Docket No. 50-423
B16367

Attachment 2

Millstone Nuclear Power Station Unit No. 3
Proposed Revision to Technical Specification
Reactivity Control For Spent Fuel Pool and Refueling Operations
(PTSCR 3-01-97)
Marked Up Page

May 1997

MARKUP OF PROPOSED REVISION

Refer to the attached markup of the proposed revision to the Technical Specifications. The attached markup reflects the currently issued version of the Technical Specifications listed below. Pending Technical Specifications revisions or Technical Specification revisions issued subsequent to this submittal are not reflected in the enclosed markup.

The following Technical Specification changes are included in the attached markup:

- Revision of the Technical Specification to require Spent Fuel Pool (SFP) boron concentration be maintained at greater than or equal to 1750 ppm:

  3.9.1.2. LCO

- Revision of the Technical Specification to reflect that it is applicable whenever fuel assemblies are in the SFP:

  3.9.1.2 Applicability

- Incorporation in the action statement of a requirement to restore boron concentration to greater than or equal to 1750 ppm with 72 hours:

  3.9.1.2 Action

- Revise the Surveillance requirement to verify every 72 hours that the boron concentration is greater than or equal to 1750 ppm in the SFP

  4.9.1.2 Surveillance Requirements

- Add a Surveillance requirement to verify the reactivity condition within the SFP following the occurrence of an Operating Basis Earthquake (OBE).

  4.9.13.2 Surveillance Requirements

- Added steps within the Action Statement to:

  1. Clarify the period during which Surveillance 4.9.1.2 must be performed;

  2. Require that action be initiated to correct the cause of a misplaced or dropped fuel assembly; and

  3. Identify additional actions required following the occurrence of a seismic event of Operating Basis Earthquake (OBE) magnitude or greater

3.9.13 Action

REFUELING OPERATIONS

BORON CONCENTRATION

Limiting Condition for Operation

3.9.1.2 The boron concentration of the Spent Fuel Pool shall be maintained uniform and sufficient to ensure that the boron concentration is greater than or equal to ~~800~~ 1750 ppm.

Applicability

~~During ALL fuel assembly movements within~~ Whenever fuel assemblies are in the spent fuel pool.

Action

~~With the boron concentration less than 800 ppm, suspend the movement of all fuel assemblies within the spent fuel pool.~~ INSERT A

Surveillance Requirements

4.9.1.2 ~~Verify that the boron concentration is greater than or equal to 800 ppm prior to any movement of a fuel assembly into or within the spent fuel pool, and every 72 hours thereafter during fuel movement.~~ INSERT B

INSERT A

a) With the boron concentration less than 1750 ppm, initiate action to bring the boron concentration in the Spent Fuel Pool to greater than or equal to 1750 ppm within 72 hours, and

b) With the boron concentration less than 1750 ppm, suspend the movement of all fuel assemblies within the Spent Fuel Pool.

INSERT B

Verify at least every 72 hours that the boron in the Spent Fuel Pool is greater than or equal to 1750 ppm.

REFUELING OPERATIONS

SPENT FUEL POOL - REACTIVITY

3.9.13 The Reactivity Condition of the Spent Fuel Pool shall be such that k_{eff} is less than or equal to 0.95 at all times.

INSERT C

APPLICABILITY: Whenever fuel assemblies are in the spent fuel pool.

ACTION: ~~With the requirements of the above specification not satisfied:~~

~~a. Borate until $k_{eff} \leq .95$ is reached, and~~

~~b. Perform surveillance 4.9.1.2 until the misplaced/dropped fuel assembly causing $k_{eff} > .95$ is corrected.~~

SURVEILLANCE REQUIREMENTS

4.9.13.1

~~4.9.13~~ Ensure that all fuel assemblies to be placed in Region II of the spent fuel pool are within the enrichment and burn-up limits of Figure 3.9-1 by checking the fuel assembly's design and burn-up documentation.

INSERT D

INSERT C

With K_{eff} greater than 0.95:

1. Borate the Spent Fuel Pool until K_{eff} is less than or equal to 0.95,

2. Initiate action to correct the cause of any misplaced/dropped fuel assembly, if required, and

3. Following a seismic event of Operating Basis Earthquake (OBE) magnitude or greater:

   a) Close, and administratively control the opening of potential dilution pathways to the Spent Fuel Pool until Boraflex in the Spent Fuel Racks is determined to be within design, and

   b) Notify the Commission of the action taken for Spent Fuel Pool Reactivity control as part of the report required by Specification 4.3.3.3.2.

INSERT D

4.9.13.2 Following a seismic event of Operating Basis Earthquake (OBE) magnitude or greater, perform an engineering evaluation to determine the K_{eff} is less than or equal to 0.95 and that soluble boron is not required for control of K_{eff} in the Spent Fuel Pool. Pending completion of engineering evaluation, take action as required for K_{eff} being greater than 0.95.

3/4.9.1 BORON CONCENTRATION

The limitations on reactivity conditions during REFUELING ensure that: (1) the reactor will remain subcritical during CORE ALTERATIONS, and (2) a uniform boron concentration is maintained for reactivity control in the water volume having direct access to the reactor vessel. The value of 0.95 or less for K_{eff} includes a 1% Δk/k conservative allowance for uncertainties. Similarly, the boron concentration value of 2600 ppm or greater includes a conservative uncertainty allowance of 50 ppm boron. The 2600 ppm provides for boron concentration measurement uncertainty between the spent fuel pool and the RWST. The locking closed of the required valves during refueling operations precludes the possibility of uncontrolled boron dilution of the filled portion of the RCS. This action prevents flow to the RCS of unborated water by closing flow paths from sources of unborated water.

INSERT E

3/4.9.1.2 Boron Concentration in Spent Fuel Pool

~~The limitations of this specification ensure that in the event of a fuel assembly handling accident involving either a misplaced or dropped fuel assembly, the K_{eff} of the spent fuel storage racks will remain less than or equal to .95.~~

3/4.9.2 INSTRUMENTATION

The OPERABILITY of the Source Range Neutron Flux Monitors ensures that redundant monitoring capability is available to detect changes in the reactivity condition of the core.

3/4.9.3 DECAY TIME

The minimum requirement for reactor subcriticality prior to movement of irradiated fuel assemblies in the reactor vessel ensures that sufficient time has elapsed to allow the radioactive decay of the short-lived fission products. This decay time is consistent with the assumptions used in the safety analyses.

3/4.9.4 CONTAINMENT BUILDING PENETRATIONS

The requirements on containment building penetration closure and OPERABILITY ensure that a release of radioactive material within containment will be restricted from leakage to the environment. The OPERABILITY and closure restrictions are sufficient to restrict radioactive material release from a fuel element rupture based upon the lack of containment pressurization potential while in the REFUELING MODE.

3/4.9.5 COMMUNICATIONS

The requirement for communications capability ensures that refueling station personnel can be promptly informed of significant changes in the facility status or core reactivity conditions during CORE ALTERATIONS.

INSERT E

During normal Spent Fuel Pool operation the spent fuel racks are capable of maintaining K_{eff} at less than or equal to 0.95 in an unborated water environment due to the geometry of the rack spacing and the presence of Boraflex neutron absorber in the spent fuel racks. Seismic analysis has shown that there is a possibility that the Boraflex absorber could degrade following a seismic event greater in magnitude than an Operating Basis Earthquake (OBE). At least 1500 ppm boron in the Spent Fuel Pool is required in anticipation that a seismic event could cause a loss of Boraflex integrity. If, in addition to a loss of Boraflex, a single misplaced fuel assembly is postulated, then a minimum of 1750 ppm boron is required.

The boron requirement in the Spent Fuel Pool also ensures that in the event of a fuel assembly handling accident involving either a dropped or misplaced fuel assembly, the K_{eff} of the spent fuel storage racks will remain less than or equal to 0.95.

3/4.9.10 and 3/4.9.11 WATER LEVEL - REACTOR VESSEL and STORAGE POOL

The restrictions on minimum water level ensure that sufficient water depth is available to remove 99% of the assumed 10% iodine gap activity released from the rupture of an irradiated fuel assembly. The minimum water depth is consistent with the assumptions of the safety analysis.

3/4.9.12 FUEL BUILDING EXHAUST FILTER SYSTEM

The limitations on the Fuel Building Exhaust Filter System ensure that all radioactive iodine released from an irradiated fuel assembly and storage pool water will be filtered through the HEPA filters and charcoal adsorber prior to discharge to the atmosphere. Operation of the system with the heaters operating for at least 10 continuous hours in a 31-day period is sufficient to reduce the buildup of moisture on the adsorbers and HEPA filters. The OPERABILITY of this system and the resulting iodine removal capacity are consistent with the assumptions of the safety analyses. ANSI N510-1980 will be used as a procedural guide for surveillance testing. The filtration system removes radioiodine following a fuel handing or heavy load drop accident. Noble gases would not be removed by the system. Other radionuclides would be scrubbed by the storage pool water. Iodine-131 has the longest half-life: ~8 days. After 60 days decay time, there is essentially negligible iodine and filtration is unnecessary.

3/4.9.13 SPENT FUEL POOL - REACTIVITY

The limitations described by Figure 3.9-1 ensure that the reactivity of fuel assemblies introduced into Region II are conservatively within the assumptions of the safety analysis.

Administrative controls have been developed and instituted to verify that the enrichment and burn-up limits of Figure 3.9-1 have been maintained for the fuel assembly.

INSERT F

3/4.9.14 SPENT FUEL POOL - STORAGE PATTERN

The limitations of this specification ensure that the reactivity conditions of the Region I storage racks and spent fuel pool k_{eff} will remain less than or equal to 0.95.

The Cell Blocking Devices in the 4th location of the Region I storage racks are designed to prevent inadvertent placement and/or storage of fuel assemblies in the blocked locations. The blocked location remains empty to provide the flux trap to maintain reactivity control for fuel assemblies in adjacent and diagonal locations of the STORAGE PATTERN.

STORAGE PATTERN for the Region I storage racks will be established and expanded from the walls of the spent fuel pool per Figure 3.9-2 to ensure definition and control of the Region I/Region II boundary and minimize the number of boundaries where a fuel misplacement incident can occur.

INSERT F

During normal Spent Fuel Pool operation, the spent fuel racks are capable of maintaining K_{eff} at less than 0.95 in an unborated water environment due to the geometry of the rack spacing and the presence of Boraflex neutron absorber in the spent fuel racks. Due to radiation enduced embrittlement, there is a possibility that the Boraflex absorber could degrade following a seismic event. At least 1500 ppm boron in the Spent Fuel Pool is required in anticipation that a seismic event could cause a complete loss of all Boraflex. If, in addition to a loss of Boraflex, a single misplaced fuel assembly is postulated, then a minimum of 1750 ppm boron is required.

The action requirements of this specification recognize the possibility of a seismic event which could degrade the Boraflex neutron absorber in the spent fuel racks. Seismic analysis has shown that there is a possibility that the Boraflex absorber could degrade following a seismic event greater in magnitude than an Operating Basis Earthquake (OBE). The action statement specifies that following a seismic event at the OBE level or greater, which is approximately one half the Safe Shutdown Earthquake (SSE) level, action will be taken to determine the condition of the Boraflex. Once a seismic event of greater than or equal to an OBE has occurred, then the boron in the Spent Fuel Pool will be credited to maintain K_{eff} less than or equal to 0.95. The specification requires that dilution paths to the Spent Fuel Pool be closed and administratively controlled until the racks can be inspected the condition of the Boraflex can be determined.

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Attachment 3

Millstone Nuclear Power Station Unit No. 3
Proposed Revision to Technical Specification
Reactivity Control For Spent Fuel Pool and Refueling Operations
(PTSCR 3-01-97)
Retyped Page

May 1997

RETYPE OF PROPOSED REVISION

Refer tc the attached retype of the proposed revision to the Technical Specifications. The attached retype reflects the currently issued version of the Technical Specifications. Pending Technical Specification revisions or Technical Specification revisions issued subsequent to this submittal are not reflected in the enclosed retype. The enclosed retype should be checked for continuity with Technical Specifications prior to issuance.

BORON CONCENTRATION

LIMITING CONDITION FOR OPERATION

3.9.1.2 The boron concentration of the Spent Fuel Pool shall be maintained uniform and sufficient to ensure that the boron concentration is greater than or equal to 1750 ppm.

Applicability

Whenever fuel assemblies are in the spent fuel pool.

Action

a) With the boron concentration less than 1750 ppm, initiate action to bring the boron concentration in the spent fuel pool to greater than or equal to 1750 ppm within 72 hours, and

b) With the boron concentration less than 1750 ppm, suspend the movement of all fuel assemblies within the spent fuel pool.

SURVEILLANCE REQUIREMENTS

4.9.1.2 Verify at least every 72 hours that the boron in the spent fuel pool is greater than or equal to 1750 ppm.

SPENT FUEL POOL - REACTIVITY

LIMITING CONDITION FOR OPERATION

3.9.13 The Reactivity Condition of the Spent Fuel Pool shall be such that K_{eff} is less than or equal to 0.95 at all times.

APPLICABILITY: Whenever fuel assemblies are in the spent fuel pool.

ACTION:

With K_{eff} greater than 0.95

1. Borate the spent fuel pool until K_{eff} is less than or equal to 0.95,
2. Initiate action to correct the cause of any misplaced/dropped fuel assembly if required, and
3. Following a seismic event of Operating Basis Earthquake (OBE) magnitude or greater:

   a) Close and administratively control the opening of potential dilution pathways to the spent fuel pool until Boraflex in the spent fuel racks is determined to be within design, and

   b) Notify the Commission of the action taken for spent fuel reactivity control as part of the report required by Specification 4.3.3.3.2.

SURVEILLANCE REQUIREMENTS

4.9.13.1 Ensure that all fuel assemblies to be placed in Region II of the spent fuel pool are within the enrichment and burn-up limits of Figure 3.9-1 by checking the fuel assembly's design and burn-up documentation.

4.9.13.2 Following a seismic event of Operating Basis Earthquake (OBE) magnitude or greater, perform an engineering evaluation to determine that K_{eff} is less than or equal to 0.95 and that soluble boron is not required for control of K_{eff} in the spent fuel pool. Pending completion of engineering evaluation, take action as required for K_{eff} being greater than 0.95.

3/4.9.1 BORON CONCENTRATION

The limitations on reactivity conditions during REFUELING ensure that: (1) the reactor will remain subcritical during CORE ALTERATIONS, and (2) a uniform boron concentration is maintained for reactivity control in the water volume having direct access to the reactor vessel. The value of 0.95 or less for K_{eff} includes a 1% Δk/k conservative allowance for uncertainties. Similarly, the boron concentration value of 2600 ppm or greater includes a conservative uncertainty allowance of 50 ppm boron. The 2600 ppm provides for boron concentration measurement uncertainty between the spent fuel pool and the RWST. The locking closed of the required valves during refueling operations precludes the possibility of uncontrolled boron dilution of the filled portion of the RCS. This action prevents flow to the RCS of unborated water by closing flow paths from sources of unborated water.

3/4.9.1.2 Boron Concentration in Spent Fuel Pool

During normal spent fuel pool operation, the spent fuel racks are capable of maintaining K_{eff} at less than or equal to 0.95 in an unborated water environment due to the geometry of the rack spacing and the presence of Boraflex neutron absorber in the spent fuel racks. Seismic analysis has shown that there is a possibility that the Boraflex absorber could degrade following a seismic event greater in magnitude than an Operating Basis Earthquake (OBE). At least 1500 ppm boron in the spent fuel pool is required in anticipation that a seismic event could cause a loss of Boraflex integrity. If, in addition to a loss of Boraflex, a single misplaced fuel assembly is postulated, then a minimum of 1750 ppm boron is required.

The boron requirement in the spent fuel pool also ensures that in the event of a fuel assembly handling accident involving either a dropped or misplaced fuel assembly, the K_{eff} of the spent fuel storage racks will remain less than or equal to 0.95.

3/4.9.2 INSTRUMENTATION

The OPERABILITY of the Source Range Neutron Flux Monitors ensures that redundant monitoring capability is available to detect changes in the reactivity condition of the core.

3/4.9.3 DECAY TIME

The minimum requirement for reactor subcriticality prior to movement of irradiated fuel assemblies in the reactor vessel ensures that sufficient time has elapsed to allow the radioactive decay of the short-lived fission products. This decay time is consistent with the assumptions used in the safety analyses.

3/4.9.4 CONTAINMENT BUILDING PENETRATIONS

The requirements on containment building penetration closure and OPERABILITY ensure that a release of radioactive material within containment will be restricted from leakage to the environment. The OPERABILITY and closure restrictions are sufficient to restrict radioactive material release from a fuel element rupture based upon the lack of containment pressurization potential while in the REFUELING MODE.

3/4.9.5 COMMUNICATIONS

The requirement for communications capability ensures that refueling station personnel can be promptly informed of significant changes in the facility status or core reactivity conditions during CORE ALTERATIONS.

3/4.9.10 and 3/4.9.11 WATER LEVEL - REACTOR VESSEL and STORAGE POOL

The restrictions on minimum water level ensure that sufficient water depth is available to remove 99% of the assumed 10% iodine gap activity released from the rupture of an irradiated fuel assembly. The minimum water depth is consistent with the assumptions of the safety analysis.

3/4.9.12 FUEL BUILDING EXHAUST FILTER SYSTEM

The limitations on the Fuel Building Exhaust Filter System ensure that all radioactive iodine released from an irradiated fuel assembly and storage pool water will be filtered through the HEPA filters and charcoal adsorber prior to discharge to the atmosphere. Operation of the system with the heaters operating for at least 10 continuous hours in a 31-day period is sufficient to reduce the buildup of moisture on the adsorbers and HEPA filters. The OPERABILITY of this system and the resulting iodine removal capacity are consistent with the assumptions of the safety analyses. ANSI N510-1980 will be used as a procedural guide for surveillance testing. The filtration system removes radioiodine following a fuel handing or heavy load drop accident. Noble gases would not be removed by the system. Other radionuclides would be scrubbed by the storage pool water. Iodine-131 has the longest half-life: ~8 days. After 60 days decay time, there is essentially negligible iodine and filtration is unnecessary.

3/4.9.13 SPENT FUEL POOL - REACTIVITY

The limitations described by Figure 3.9-1 ensure that the reactivity of fuel assemblies introduced into Region II are conservatively within the assumptions of the safety analysis.

Administrative controls have been developed and instituted to verify that the enrichment and burn-up limits of Figure 3.9-1 have been maintained for the fuel assembly.

During normal spent fuel pool operation, the spent fuel racks are capable of maintaining K_{eff} at less than 0.95 in an unborated water environment due to the geometry of the rack spacing and the presence of Boraflex neutron absorber in the spent fuel racks. Due to radiation enduced embrittlement, there is a possibility that the Boraflex absorber could degrade following a seismic event. At least 1500 ppm boron in the spent fuel pool is required in anticipation that a seismic event could cause a complete loss of all Boraflex. If, in addition to a loss of Boraflex, a single misplaced fuel assembly is postulated, then a minimum of 1750 ppm boron is required.

The action requirements of this specification recognize the possibility of a seismic event which could degrade the Boraflex neutron absorber in the spent fuel racks. Seismic analysis has shown that there is a possibility that the Boraflex

absorber could degrade following a seismic event greater in magnitude than an Operating Basis Earthquake (OBE). The action statement specifies that following a seismic event at the OBE level or greater, which is approximately one-half the Safe Shutdown Earthquake (SSE) level, action will be taken to determine the condition of the Boraflex. Once a seismic event of greater than or equal to an OBE has occurred, then the boron in the spent fuel pool will be credited to maintain K_{eff} less than or equal to 0.95. The specification requires that dilution paths to the spent fuel pool be closed and administratively controlled until the racks can be inspected and the condition of the Boraflex can be determined.

3/4.9.14 SPENT FUEL POOL - STORAGE PATTERN

The limitations of this specification ensure that the reactivity conditions of the Region I storage racks and spent fuel pool K_{eff} will remain less than or equal to 0.95.

The Cell Blocking Devices in the 4th location of the Region I storage racks are designed to prevent inadvertent placement and/or storage of fuel assemblies in the blocked locations. The blocked location remains empty to provide the flux trap to maintain reactivity control for fuel assemblies in adjacent and diagonal locations of the STORAGE PATTERN.

STORAGE PATTERN for the Region I storage racks will be established and expanded from the walls of the spent fuel pool per Figure 3.9-2 to ensure definition and control of the Region I/Region II boundary and minimize the number of boundaries where a fuel misplacement incident can occur.

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Attachment 4

Millstone Nuclear Power Station Unit No. 3
Proposed Revision to Technical Specification
Reactivity Control For Spent Fuel Pool and Refueling Operations
(PTSCR 3-01-97)
Background and Safety Assessment

May 1997

<u>Background</u>

Technical Specification (TS) 3.9.13 requires K-effective (K_{eff}) in the Spent Fuel Pool (SFP) to be maintained equal to or less than ($\leq$) 0.95 at all times. Credit for soluble boron to maintain $K_{eff} \leq 0.95$ in the SFP during normal operating conditions has not been utilized. Credit for using soluble boron to meet the TS limit on K_{eff} has been taken for accident conditions. Specifically, in the current TS 800 parts per million (ppm) soluble boron in the SFP is credited towards maintaining K_{eff} less than the limit specified during events stemming from either a misplaced or dropped fuel assembly.

It has been identified that a seismic event of magnitude greater than tnat of an Operating Basis Earthquake (OBE) could cause wide spread cracking and settling of the Boraflex utilized within the spent fuel racks. The resultant Boraflex settling could cause gaps to occur at the top of the fuel racks. No Boraflex would be present in these gaps. Because of the difficulty in predicting the final configuration of the Boraflex it was conservatively assumed that there would be no Boraflex in the fuel racks following a seismic event greater than or equal to an OBE. The proposed Technical Specification change will increase the solubie boron credited in the Spent Fuel Pool from 800 ppm to 1750 ppm.

<u>Safety Assessment</u>

The proposed TS change will allow crediting soluble boron in the Spent Fuel Pool following a seismic event greater than or equal to an OBE to maintain spent fuel rack matrix k_{eff} less than or equal to 0.95.

The design basis of the existing fuel racks assumes that following a seismic event the k_{eff} of the fuel pool remains less than 0.95. Previous SFP criticality analysis assumed that the Boraflex absorber remains intact for all occasions. The embrittlement of the Boraflex due to gamma radiation and potential cracking/gap formation of the Boraflex results in the need to credit soluble boron in the SFP following a seismic event greater than an OBE.

The use of soluble boron in the Spent Fuel Pool is safe following a seismic event because the balance of the equipment in the fuel building which could cause a dilution (firewater, hot water heating, and demineralized water, CCP) is seismic or mounted in such a fashion as to not direct unborated water into the fuel pool should a line rupture. Therefore there is no possibility of reducing the SFP boron concentration coincident with a seismic event, and credit for soluble boron is acceptable to meet the K-effective limit of 0.95 for the SFP.

The soluble boron value of 1750 ppm will be required to be present in the SFP at all times. This boron value was calculated by Westinghouse using standard criticality practices which have been previously reviewed and approved by the NRC. The 1750

ppm boron concentration contains very conservative assumptions. By maintaining 1750 ppm soluble boron concentration in the SFP at all times, K-effective would remain less than 0.95 following a seismic event greater than OBE if all of the following occurred:

- no credit for any Boraflex, and
- a simultaneous worst case single misplaced/dropped fuel assembly, and
- a loss of Spent Fuel Pool cooling resulting in boiling conditions in the SFP.

A seismic event which results only in the loss of all Boraflex would have required 1500 ppm of soluble boron to ensure that K_{eff} was maintained less then 0.95. However, it was thought prudent to conservatively postulate the additional malfunctions of a single misplaced/dropped fuel assembly, with a concurrent loss of Spent Fuel Pool cooling which resulted in boiling conditions in the SFP. It was this more severe condition which required the value of 1750 ppm of soluble boron.

The criticality analysis for the Spent Fuel Pool also utilized conservative parameters as analytical inputs when compared to the present condition of the Spent Fuel Pool. The analysis assumed that all fuel assemblies in the fuel pool were at the maximum possible reactivity. In reality, all fuel assemblies in the Spent Fuel Pool are at a lower reactivity than assumed in the analysis.

The surveillance interval for the proposed TS which verifies the SFP soluble boron concentration would be at least every 72 hours. Normal makeup from primary grade water as a result of evaporative losses can be made with reliance on the at least every 72 hour boron sampling surveillance requirement. The at least every 72 hour sampling frequency for Spent Fuel Pool boron was selected based on existing Technical Specification sampling requirements. This interval is considered acceptable based on the fact that the same interval is satisfactory for determining that Spent Fuel Pool boron is being maintained at a safe level during fuel handling. This surveillance interval is also consistent with the required surveillance interval for boron during fuel movement as specified in NUREG 1431. Makeup to the Spent Fuel Pool from non borated water sources for non evaporative reasons can be allowed provided that prior to makeup the volume of water to be added is determined to not cause a dilution below the required boron concentration and the Spent Fuel Pool is sampled for boron following the makeup.

With this soluble boron concentration present in the SFP prior to a seismic event, K-effective will be maintained $\leq$ 0.95 during and immediately after the seismic event. Following a greater than OBE seismic event when Boraflex is postulated to fail, it will be necessary to prohibit dilution of the fuel pool by isolating the normal makeup path to the fuel pool that could dilute the fuel pool. Currently the Final Safety Analysis Report (FSAR) (section 9.1.3.2) allows SFP normal makeup from either the Refueling Water Storage tank (RWST) or the primary grade water system. The RWST tank after a seismic event, remains available as a seismic source of borated water that would be

available as makeup to the SFP should it be needed. Temporary piping may be necessary from the RWST tank to the SFP as the lines from the RWST to the SFP are category four (non seismic) piping. Additionally, after a seismic event makeup to the SFP from primary grade water can be allowed provided that prior to the makeup, the volume of water to be added is determined to not cause a dilution below the required boron concentration and the fuel pool is sampled for boron following the makeup.

The Service Water (SW) system is described in FSAR section 9.1.3.3 as a seismic makeup system to the Spent Fuel Pool in the unlikely event of a failure of both SFP cooling trains and the RWST makeup source, where the SW system would be utilized to makeup for evaporative losses in the pool. As SW cannot be borated, it can be allowed to makeup to the SFP provided that prior to the makeup, the volume of water to be added is determined to not cause a dilution below the required boron concentration and the fuel pool is sampled for boron following the makeup.

Additionally, the condition proposed is a temporary condition not expected to go beyond the year 2001. Re-racking of the SFP is expected prior to the start of the eighth operating cycle. When the SFP is re-racked, new spent fuel storage racks using a different neutron absorber material will be installed, and any remaining existing spent fuel racks will not credit Boraflex. Additionally, the unit is located in a geologically stable region. The level of earthquake chosen for the OBE level is approximately double the largest recorded earthquake noted in the region as described in section 2.5.2 of the FSAR. The conservative value selected for an OBE, the low seismic activity for the region and the limited period of time for which the need to credit soluble boron in the SFP will be required, further reduces the possibility of the need to actually utilize soluble boron for control of K_{eff}.

This proposed change:

- maintains the SFP in a safe condition by requiring the presence of soluble boron in the SFP to compensate for the potential loss of Boraflex following a seismic event greater than an OBE

- maintains SFP k_{eff} at less than 0.95 following a seismic event with no reduction in the margin of safety.

- does not change the operation of any system or system component during normal or accident evolutions.

- considered safe because it will not result in the plant being operated in an unsafe condition, decrease available safety margins, nor adversely impact the consequences of an accident. It will cause no increase in the risk to the public health or safety. It does not increase either the probability of event occurrence, the probability of human errors mitigating the event, nor does it increase the probability of the failure of mitigating equipment.

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Attachment 5

Millstone Nuclear Power Station Unit No. 3
Proposed Revision to Technical Specification
Reactivity Control For Spent Fuel Pool and Refueling Operations
(PTSCR 3-01-97)
Significant Hazards Consideration and Environmental Considerations

May 1997

Significant Hazards Consideration

NNECO has reviewed the proposed change in accordance with 10CFR50.92 and has concluded that the change does not involve a Significant Hazards Consideration (SHC). The bases for this conclusion is that the three criteria of 10CFR50.92(c) are not satisfied. The proposed change does not involve a SHC because the change would not:

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

   There is one Spent Fuel Pool accident condition discussed in Chapter 15 of the FSAR. The FSAR discusses a fuel handling accident which drops a fuel assembly onto the fuel racks during fuel movement. Degradation of the Boraflex panels in a post-seismic condition will have no effect on the probability of a fuel assembly drop onto the stored fuel, or the fuel racks. Changing the way Boraflex responds to a seismic event will have no impact on the probability of a seismic event. A misplaced fuel assembly can be postulated in the MP3 fuel pool as a result of either equipment malfunction or operator error. Degradation of the Boraflex panels will have no effect on the probability of a fuel misplacement event. Therefore, the degradation of Boraflex in a post-seismic condition does not involve an increase in the probability of an accident previously evaluated.

   A fuel handling accident could cause a radioactive release of fission gases, resulting in dose consequences. This radioactive release of fission gases is due to the failure of a certain number of fuel pins which are postulated to fail during the fuel handling accident. The number of fuel pins which are postulated to fail in this event is not affected by the degradation of the Boraflex panels in a post-seismic condition. There are no criticality issues with this fuel handling accident for the reasons described next. Should a fuel handling accident occur prior to a seismic event, the existing fuel handling accident/misloading criticality analysis is still valid, such that 800 ppm of soluble boron is sufficient to ensure that K-effective of the SFP is maintained at less than 0.95. Although overly conservative, should a fuel handling accident occur during or after a seismic event, even with no Boraflex credit, the proposed 1750 ppm of soluble boron is sufficient to ensure that K-effective of the SFP is maintained at less than 0.95. Therefore, this proposed change does not involve an increase in the probability or consequences of an accident previously evaluated.

   Therefore, the proposed changes do 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 change in the way Boraflex in conjunction with the addition of 1750 ppm boron responds to a seismic event does not create a new accident. The use of soluble boron in the Spent Fuel Pool is safe during and immediately following a seismic event, because the balance of the equipment in the fuel building not connected to the fuel pool which could cause a dilution (firewater, hot water heating, and demineralized water, CCP) are seismic or mounted in such a fashion as to not direct unborated water into the fuel pool should a line rupture. Non borated water sources that are connected to the SFP will be isolated following a seismic event of greater than or equal to a OBE to prevent dilution. Therefore there is no possibility of a SFP boron dilution accident coincident with a seismic event, and credit for soluble boron is acceptable to meet the K-effective limit of 0.95 for the SFP. The crediting of soluble boron in the Spent Fuel Pool to control K-effective following a seismic event does not create a new accident as boron dilution of the pool can be prevented by closing and administratively controlling the opening of dilution paths to the pool and initiating routine sampling requirements on SFP boron. At present the crediting of soluble boron following a fuel misplacement event is allowed for the Millstone 3 Spent Fuel Pool. Analysis has shown that a seismic event of greater than an OBE level earthquake can be more limiting than a fuel misplacement event. As such the minimum boron requirement in the fuel pool will be increased from 800 ppm to 1750 ppm. As such, no new accident has been created because the crediting of boron following a malfunction/accident has always been an allowed event.

Therefore, the proposed change 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 margin of safety, as defined by MP3 Technical Specifications, is to ensure that the K-effective of the MP3 SFP is maintained less than or equal to 0.95 at all times. There is no reduction in the margin of safety as the result of the degradation of Boraflex following a greater than an OBE seismic event, because soluble boron can be used to compensate for the loss of Boraflex. A value of 1750 ppm of soluble boron in the SFP at all times ensures that K-effective of the MP3 SFP is maintained less than or equal to 0.95 at all times, including this new malfunction of degraded Boraflex following a greater than an OBE seismic event.

Eliminating the credit for the negative reactivity effect of Boraflex panels in conjunction with the addition of 1750 ppm boron will have no effect on the probability of a seismic event. As the probability of a seismic event has not changed there is no increase in the probability of an accident or malfunction due to a seismic event. Following a seismic event operators are presently required

to make inspections of the plant to determine post seismic event plant conditions. As a result of this change, inspections will be required to post seismic event evaluations to review the status of the Spent Fuel Pool and isolate potential dilution paths. These actions are consistent with present guidance in the seismic response procedure and do not create an undue burden on the operator. To compensate for the potential loss of Boraflex after a seismic event, the SFP is now required to be borated at all times to 1750 ppm to maintain the proper post seismic k_{eff} condition. As such there is no mitigation equipment that has to operate in the Spent Fuel Pool following a seismic event.

Although the Boraflex in the fuel racks is assumed to fail in a greater than an OBE seismic event, the presence of soluble boron in the fuel pool water will compensate for the loss of Boraflex. Surveillance requirements on SFP boron will ensure that there will be boron present in the SFP and ensure that the SFP is not diluted below the minimum required boron concentration during normal operation.

As the presence of SFP soluble boron during and after a seismic event maintains k_{eff} less than 0.95 there is no effect on the consequences of any malfunctions evaluated. As there are no new accidents created and there are no changes in the probability or consequences of previously analyzed accidents there is no effect on the consequences of any accident. There is no reduction in the margin of safety as the result of the degradation of Boraflex following a greater than an OBE seismic event, because soluble boron can be used to compensate for the loss of Boraflex to maintain K-effective less than 0.95.

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

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

Environmental Considerations

NNECO has reviewed the proposed license amendment against the criteria of 10CFR51.22 for environmental considerations. The proposed change does not involve a 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 change meets the criteria delineated in 10CFR51.22(c)(9) for categorical exclusion from the requirements of an environmental considerations.