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July 23, 1998

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OFFICE OF SECRETARY
RULEMAKINGS AND
ADJUDICATIONS STAFF

UNITED STATES OF AMERICA
NUCLEAR REGULATORY COMMISSION

BEFORE THE ATOMIC SAFETY AND LICENSING BOARD

In the Matter of	)	
	)	
Northeast Nuclear Energy Company	)	Docket No. 50-423-LA-2
	)	
(Millstone Nuclear Power Station,	)	
Unit No. 3)	)	

NORTHEAST NUCLEAR ENERGY COMPANY'S
AMENDMENT APPLICATION

In accordance with the Order of the Atomic Safety and Licensing Board of this same date, Northeast Nuclear Energy Company hereby files a copy of the April 1, 1998 license amendment application related to the addition of a new sump pump subsystem.

Respectfully submitted,

David A. Repka

David A. Repka

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ATTORNEYS FOR NORTHEAST NUCLEAR
ENERGY COMPANY

Dated in Washington, D.C.
this 23rd day of July, 1998

19352

SECY-EHD-002 DS03

UNITED STATES OF AMERICA
NUCLEAR REGULATORY COMMISSION

DOCKETED
USNRC

BEFORE THE ATOMIC SAFETY AND LICENSING BOARD '98 JUL 24 P12:29

OFFICE OF [illegible]
RULEMAKING [illegible]
ADJUDICATIONS STAFF

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Northeast Nuclear Energy Company	)	Docket No. 50-423-LA-2
	)	
(Millstone Nuclear Power Station,	)	
Unit No. 3)	)	

CERTIFICATE OF SERVICE

I hereby certify that copies of "NORTHEAST NUCLEAR ENERGY COMPANY'S AMENDMENT APPLICATION," in the above-captioned proceeding, have been served on the following by deposit in the United States mail, first class, this 23rd day of July, 1998.

Nancy Burton, Esq.
147 Cross Highway
Redding Ridge, CT 06876

Thomas S. Moore
Chairman
Atomic Safety and Licensing Board
U.S. Nuclear Regulatory Commission
Washington, DC 20555-0001

Office of the Secretary
U.S. Nuclear Regulatory Commission
Washington, DC 20555
Attn: Rulemaking and Adjudications
(original + two copies)

Dr. Charles N. Kelber
Administrative Judge
Atomic Safety and Licensing Board
U.S. Nuclear Regulatory Commission
Washington, DC 20555-0001

Adjudicatory File
Atomic Safety and Licensing Board Panel
U.S. Nuclear Regulatory Commission
Washington, DC 20555

Dr. Richard F. Cole
Administrative Judge
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Northeast
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Millstone Nuclear Power Station
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The Northeast Utilities System

APR - 1 1998

Docket No. 50-423
B17141

Re: 10CFR50.90
10CFR50.59 (a)(2)

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

Millstone Nuclear Power Station, Unit No. 3
Proposed License Amendment Request
ESF Building Sump Pumping Subsystem
(PLAR 3-98-2)

Pursuant to 10CFR50.90, Northeast Nuclear Energy Company (NNECO) hereby proposes to amend Operating License NPF-49 by incorporating the attached proposed revision into Chapters 2, 3 and 9 of the Millstone Unit No. 3 Final Safety Analysis Report (FSAR).

The proposed revision to the Millstone Unit 3 licensing basis adds a new sump pump subsystem to address groundwater inleakage through the Containment basemat.

Description of Proposed Revision

A Millstone Unit No. 3 Configuration Management Program review revealed that inleakage of groundwater has the potential to flood Engineered Safety Features (ESF) building sumps if the existing nonsafety-related sump pumps should fail to operate. If the sumps are not pumped out, the groundwater could eventually affect both trains of the Recirculation Spray System (RSS). This was previously reported in Licensee Event Report (LER) 97-046-00

The containment substructure is encased within a waterproof membrane that is connected to sumps located in the ESF building. Degradation of the waterproof membrane has been detected, allowing groundwater inleakage. Any groundwater inleakage permeates through a porous containment basemat containing embedded drainage pipes, and is directed to one of the two RSS cubicle sumps in the ESF building.

The current FSAR concluded that significant amounts of groundwater are not expected and thus, no safety-related dewatering system is required. The degradation of the waterproof membrane and the measurements of groundwater inleakage has changed this conclusion. It is now recognized that enough groundwater inleakage can occur to potentially affect the operability of both trains of RSS pumps. Thus, the FSAR is being changed to reflect this new conclusion. In order to resolve this issue, two safety-related, air-driven sump pumps have been installed in the RSS sumps. A description of these new pumps is being added to the FSAR.

Markup of Proposed Revision

A copy of the marked up FSAR pages is contained in Attachment 2. The markup reflects the currently issued version of the FSAR.

Background, Safety Assessment, Significant Hazards Consideration and Environmental Considerations

The Background, Safety Assessment, Significant Hazards Consideration and Environmental Considerations that support this proposed revision are contained in Attachments 3 and 4.

Plant Operations Review Committee and Nuclear Safety Assessment Board Review

The Plant Operations Review Committee and the Nuclear Safety Assessment Board have reviewed this proposed amendment request and concur with the contained determinations.

State Notification

In accordance with 10CFR50.91(b), we are providing the State of Connecticut with a copy of this proposed amendment to ensure their awareness of this request.

Schedule Request for NRC Approval

NNECO requests NRC review and approval of this proposed revision by May 15, 1998 and that the license amendment be effective upon issuance with implementation within sixty (60) days.

If the NRC Staff should have any questions or comments regarding this submittal, please contact Mr. D. Smith at (860) 437-5840.

Very truly yours,

NORTHEAST NUCLEAR ENERGY COMPANY

M.L. Bowling, Jr.
Millstone Unit No. 2 - Recovery Officer

Subscribed and sworn to before me

this 1st day of April, 1998

Date Commission Expires: 1/31/2000

cc: H. J. Miller, Region I Administrator
W. D. Travers, Ph.D., Director, Special Projects Office
J. W. Andersen, NRC 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

Docket No. 50- 423
B17141

Attachment 1

Millstone Nuclear Power Station, Unit No. 3
Proposed License Amendment Request
ESF Building Sump Pumping Subsystem
(PLAR 3-98-2)
NNECO's Commitments

April 1998

Enclosure
List of Regulatory Commitments

The following table identifies those actions committed to by NNECO in this document. Please notify the Manager - Regulatory Compliance at the Millstone Nuclear Power Station Unit No. 3 of any questions regarding this document or any associated regulatory commitments.

	Commitment	Committed Date or Outage
17141-01	Two air compressors are staged in designated locations, and will maintained and periodically tested to ensure their availability. Periodic testing of the safety related sump pumps will also be performed. The surveillance requirements are incorporated into the Technical Requirements Manual.	Complete
17141-02	Procedures have been modified as required to address installation of the standby air compressors and operation of the new sump pumping subsystem	Complete
17141-03	NNECO has provided for interim environmental discharge requirements as part of a system Operability Determination.	Complete

Docket No. 50-423
B17141

Attachment 2

Millstone Nuclear Power Station, Unit No. 3
Proposed License Amendment Request
ESF Building Sump Pumping Subsystem
(PLAR 3-98-2)
Marked Up Pages

April 1998

MARKUP OF PROPOSED REVISION

Refer to the attached markup of the proposed revision to the Final Safety Analysis Report (FSAR). The attached markup reflects the currently issued version of the FSAR.

The following FSAR changes are included in the attached markup.

- Section 2.4.13.5 Design Bases for Subsurface Hydrostatic Loading

A reference is added to Section 9.3.3.2.4.1 that describes the augmentation of the water proof membrane for post-DBA operation.

- Section 2.5.4.6.1 Design Basis for Groundwater

Two references are added to Section 9.3.3.2.4.1 that describes the augmentation of the water proof membrane for post-DBA operation. The phrase "...and failure of the system would not result in a significant inflow of water into the basement of any structures" is replaced with "However enough leakage occurs to require pumping for equipment protection"

- Section 3.4.1.2 Permanent Dewatering System

The sentence is being modified to clarify that no safety-related dewatering systems are needed for adverse hydrology events.

- Section 3.8.1.6.4 Waterproofing Membrane

The sentence stating "Pumps are used as necessary to remove the water" is being replaced with a sentence that nonsafety-related pumps are used as necessary to remove water during normal plant operation and safety-related pumps are used for post Loss of Coolant Accident(LOCA) or Loss of Normal Power(LNP) conditions.

- Section 3.8.5.1 Description of Foundations

A sentence is being added that states that a safety-related subsystem has been installed in the event that the nonsafety sump system can not be operated during post-LOCA conditions. The word "unlikely" was deleted.

- Section 9.3.3.2.4 Reactor Plant Aerated Drains System

The reference to two containment recirculation cubicle sumps is being deleted.

- Section 9.3.3.2.4.1 Safety Related Containment Recirculation Cubicle Sumps

A new section is being added to describe the containment recirculation cubicle sumps located in the ESF building and the addition of the safety-related air-driven pumps also located within the Containment Recirculation Cubicle Sumps.

- Section 9.3.3 Safety Evaluation

Two sentences are being inserted to identify the new safety-related air-driven pumps designed to remove groundwater seepage following a LOCA or an extended loss of offsite power.

97-MP3-382

l, b = Source dimensions in the x and y direction, respectively

H_1, H_2 = Upper and lower surface of the volume source

H = Aquifer thickness

x, y, z = Coordinates in the longitudinal, transverse, and vertical direction, respectively

t = Time from initial release

When input data are substituted in Equation 2.4-19, the minimum dilution factor for the groundwater, C_o/C, equals 73.

The discharged liquid on reaching Niantic Bay is diluted further in that body of water. The method used to calculate the dilution in Niantic Bay and Long Island Sound is the same method as described in Section 2.4.12. The only difference is that the released point is in the intake area instead of the circulating water discharge tunnel. The dilution factor upon entering Niantic Bay at the Intake area is calculated to be 13,052 and at 1,000 feet from the point of discharge into Niantic Bay is calculated to be 32,151. One-thousand feet was chosen arbitrarily as the point to calculate the dilution factor in Niantic Bay so as to show the large dilution factor obtained in the bay.

2.4.13.4 Monitoring or Safeguard Requirements

Since the potential for groundwater contamination is minimal, as discussed in Sections 2.4.13.2 and 2.4.13.3, procedures and safeguards to protect groundwater users are not necessary.

2.4.13.5 Design Bases for Subsurface Hydrostatic Loading

There is no safety related permanent dewatering system for Millstone 3. (SEE 9.3.3.2.4.1 FOR AUGMENTATION OF THE WATERPROOF MEMBRANE FOR POST DBA OPERATION) Safety related structures are designed for water pressure and buoyancy forces applied from their respective foundation levels to the design piezometric surface levels, as shown in Figure 2.5.4-37 assuming saturated soil conditions to the water surface. Section 2.5.4.6 includes a discussion of groundwater conditions with respect to plant structure design and construction and Section 3.4 includes a discussion of flood design for Seismic Category I structures and components. (97-8 2/97)

2.4.14 Technical Specification and Emergency Operation Requirements

No emergency protective measures or technical specifications are required to minimize the water associated impact of adverse hydrologically related events on safety related equipment and facilities.

The service water pumps are designed to operate at a low water level of el -8.0 feet msl, which is 3.2 feet lower than the historical low water level (Section 2.4.11.3) and are enclosed in a flood protected portion of the circulating and service water pumphouse (Sections 2.4.1.1 and 3.4.1). Other safety related structures and components are protected from flooding by the site grade of el 24.0 feet msl. AOP 3569 addresses safety (97-214 7/97) (92-12 3/92)

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2.5.4.6.1 Design Basis for Groundwater

Groundwater observations at the site prior to construction were made in piezometers installed in several borings. Listings of the water elevations and dates of reading are presented in Table 2.5.4-17. Three borings, 303, 310, and 311, were continually monitored over a 2-year period. A plot of elevation vs date for water levels in these boreholes is shown on Figure 2.5.4-38. As a result of these observations, a stabilized groundwater level contour map, based on the water levels measured in January 1972, shown on Figure 2.5.4-37, is used as the basis for determining hydrostatic loadings on structure foundations.

Localized perched groundwater conditions probably exist because of the irregular distribution of ablation till materials of varying gradation and porosity. It is also likely that shallow, ponded water exists in localized bedrock troughs. The prevalence of bedrock outcrops to the north and northwest of the site indicates that bedrock acts as a groundwater divide, isolating the soils of the tip of Millstone Point from soils further inland. Thus, groundwater recharge would primarily be due to absorption of local precipitation, with probable migration of the waters to the immediately adjacent Long Island Sound. Little groundwater is present in the crystalline bedrock, and virtually all of the groundwater movement is restricted to the soil overburden.

Measurements taken during previous investigations (Bechtel Corporation 1969) showed average influx rates into test pits of about 8 gallons per hour, and it was concluded that both the ablation and basal tills were relatively impervious. The ablation till soils are more pervious than the basal tills and occasionally exhibit partial stratification, including sporadic sand lenses. Thus, the upper portions of the soil transmits water more readily than the underlying dense basal tills.

(SEE 9.3.3.2.4.1 FOR AUGMENTATION OF THE WATERPROOF RUBBER MEMBRANE FOR POST DBA OPERATION)

All structures are designed for the groundwater levels shown in Table 2.5.4-14 which are based on groundwater contours plotted on Figure 2.5.4-37. No safety-related permanent dewatering system is required to lower groundwater levels. These groundwater contours represent average groundwater elevations of the site prior to the start of construction. A comparison of groundwater contours with the top of basal till contours on Figure 2.5.4-36 verifies that the primary medium for groundwater flow is the permeable surficial soil overlying the basal till. Recharge of the groundwater occurs mainly from precipitation infiltrating through the surficial soils, and flowing toward Long Island Sound and the outwash deposits above the till.

Construction of the plant results in large changes to the site geohydraulic conditions. Site grade has been lowered to a uniform elevation of +24 feet from the original site grade which varied from elevation 26 feet to 30 feet. The major plant structures are founded at approximately elevation 0 feet on blasted rock excavations and backfilled from subgrade level to the ground surface with fill materials of relatively high permeability. The backfilled zones under and around these structures and the circulating water intake pipelines provide a continuous hydraulic conduit for groundwater flow from the plant area to Long Island Sound. Therefore, the average water levels prior to construction are not necessarily representative of post-construction groundwater conditions. Design groundwater levels used in plant design are shown in Table 2.5.4-14.

 97-MP3-587

HOWEVER, ENOUGH LEAKAGE OCCURS TO REQUIRE PUMPING FOR EQUIPMENT PROTECTION

A seepage diversion system, consisting of a series of underdrains and porous concrete, has been installed under and around several structures to minimize the amount of seepage into the basement of structures founded below the groundwater table. The quantity of seepage expected to be diverted through the system is small, due to the low permeability of the basal till and rock at the site. This system is not considered safety related because dewatering is not necessary to ensure the stability of any structure, ~~and failure of the system would not result in a significant inflow of water into the basement levels of any structures.~~ (SEE SECTION 2.4.13.5) The containment and all other Category I structures are protected from groundwater inflow by a waterproof membrane below the groundwater level. (SEE 9.3.3.2.4.1 FOR AUGMENTATION OF THE MEMBRANE FOR POST DBA OPERATION.) 10/87

Water levels measured in borings taken at the site in early 1972 indicate a groundwater piezometric surface with a 3-percent gradient generally sloping from northeast to southwest, as shown on Figure 2.5.4-37.

As discussed in Section 2.4.5.2, Flood Design Considerations, the controlling event for flooding at the Millstone 3 site is a storm surge resulting from the occurrence of the probable maximum hurricane (PMH). The maximum stillwater level resulting from hurricane surge was calculated to be elevation 19.7 feet msl. As shown on Figure 2.4-9, the water level drops significantly with time, so that after 2 hours the flood level is at elevation 17 feet and after 6 hours the surge level subsides to elevation 10 feet. A continuous hydraulic connection would occur across the site from the main structure area to the shorefront through the backfill placed around structures and the backfill placed in the circulating water pipeline trench. It can be expected that the maximum groundwater level due to flooding would not exceed elevation 19.7 feet and would probably be less because of head losses in the soil. According to Figure 2.4-9, the water level drops to 17 feet after 2 hours. 10/87

The design groundwater levels for major safety-related structures shown on Table 2.5.4-14 are all equal to or greater than elevation 19 feet with the exception of the hydrogen recombiner building, which has a design groundwater level of 18 feet. However, founding grade is at elevation 20 feet for this structure, which is founded on concrete fill placed directly on bedrock. Design criteria for flood conditions are discussed in Section 3.4.

2.5.4.6.2 Groundwater Conditions During Construction 241.15

During construction, the inflow of water into the excavations was controlled by pumping from sumps located outside of the building lines adjacent to structures. Most flow through the overburden was transported through the sand lenses. All water-softened material was removed and replaced with a fill concrete working mat as described in Section 2.5.4.5.1. The rate of inflow was sufficiently low to allow enough time to pour the concrete working mat without further softening of the till.

Drainage pipes were installed in the southwest face of the containment excavation in order to relieve the hydrostatic pressure on the bedrock joint and foliation surfaces. Very little water was observed flowing through these pipes, indicating that the quantity of flow through the bedrock is small and that the permeability of the rock is low.

Water pressure tests were performed in three boreholes prior to construction. These tests indicated that the rock within the site area is generally massive with slight to moderate interconnected jointing. A summary of the water pressure test data from the boreholes is

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3.4.1.2 Permanent Dewatering System (FOR ADVERSE HYDROLOGY EVENTS)

There is no safety-related dewatering system for Millstone 3. This system is not applicable.

3.4.2 Analytical and Test Procedures

Ground levels of all Category I structures, except for the circulating and service water pumphouse and the discharge structure, are located above the design basis flood (DBF) level. This level is based on the maximum combination of storm surge due to the PMH and associated wave run-up (Section 3.4.1). Structures located above this level are designed for the hydrostatic effects of uplift and lateral water pressure resulting from the DBF or normal groundwater, whichever is more severe. Groundwater levels are based on piezometric readings taken at the site (Figure 2.5.4-37). (9 7/84) (97-8 2/97)

The circulating water discharge structure and discharge tunnel and the circulating and service water pumphouse are located below the DBF level.

The circulating water discharge structure and discharge tunnel are designed for the hydrostatic and dynamic effects of the DBF as described in Section 3.4.1.

The circulating and service water pumphouse is designed laterally for a standing wave and for uplift on the operating floor due to confined wave action within the pumphouse (Section 3.4.1).

Foundation loadings used in the design reflect saturated soil conditions, where applicable.

The design wind loading described in Section 3.3.1 is applied concurrently with the hydrostatic and dynamic effects of the DBF (Sections 3.8.1.3, 3.8.3.3 and 3.8.4.3). Tornado loading is not applied concurrently with the DBF. (97-8)

3.4.3 Reference for Section 3.4

Hansen, E.M., Schreiner, L.C., and Miller, J.F, 1982. Application of Probable Maximum Precipitation Estimate - U.S. East of the 105th Meridian. Hydrometeorological Report No. 52, National Weather Service, NOAA, U.S. Department of Commerce, Washington, D.C. (9)

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Construction Techniques

Structural steel material, erection, and fabrication tolerances are in accordance with the AISC Specification for the Design Fabrication, and Erection of Structural Steel for Buildings.

Welding of structural steel is in accordance with AWS D 1.1-72, Revision 1-73.

3.8.1.6.4 Waterproofing Membrane

A waterproofing membrane (Figure 3.8-57) was placed below the containment structure mat and carried up the containment wall to above groundwater level. Attached to and entirely enveloping the part of the containment structure below ground level, the membrane protects the structure from the effects of groundwater and the steel liner from external-hydrostatic pressure. If water penetrates or otherwise circumvents the membrane, the water drains to a layer of porous concrete directly below the mat and above the membrane. This layer of porous concrete serves as a horizontal drain under the entire containment structure. The porous layer is drained by two pump casings exterior to the containment structure and extending to the underside of the mat. ~~Pumps are used as necessary to remove the water.~~ INSERT "A"

The surface of the containment structure steel liner in contact with concrete is not subject to corrosion because of the alkaline nature of the concrete.

3.8.1.6.5 Steel Liner and Penetrations

Materials

Liner plate up to 1-1/4-inches inclusive and bridging plate are made from SA 537 Class 2 Quenched and Tempered, nil-ductility transition temperature (NDTT) test not higher than -10°F, with the exception of dome liner plate which is made from SA 537, Class 2 normalized to Class 1 practice, NDTT not higher than -10°F. All liner insert plates and embedment material greater than one-inch thick was ultrasonically tested prior to installation for the purpose of detecting possible laminations.

Toughness tests (Charpy V-notch) were performed on all materials which form part of the containment structure boundary. Nil-ductility Transition Temperature Tests were also performed on all ferritic steel that formed part of the pressure boundary but were not required of backing plates, test channels, hatch bolts, and hatch nuts.

Penetration sleeves are made of SA537 Grade B Q&T, SA516 Grade 60 fine grain, normalized and SA333 Grade 6 fine grain normalized, all with a NDTT of -10°F.

Neutron shield tank embedment base and the carbon steel penetration forgings are SA508 Class 1 with a NDTT of +10°F.

Penetration coolers, equipment hatch, personnel airlock, shear lugs, and backing plates are SA516 Grades 60 and 70 fine grain normalized with NDTT of -10°F.

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1. All structures, except the containment, have waterstops installed at construction joints below grade.

14 (10/85) 2. The containment substructure is encased with a waterproof membrane to el 25 feet-0 inches or to the bottom or approximate midpoint at slabs abutting the containment structure below el 25 feet-0 inches. Such slabs are provided with waterstops or the membrane is continued as an encasement for the abutting structure to preclude seepage at the interface of the slab and the containment wall. In the unlikely event the membrane should leak, a drainage system is provided within that membrane and connected to sumps located in the engineered safety features building. ← INSERT "B"

10/87 220.8 3. The service, control, auxiliary, and engineered safety features building substructures are encased with a waterproof membrane to el 23 feet-6 inches and have drainage systems located under the mat of each building. These run into sumps for collection and then discharge. The coefficient of friction between the membrane and the concrete is equal to or greater than that between the concrete below the membrane and the soil or rock. Sliding stability is therefore not affected by the presence of the membrane.

4. The Technical Support Center, fuel, and waste disposal buildings are provided with perimeter and substructure drains.

3.8.5.2 Applicable Codes, Standards, and Specifications

Section 3.8.3.2 contains the codes, standards, specifications, and NRC regulatory guides used in establishing design methods and material properties for foundations and concrete supports.

3.8.5.3 Loads and Loading Combinations

Foundation design is based upon appropriate loading combinations. The loads and loading combinations given in Section 3.8.1.3 are used for the containment foundation design. The loads and loading combinations given in Table 3.8-3 are used for the design of all other Seismic Category I foundations.

10/87 In addition to the above loads and load combinations, the following were used to check against sliding and overturning due to earthquakes, winds, tornadoes, and the design basis flood:

1. D + H + OBE
2. D + H + W
3. D + H + SSE
4. D + H + W_T
5. D + F

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

Aerated drains are collected in sumps located inside the containment structure (incore instrument room sump, unidentified leakage sump, and containment drains sump); 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 "C"

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.

 97-np3-587

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.

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.

INSERT "D" →

The residual heat removal cubicle ~~and containment recirculation 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.

INSERT "E"

97-MP3-587

INSERT "A"

Non-safety-related pumps are used as necessary to remove the water during normal plant operation while safety-related pumps are used for post-LOCA or LNP conditions (See 9.3.3.2.4.1 for additional information). EJR 3/11/98

INSERT "B"

A safety-related subsystem has been installed in the event that the non-safety sump system can not be operated during post-LOCA conditions (See 9.3.3.2.4.1 for additional information). EJR 3/11/98

INSERT "C"

9.3.3.2.4.1 Safety-Related Containment Recirculation Cubicle Sumps

The Containment Recirculation Cubicle Sumps are located in the engineered safety features (ESF) building. These sumps collect non-radioactively contaminated discharges from equipment via aerated drains. In addition, these sumps also serve to collect (via an underdrain and porous concrete design) 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 pump. Following a LOCA or during extended losses of normal power, the removal of groundwater seepage will be performed by safety-related air-driven pumps also located within the Containment Recirculation Cubicle Sumps. EJR 3/11/98

One air driven sump pump is located in each Containment Recirculation Cubicle Sump. Motive air is supplied by portable diesel compressors which will be connected to permanent supply lines outside of the ESF building. The air driven pumps will discharge water to temporary storage tanks also located outside of the ESF 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. EJR 3/11/98 PORC COMMEN

97-MP3-587

Although located in different Containment Recirculation Cubicles, either air-driven pump is capable of removing groundwater seepage from both cubicles. Testing has shown that the two sumps communicate hydraulically even though they are not directly linked via the underdrain system. The two safety functions - preventing Containment Recirculation Cubicle flooding (which could possibly 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 - will be maintained in the event that one train is lost.

GR 3/11/95

INSERT "D"

In addition to the pumps mentioned above, the Containment Recirculation Cubicle Sumps are equipped with safety-related air-driven pumps which are 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.

INSERT "E"

The Containment Recirculation Cubicle Sumps and air-driven pumps are 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. This equipment is designed safety-related to ensure operation following a LOCA when the area is inaccessible. The Containment Recirculation Cubicle Sump pumps used during normal operation are non-safety-related.

TABLE 3.2-1

LIST OF QA CATEGORY I AND SEISMIC CATEGORY I STRUCTURES, SYSTEMS, AND COMPONENTS

	ANS Safety Class	Code (1)	Code Class	Location	Tornado Criterion	Notes
Sample lines originating from safety-related components, up to and including remotely operated sample selection valve or second manual isolation valves	2 or 3	ASME III	2 or 3	AB/ESB	P	Figure 9.3-2 (P&ID144) delineates SC boundaries.
Supports for QA Category I Components*	Same as component being supported.					
Reactor Plant Aerated Drains						
Instrumentation and Control (sump level indication) required to provide leak detection	N/A	IEEE-279-71 IEEE-336-71 IEEE-323-74	N/A	AB/ESB	P	
CONTAINMENT RECIRC SUMP PIPING	3	ANSI B31.1	N/A	ESB	P	ANS SAFETY CLASS 3 FOR PIPING FROM AIR-DRIVEN SUMP PUMPS TO ISOLATION VALVES
Containment Monitoring System						
Instrumentation and Controls required to monitor hydrogen concentration	N/A	IEEE-279-71 IEEE-336-71 IEEE-323-74	N/A	CS	P	
Heating, Ventilation, and Air Conditioning System*						
ESF Building						
All air-conditioning systems	3	SMACNA ARI, AMCA	ASME III	ESB	P	ASME III, Class 3 for service water side of refrigeration condenser.
Emergency Ventilation System for mechanical equipment room and auxiliary feedwater pump room	3	SMACNA, AMCA	N/A	ESB	P	

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Attachment 3

Millstone Nuclear Power Station, Unit No. 3
Proposed License Amendment Request
ESF Building Sump Pumping Subsystem
(PLAR 3-98-2)
Description of the Change, Background and Safety Summary

April 1998

Background

On May 23, 1997, a Configuration Management Program review revealed that inleakage of groundwater results in a potential to flood the Recirculation Spray System (RSS) pump cubicles in the Engineered Safety Features (ESF) Building, if the nonsafety-related sump pumps should fail to operate. This could result in the loss of both trains of RSS. The RSS cubicle sump pumps are non safety-related and cannot be credited post-accident. Therefore, groundwater inleakage could accumulate in each of the RSS cubicle sumps which are connected to the drain lines under the Containment basemat. If the sumps are not pumped out, the groundwater could eventually affect both trains of the RSS system. This was reported in Licensee Event Report 97-046-00.

The containment substructure is encased within a waterproof membrane that is connected to sumps located in the ESF building. Degradation of the waterproof membrane has been detected, allowing groundwater inleakage. Any groundwater inleakage permeates through a porous containment basemat containing embedded drainage pipes, and is directed to one of the two RSS cubicle sumps in the ESF building.

The amount of groundwater which consistently bypasses the rubber membrane and enters the RSS sumps is presently on the order of 750 to 1000 gallons per day. Rainfall and inleakage tracking data has shown that the volume of water will vary seasonally and with climatic conditions. Therefore this requires the capability to remove inleakage from the sumps during accident or post-accident conditions.

The current Final Safety Analysis Report (FSAR) concluded that significant amounts of groundwater are not expected and, thus, no safety-related dewatering system is required. The degradation of the waterproof membrane and the measurements of groundwater inleakage has changed this conclusion. It is now recognized that enough groundwater inleakage can occur to potentially affect the operability of both trains of RSS pumps. Thus, the FSAR is being changed to reflect this new conclusion. In order to resolve this issue, two safety-related, air-driven sump pumps have been installed in the RSS sumps. A description of these new pumps is being added to the FSAR.

Description of the Change

The new safety-related pumping subsystem consists of one train (a pump, piping, fittings, valves and supports) for each of the Containment Recirculation Spray Cubicle sumps (3DAS-SUMP7A/B) in conjunction with the upgraded safety-related sump liner. Emergency Operating Procedure(EOP) 35-ES 1.3 directs operators to perform

Operating Procedure(OP) 3335B which provides the instruction for air-driven pump operation. Operation of this new subsystem will take place roughly 10 hours post accident and will only be required to be intermittently operated to remove collected in-leakage. In addition, operation of the pumps does not require access to plant areas affected by post accident conditions (RSS cubicles). The discharge of the safety related sump pumps (3DAS*P15A/B) is directed to the Millstone Unit No. 3(MP3) plant yard above grade elevation to a designated water collection device for the purpose of sampling. If the sample is deemed sufficiently radioactively clean, the contents can be discharged to the Long Island Sound via the Yard Drainage System. Contaminated water will be evaluated and sent as directed by Chemistry for proper disposal. Each air driven motor pump is powered by a portable nonsafety-related air compressor using permanent connections installed outside of the ESF building which is accessible during post accident conditions. The compressors will be connected post accident when sump pump operation is required. Compressors are staged in designated locations, maintained and periodically tested to ensure their availability. Because the air compressors (and sump pump operation) will not be required for a significant time period after any accident (10 hours is expected), the compressor connection and operation are in accessible areas outside of the ESF building not adversely affected by accident conditions. A compressor can be easily changed should a problem arise and, therefore, the nonsafety-related status of the compressors themselves does not present a condition which will jeopardize the operation or availability of the new subsystem.

To preclude the possibility for radiological contamination of the groundwater, all sources of liquid radiological contamination to the sumps have been eliminated. The RSS cubicle floor drains leading to Sumps 7A/7B have been plugged. Drains from equipment determined not to be a potential source of radiological contamination continue to drain to Sumps 7A/7B (sources include Component Cooling Water System(CCP) and Service Water relief valves) and are covered with splash guards to prevent the entrance of contaminated spray. The Hydrogen Recombiner area floor drains and the drain from the Post Accident Sampling System(PASS) sample sink, all of which are nonsafety-related, are isolated from the indirect waste receptor which drains to Sump 7B. Sumps 7A and 7B have been cleaned and the existing nonsafety-related sump pumps replaced to remove any existing residual contamination. The nonsafety-related pumps (3DAS-P8A/B) discharge to ESF Building sump 3DAS-SUMP10. To preclude any potential siphoning from the potentially contaminated Sump 10 back to Sumps 7A/7B, the lines of the existing nonsafety-related pumps have been shortened to discharge above the water level in Sump 10.

The walls of Sumps 7A/7B have been extended to protect from a Limited Passive Failure and Pipe Break in the RSS cubicles. The expected flooding height is 6.6 inches. The sump cubicle height has been extended to 3 ft. above the cubicle floor, well above this height. The sumps are covered with a vented hood to protect from pipe break spray and miscellaneous overhead leaks to further assure the sumps remain isolated from potentially contaminated RSS system fluids.

Due to the migration of water between Sumps 7A/B, two safety-related sump pumps are not required for each sump. Failure of one safety-related pump does not affect the removal capability of the remaining safety-related pump. Either pump is sufficient to remove ground water inflow. The cross communication is ensured by Periodic Maintenance Procedures(PMs) and has been re-verified during post-installation testing. Design codes and standards are consistent with the original plant design and construction. In addition, design requirements for safety-related subsystems such as seismic, flooding and radiation exposure have been incorporated into the design and construction for the new safety-related sump pumps and associated piping and components.

The existing Supplementary Leak Collection and Release System(SLCRS) boundary has been extended to the isolation valves located outside of the ESF building. Additionally, when the sump level is reduced while using the air driven pump, the pumps are designed such to prevent air from being discharged through the pump discharge outside of the ESF building.

NNECO currently has temporary permits and procedures in place and is preparing the required long term environmental permit applications for operation of the diesel air compressors and discharge of the ground water.

SAFETY SUMMARY

As discussed below, the proposed changes have no impact on the probability or consequences of any accident. Further, the operator action required to install the air compressors to power the new air-driven RSS sump pumps will not be needed for several hours (approximately ten hours) and is performed outside the ESF building where the environmental conditions do not pose a restriction. Thus, it is concluded that the new operator action can be performed as required and will not affect the mitigation of a LOCA or any other accident.

While the proposed change meets the Standard Review Plan(SRP) criterion for single failure, the protection for groundwater leakage is being changed from the passive protection provided by the waterproof membrane to the use of an active pumping system. Since this protection is needed to ensure operability of the RSS pumps, this represents the potential for an increase in the probability of failure of the RSS pumps. As such, the change is an Unreviewed Safety Question.

The installation and design of the new subsystem is safety related where required, and in accordance with applicable codes and standards to ensure that its installation does not adversely affect existing safety related components in the area. The new subsystem has been installed with redundant trains, each capable of performing the intended function of removing groundwater in-leakage from both RSS cubicles. Post modification testing and revisions to maintenance and operations surveillance procedures and programs ensure the new subsystem performs its intended function and will be maintained in an appropriate level of readiness.

The new subsystem contains minimal active components. Seismic installation ensures adjacent safety related components will not be affected in the case of a seismic event. Post accident environmental conditions have been taken into account in the design to ensure the subsystem will not be adversely affected.

The air compressors can be easily changed should a problem arise and, therefore, the nonsafety-related status of the compressors themselves does not present a condition which will jeopardize the operation or availability of the new subsystem.

Thus, it is concluded that the increase in probability of failure of the RSS pumps is not risk significant and that the change is safe.

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Attachment 4

Millstone Nuclear Power Station, Unit No. 3
Proposed License Amendment Request
ESF Building Sump Pumping Subsystem
(PLAR 3-98-2)
Significant Hazards Consideration and Environmental Considerations

April 1998

Significant Hazards Consideration

NNECO has reviewed the proposed revision in accordance with 10CFR50.92 and has concluded that the revision does not involve a significant hazards consideration (SHC). The basis for this conclusion is that the three criteria of 10CFR50.92(c) are not satisfied. The proposed revision does not involve an SHC because the revision would not:

1. Involve a significant increase in the probability or consequence of an accident previously evaluated.

   The current FSAR credits the waterproof membrane for assuring that groundwater inleakage is not significant and would have no impact on safety related structures and components. However, degradation of the waterproof membrane has been detected, and it is now concluded that groundwater inleakage can be significant in that it could affect the operability of the RSS pumps. The original plant design had only nonsafety-related RSS sump pumps available for pumping the groundwater from the RSS sumps. These pumps are not powered from the emergency busses and would not be accessible during a design basis LOCA. Thus, it is assumed that they would not be available to mitigate a design basis accident. Two independent safety-related air-driven sump pumps have been installed to eliminate the potential for groundwater inleakage that would affect the RSS pumps.

   Air-driven sump pumps have been installed with the air supply line routed to a connection outside the ESF building. This allows the installation of an air compressor in an area that is accessible during a design basis accident such as a LOCA. Two air compressors have been staged in designated locations, and will be maintained and periodically tested to ensure their availability. Periodic testing of the sump pumps will also be performed. The surveillance requirements have been incorporated into the Technical Requirements Manual.

   EOP 35-ES1.3 has been modified to add a step to install the compressors and start the sump pumps. It is estimated that these sump pumps would be needed approximately ten hours after a design basis accident. Thus, there is sufficient time for the operators to perform this action. Since sufficient time is available, the action has been incorporated into procedures and the environmental conditions allow access to the area, it is concluded that credit for operator action can be taken.

   Thus, the new system is single failure proof and meets the requirements of Standard Review Plan 3.4.1 which states the following:

"If safety-related structures are protected from below-grade groundwater seepage by means of a permanent dewatering system, then the system should be designed as a safety-related system and meet the single failure proof criterion."

This provides assurance that the RSS pumps and other safety-related structures and components will perform the required safety function as assumed in the accident analysis.

The current nonsafety-related RSS sump pump system will continue to provide protection from groundwater inleakage during normal operation. Thus, there is no impact on the probability of occurrence of a transient because of equipment or structural failure due to groundwater inleakage. In addition, the new safety-related RSS sump pump system provides additional assurance that groundwater inleakage would not affect structures or equipment during an extended loss of offsite power or a design basis accident. Thus, it is concluded that there is no impact on the probability of occurrence of any previously evaluated accident.

The change results in the use of the new air-driven sump pumps to remove groundwater in-leakage from the RSS cubicles. To preclude the possibility for radiological contamination of the groundwater, all sources of liquid radiological contamination to the sumps have been eliminated. The RSS cubicle floor drains leading to Sumps 7A/7B have been plugged. Drains from equipment determined not to be a potential source of radiological contamination continue to drain to Sumps 7A/7B (sources include CCP and Service Water relief valves) and are covered with splash guards to prevent the entrance of contaminated spray. The Hydrogen Recombiner area floor drains and the drain from the PASS sample sink, all of which are nonsafety-related, have been isolated from the indirect waste receptor which drains to Sump 7B. Sumps 7A and 7B have been cleaned and the existing nonsafety-related sump pumps replaced to remove any existing residual contamination. The nonsafety-related pumps (3DAS-P8A/B) discharge to ESF Building sump 3DAS-SUMP10. To preclude any potential siphoning from the potentially contaminated Sump 10 back to Sumps 7A/7B, the lines of the existing nonsafety-related pumps have been shortened to discharge above the water level in Sump 10.

The walls of Sumps 7A/7B have been extended to protect from a Limited Passive Failure and Pipe Break in the RSS cubicles. The expected flooding height is 6.6 inches (Ref. 5.2). The sump cubicle height was extended to 3 ft. above the cubicle floor, well above this height. The sumps are covered with a vented hood to protect from pipe break spray and miscellaneous overhead leaks to further assure the sumps remain isolated from potentially contaminated RSS system fluids.

The existing SLCRS boundary has been extended to the isolation valves located outside of the ESF building. Additionally, when the sump level is reduced while using the air driven pump, the pumps are designed to prevent air from being discharged through the pump discharge outside of the ESF building.

Thus, use of the new sump pumps would not affect the offsite doses following a design basis accident.

Therefore, the proposed revision does not involve a significant increase in the probability or consequence of an accident previously evaluated.

2. Create the possibility of a new or different kind of accident from any accident previously evaluated.

The current nonsafety-related RSS sump pump system will continue to provide protection from groundwater inleakage during normal operation. This will continue to provide assurance there is no potential for a transient because of equipment or structural failure due to groundwater inleakage. In addition, the new safety-related RSS sump pump system provides additional assurance that groundwater inleakage would not affect structures or equipment during an extended loss of offsite power or a design basis accident.

Therefore, the proposed revision does not create the possibility of a new or different kind of accident from any accident previously evaluated.

3. Involve a significant reduction in a margin of safety.

The current FSAR credits the waterproof membrane for assuring that groundwater inleakage is not significant and would have no impact on safety related structures and components. However, degradation of the waterproof membrane has been detected and it is now concluded that groundwater inleakage can be significant in that it could affect the operability of the RSS pumps. Original design had only nonsafety-related RSS sump pumps available for pumping the groundwater from the RSS sumps. These pumps are not powered from the emergency busses and would not be accessible during a design basis LOCA. Thus, it is assumed that they would not be available to mitigate a design basis accident. Two independent safety-related air-driven sump pumps have been installed to eliminate the potential for groundwater inleakage that would affect the RSS pumps. The new system is single failure proof and meets the requirements of Standard Review Plan 3.4.1.

Use of the new system requires operator action to install pre-staged air compressors to provide power for the new air-driven sump pumps. It is estimated that these sump pumps would be needed approximately ten hours after a design basis accident. Thus, there is sufficient time for the operators to perform this action. Since sufficient time is available, the action has been incorporated into procedures and the environmental conditions allow access to the area, it is concluded that credit for operator action can be taken.

With credit for the new single failure proof air-driven sump pumps and operator action to install pre-staged compressors to provide power for the pumps, the new subsystem provides the required assurance that the RSS pumps will not be affected by groundwater inleakage. Thus, it is concluded that the RSS pumps would be operable for long term accident mitigation and there is no impact on the margin of safety as defined in the basis of the Emergency Core Cooling Technical Specifications or any other Technical Specification.

Therefore, the proposed revision does not involve a significant reduction in a margin of safety.

In conclusion, based on the information provided, it is determined that the proposed revision does not involve an SHC.

<u>Environmental Considerations</u>

NNECO has reviewed the proposed license amendment against the criteria of 10CFR51.22 for environmental considerations. The proposed revision does not involve an SHC, does not significantly increase the type and amounts of effluents that may be released offsite, nor significantly increase individual or cumulative occupational radiation exposures. Based on the foregoing, NNECO concludes that the proposed revision meets the criteria delineated in 10CFR51.22(c)(9) for categorical exclusion from the requirements for environmental review.