressure control valve, located in the reactor plant gaseous vent system discharge line to the condenser air removal system, maintains back pressure in the line. A local pressure indicator is provided in the reactor plant gaseous vent system discharge line.

9.3.3.5.2 Reactor Plant Aerated Vent System

No instrumentation is associated with this system.

9.3.3.5.3 Reactor Plant Gaseous Drain System

The reactor plant gaseous drain system operating parameters are monitored, indicated, and controlled, locally or remotely as follows:

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12.3.1.3.2 Post-Accident Access to Vital Areas

A radiation and shielding design review was performed in accordance with NUREG-0737, Action Item II.B.2 (USNRC, 1980), in order to ensure personnel accessibility after a design-basis accident (DBA). The DBA considered for this evaluation was the loss-of-coolant accident (LOCA). The projected dose to complete each activity necessary to mitigate a DBA LOCA, en route to and in vital areas, is less than the 5 rem design limit of NUREG-0737. At Millstone 3, this requirement is met by providing sufficient shielding of components containing post-accident radioactive inventories, consistent with anticipated access routes and stay times.

One activity evaluated as part of the review was the post-LOCA hydrogen purge of containment. Because this activity requires multiple failures resulting in a loss of both trains of the Hydrogen Recombiner, this is considered beyond the design basis of a DBA LOCA. As such, the design guidance for performance of an activity within 5 rem is no longer applicable. The projected dose for this activity is less than 25 rem, which falls within the authorized limit of 25 rem as described in the Emergency Plan for severe accident mitigation.

Areas requiring accessibility (vital areas) are those areas where post-LOCA actions can be taken over the short-term to ensure the capability of operators to control and mitigate the consequences of an accident. A description of the post-accident activities is summarized below and in Table 12.3-3.

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1. <u>Locally trip the reactor trip breakers and bypass breakers</u>

   This action is performed at the 43'6" elevation in the auxiliary building MCC rod control area. This is done in the event that the reactor failed to trip. This action must take place as soon as possible. Thus, the 0 to 30 minute time frame is assumed. While this step is done only in the event of an ATWS (beyond the design basis scenario), it is conservatively included as a required operator action.

2. <u>Sampling</u>

   PASS (Post Accident Sampling System) samples are required for isotopic and gas composition analyses of containment air and isotopic, pH, boron and chloride analyses of reactor coolant/sump samples. NUREG-0737 II.B.3 states that the combined time for sampling and analysis should be 3 hours or less from the time a decision is made to take a sample. In a design basis LOCA where fuel failure would occur almost immediately, the 0 to 30 minute time is assumed.

3. <u>Local actions needed to realign Spent Fuel Pool Cooling, RBCCW and Service Water for spent fuel pool cooling</u>

   FSAR 9.1.3.3 states that spent fuel pool cooling will be initiated approximately 4 hours after the LOCA. This requires operator action in the spent fuel pool building. The 2 to 8 hour time frame is assumed.

4. Powering the Plant Process Computer

The Plant Process computer is normally not powered from an Emergency Bus. It is powered from an uninterruptible power supply that may last for only 30 minutes. Thus, the 0 to 30 minute category is assumed. The plant process computer is used for SPDS and OFIS. In order to restore power to the plant process computer, MCC 32-3T is energized on the 38' level in the turbine building.

5. Powering the SI accumulator valves

For post-LOCA cooldown and depressurization, the SI accumulator isolation valves are closed to prevent injection of nitrogen that might interrupt natural circulation. It is necessary to repower the valves from the 24'6" level in the auxiliary building. Since this would be done only after the plant is stabilized in preparation for a cooldown, the 30 minute to 2 hour time frame is assumed.

6. Initiate hydrogen monitor

FSAR Section 6.2.5.2 states that this system will be available to provide continuous monitoring within 1 hour and 30 minutes of an accident. For dose consequence evaluation, availability within 30 minutes was assumed for conservatism. Thus, the 0 to 30 minute category is assumed. Access to the hydrogen recombiner building is needed in order to initiate hydrogen monitoring.

7. Initiate hydrogen recombiner

FSAR Section 6.2.5.3 assumes that the hydrogen recombiner will be placed in service within 24 hours at which time the hydrogen concentration is 1.6%. 98-103
However, it also states that the hydrogen recombiner is started well before this concentration is attained. To meet the latter requirement, emergency procedures specify initiation of the hydrogen recombiner when hydrogen concentration exceeds 0.2%. Thus, the 30 minute to 2 hour time frame is assumed. Access to the hydrogen recombiner building is needed in order to initiate the hydrogen recombiner.

8. Initiate hydrogen purge

FSAR Section 6.2.5.3 states that if hydrogen purge is initiated at 4 days, the 50 scfm purge flow rate is sufficient to maintain hydrogen concentration below 4%. Thus, the 4 day to 30 day category is assumed. Access to the 4'6", 24'6" and 43'6" levels of the auxiliary building are needed.

9. Locally open the breakers for RWST/Charging pump suction valve

Valves 3CHS*LCV112D and 3CHS*LCV112E are closed and associated breakers are opened as a backup to the check valve to prevent back leakage to the RWST when post-LOCA recirculation is established. As stated in FSAR Section 6.3.2.8, the minimum time frame for post-LOCA recirculation is 33 minutes. Thus, the 30 minute to 2 hour category is assumed. This action is performed on the 24'6" level of the auxiliary building.

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 INSERT (E)

10. Install and Operate air compressors for RSS sump pumps

Safety grade sump pumps were installed because of the potential for ground water intrusion flooding the RSS sump pumps. Installation of air compressors is necessary to operate the sump pumps. It is assumed that operation of the sump pumps would take place roughly 10 hours post accident. Thus, the 8 hour to 24 hour category is assumed. The air compressors will be operated periodically, once every twelve hours. Thus, this also should be evaluated for the 1 to 4 day and the 4 day to 30 day category. The air compressors are installed outside of the ESF building.

11. Open the breakers for the non-safety grade sump pumps

The operation of the non-safety grade sump pumps may mask the presence of a leak. Thus, the need to secure sump pumps in ECCS pump cubicles and common areas in the Auxiliary and ESF buildings. The 1 day to 4 day time frame is assumed. This action requires access to the 21' elevation of the ESF building and the 24'6" elevation of the auxiliary building.

12. Stopping non-safety grade HVAC fans to maintain the SLCRS boundary

Prior to placing the Control Room on emergency ventilation, the operators will verify that the non-safety grade fans that could affect the SLCRS boundary are tripped. If not, local actions in the auxiliary building (43'6" level) and service
98-103 building are necessary to trip fans 3HVV-FN1A, 3HVV-FN1B, 3HVQ-FN2, 3HVR-FN5 and 3HVR-FN7. This will be done after Control Building Isolation has been actuated for one hour. Thus, the 30 minutes to 2 hour category is assumed.

13. Align Service Water to AFW to provide long term SG decay heat removal

For LOCAs where the break is not big enough to remove decay heat, the design basis long term cooling method is service water as back up to auxiliary feedwater in conjunction with post-LOCA recirculation. As discussed in the basis for Technical Specification 3/4.7.1.3, the Demineralized Water Storage Tank supply will last a minimum of 16 hours. Thus, the 8 hour to 24 hour category is assumed. This action is performed on the 21' elevation of the ESF building.

14. Reset MCC breakers for Diesel Generator keep warm systems

This action is taken when offsite power is available and the running diesel generator is stopped. The keep warm system assures that the diesel generator would be maintained in the optimum condition for a subsequent start if a loss of offsite power occurs later in the transient. This action is performed in the emergency diesel generator building.

In addition to the areas and activities defined above, the following areas require post-accident access and continued occupancy:

1. Control Room - post accident control room habitability is discussed in Section 6.4 and control room post-LOCA doses are presented in Section 15.6.5.

(A)

The aerated drain system also contains four underdrain sumps. Three of these sumps collect drainage from under the Engineered Safety Features, Fuel, Waste Disposal, Auxiliary, Service and Control Buildings. The uncontaminated effluent from these sumps is pumped directly to the yard storm sewer system. The fourth underdrain sump is located in the basement of the Engineered Safety Features Building. This sump collects groundwater that has circumvented the waterproof membrane that was installed around the Containment Structure and the Containment Structure contiguous buildings. The effluent from this sump is pumped to a storage tank in the yard. The effluent is not radiologically contaminated, but the groundwater has a high pH and is treated as necessary to achieve satisfactory effluent limits prior to discharge. There is no connection between the underdrain sumps and the contaminated section of the aerated drains system.

The contaminated portion of the aerated drains system includes several sumps. Except for the containment drains sump, these sumps collect

(B)

9.3.3.2.4.1 Safety Related Porous Concrete Groundwater Sump (Underdrain System Sump)

The porous concrete groundwater sump is located in the Engineered Safety Features Building. This sump collects (via an underdrain and porous concrete media) any significant amount of groundwater seepage which has circumvented the waterproof membrane. The sump is equipped with a non-safety related electric sump pump. The sump protects the containment steel liner from hydrostatic loading. It is sized such that using a design basis seepage of approximately 2200 gallons per day, 32 hours are available to replace a failed non-safety related electric sump pump and restore the groundwater removal capability of the sump pump. The sump pump transfers groundwater collected in the sump to a tank in the yard. Sampling and pH treatment is performed as necessary on the tank contents prior to discharge. The sump pump is accessible via the Engineered Safety Features Building roof and is outside the SLCRS boundary (i.e. the sump pump can be removed and installed from the roof). The electric sump pump is powered by non-safety related electrical circuits which derive power from a safety related electrical bus (see Table 8.3-3). Utilizing a safety related power source to provide power to the non-safety related pump provides greater assurance of a reliable energy source. A spare sump pump is stored on site. Administrative controls are in place to monitor the groundwater inleakage and the non-safety related electric pump operability. Administrative controls include monitoring of the non-safety related pump start and stop times, the water level of the porous concrete groundwater sump and the water level of the tank in the yard.

Ⓒ

In addition to the pumps described above, the Engineered Safety Feature Building (ESFB) is equipped with a non-safety related sump pump to remove groundwater that has circumvented the waterproof membrane surrounding the Containment Structure and the Containment Structure contiguous buildings. This pump is credited with groundwater removal during normal operation, following a LOCA and during loss of normal power scenarios. The ESFB roof is accessible after 24 hours post LOCA with respect to radiation. The single non-safety related sump pump design is acceptable because the sump pump is accessible from the ESFB roof and sufficient time is available to perform maintenance activities for the pump without overfilling the sump and without compromising safety related structures, systems or components. A spare sump pump is stored on site.

Ⓓ

The safety related Engineered Safety Feature Building (ESFB) sump and associated non-safety related sump pump were tested after installation to confirm the system's capability to remove the accumulated groundwater from the sump. The testing also confirmed that the ESFB basement area is water tight up to an elevation that is equal to the top of the safety related sump. The sump is qualified for seismic loading and post accident conditions and performance testing was conducted to confirm that the subsystem would operate as required post LOCA.

Ⓔ

10. Monitor and Maintain the porous concrete groundwater removal system

A non-safety related pump is credited with groundwater removal that circumvents the waterproof membrane that surrounds the containment structure and the containment structure contiguous buildings. The status of the groundwater removal system will be monitored daily. Thus the 8 hour time frame and beyond is assumed for monitoring. Should the single non-safety related groundwater sump pump become nonfunctional, approximately 32 hours are available before the sump pump needs to be restored to a functional status based on design basis seepage rate of approximately 2200 gallons per day. Due to dose considerations, the 1 day time frame and beyond is assumed for maintenance and repair activities for the sump pump (note: The pump repair is required prior to 32 hours from the time when the pump becomes non-functional). Monitoring activities take place in the yard on the east side of the Engineered Safety Features Building (ESFB). The sump pump is accessible from the ESFB roof. Access to the ESFB roof is achieved via the Hydrogen Recombiner Building stairway.

TABLE 1.8-1

NRC REGULATORY GUIDES

R.G. No.	Title	Degree of Compliance	FSAR Section Reference
		• Average burn-up of 25,000 MWD/MTU • Maximum fuel rod pressurization of 1,200 psig Presumably more conservative assumptions should be applied in the fuel handling accident analysis for more highly rated fuel. However, since present LWR fuel exceeds these ratings by negligible amounts, if at all, the assumptions are used as is.	
1.26*	Quality Group Classifications and Standards for Water-, Steam-, and Radioactive-Waste Containing Components of Nuclear Power Plants (Rev. 3, February 1976)	Comply, with the following exceptions: 1. The safety class terminology of ANSI N18.2 and ANSI N18.2-a, 1975 is used instead of the quality group terminology. Thus, the terms Safety Class 1, Safety Class 2, Safety Class 3, and non-nuclear safety (NNS) are used instead of Quality Groups A, B, C, and D, respectively. 2. Regarding Regulatory Positions C.1.e and C.2.c, one safety valve designed, manufactured, and tested in accordance with ASME III Division 1 (i.e., a code safety valve) is considered acceptable as the boundary between the reactor coolant pressure boundary and a lower safety class or NNS line. 3. Regarding Regulatory Positions C.1 and C.2, all instrument tubing, classified as Safety Class 2 or 3, is designed to ASME Section III rules, with Seismic Category I supports installed with a 10CFR50, Appendix B program as described in Section 3.2.3. INSERT ①	3.2.2
1.27	Ultimate Heat Sink for Nuclear Power Plants (Rev. 2, January 1976)	Comply	2.4.11.6 9.2.5
1.28*	Quality Assurance Program Requirements (Design and Construction) (Rev. 2, February 1979)***	Comply as follows: 1. Construction Millstone 3 complied with R.G. 1.28, Rev. 0. 2. Operation Millstone 3 complies with R.G. 1.28, Rev. 2.	17.1.2 17.2
1.29*	Seismic Design Classification (Rev. 3, September 1978)	Comply	3.2.1

INSERT ①

4. Groundwater removal post accident via the porous concrete groundwater removal system is a safety-related function. The components within the Engineered Safety Features Building (ESFB) that are accessible / retrievable from the roof are classified as non-nuclear safety instead of Safety Class 3 commensurate with their importance to safety. The sump and piping in the ESFB are Safety Class 3, however, the sump is designed to the guidance of the AISC Code and the piping is designed to the ANSI B31.1 Code. The electrical power for the sump pump is supplied from a single safety related source and is routed via non-safety related power cables.