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July 24, 2008

U. S. Nuclear Regulatory Commission
Attention: Document Control Desk
Washington, DC 20555-0001

Serial No.	08-0251A
MPS Lic/MLC	R0
Docket Nos.	50-336 50-423
License Nos.	DPR-65 NPF-49

DOMINION NUCLEAR CONNECTICUT, INC.
MILLSTONE POWER STATION UNITS 2 AND 3
SUPPLEMENTAL INFORMATION FOR RCS LEAKAGE DETECTION RAI
LICENSE AMENDMENT REQUEST (LBDCRS 07-MP2-012 AND 07-MP3-032)
(TAC NOS. MD6640 AND MD6641)

On August 15, 2007, Dominion Nuclear Connecticut, Inc. (DNC) submitted a request to the Nuclear Regulatory Commission (NRC) for an amendment to Technical Specification (TS) 3.3.3.1, "Radiation Monitoring," and TS 3.4.6.1, "Reactor Coolant System Leakage Detection Systems" for Millstone Power Station Units 2 and 3 (MPS2 and MPS3) (Serial No. 07-0449) that would require only one containment radioactivity monitor (particulate channel) and the containment sump level monitoring system to be operable in Modes 1, 2, 3, and 4. Following review of the license amendment request, the NRC issued a request for additional information (RAI). DNC responded to this request in a letter dated May 27, 2008 (Serial No. 08-0251).

Subsequently, three conference calls were held between the NRC staff and DNC on May 29, June 17, and July 10, 2008, to discuss the RAI response. The attachments to this letter contain supplemental information related to the RAI as discussed in the conference calls.

The information provided in this letter does not affect the conclusion of the significant hazards consideration discussion provided in the August 15, 2007, DNC letter (Serial No. 07-0449).

Should you have any further questions in regard to this submittal, please contact Mr. Geoffrey A. Wertz (804) 273-3572.

Sincerely,

Gerald Bischof
Vice President – Nuclear Engineering

COMMONWEALTH OF VIRGINIA
COUNTY OF HENRICO

The foregoing document was acknowledged before me, in and for the County and Commonwealth aforesaid, today by Gerald T. Bischof, who is Vice President – Nuclear Engineering of Dominion Nuclear Connecticut, Inc. He has affirmed before me that he is duly authorized to execute and file the foregoing document in behalf of that company, and that the statements in the document are true to the best of his knowledge and belief.

Acknowledged before me this 24TH day of July, 2008.

My Commission Expires: May 31, 2010

Vicki L. Hull
Notary Public

VICKI L. HULL
Notary Public
Commonwealth of Virginia
140642
My Commission Expires May 31, 2010

Attachments:

(1) RCS Leakage Detection RAI Supplemental Information
(2) Revised Marked-Up Technical Specification Pages, MPS2
(3) Revised Marked-Up Technical Specification Pages, MPS3
(4) Revised Marked-Up Bases Pages, MPS2 and MPS3 (For Information Only)

Commitments: (None)

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ATTACHMENT 1

LICENSE AMENDMENT REQUESTS (LBDCRS 07-MP2-012 and 07-MP3-032)

RCS LEAKAGE DETECTION SYSTEMS RAI

SUPPLEMENTAL INFORMATION

DOMINION NUCLEAR CONNECTICUT, INC.
MILLSTONE POWER STATION UNITS 2 AND 3

RCS Leakage Detection RAI - Supplemental Information

As discussed in three conference calls between the Nuclear Regulatory Commission (NRC) and Dominion Nuclear Connecticut, Inc. (DNC) on May 29, June 17, and July 10, 2008, DNC is providing supplemental information to address questions raised by the NRC staff regarding DNC's response to the NRC's request for additional information (RAI) on Reactor Coolant System (RCS) Leakage Detection Systems, dated May 27, 2008 (Serial No. 08-0251).

Question 4

Explain how the proposed action statements affect the redundancy and minimal functionality of leak detection instrumentation necessary to support the leak-before-break analysis.

DNC Response

In teleconference calls on May 29, June 17, and July 10, 2008, the NRC staff raised questions regarding DNC's response to RAI Question 4. Specifically, with respect to leak-before-break (LBB), additional justification was requested for how the proposed Technical Specification (TS) 3.4.6.1 Action c (the required action for when all TS-required RCS leak detection systems are inoperable) would provide the same or comparable level of protection during the proposed 7-day allowed outage time (AOT), for both steady state and transient conditions.

In response to the discussions referenced above, DNC is proposing the following revision to Action c that was originally proposed in the license amendment request dated August 15, 2007 (Serial No. 07-0449). The marked-up pages for the proposed revisions are contained in Attachments 2 and 3 for Millstone Power Station Unit 2 (MPS2) and Millstone Power Station Unit 3 (MPS3), respectively. The associated changes for the MPS2 and MPS3 TS Bases sections are provided for information only in Attachment 4.

The revised Action c for MPS2 and MPS3 is as follows:

MPS2

Proposed TS 3.4.6.1 Action c

c. With both the containment atmosphere particulate radioactivity monitoring channels inoperable and the containment sump level monitoring system inoperable, operation may continue for up to 72 hours provided:

1. Immediate action is initiated to restore either a containment atmosphere particulate radioactivity monitoring channel or the containment sump level monitoring system to OPERABLE status, and

2. Appropriate grab samples of the containment atmosphere are obtained and analyzed for particulate radioactivity within 6 hours and at least once per 6 hours thereafter, and

3. A Reactor Coolant System water inventory balance is performed per SR 4.4.6.2.1 within 6 hours and at least once per 6 hours thereafter.

Otherwise, be in COLD SHUTDOWN within the next 36 hours.

MPS3

Proposed TS 3.4.6.1 Action c

c. With the Containment Atmosphere Particulate Radioactivity Monitor inoperable and the Containment Drain Sump Monitoring System inoperable, operation may continue for up to 72 hours provided:

    1. Immediate action is initiated to restore either the Containment Atmosphere Particulate Radioactivity Monitor or the Containment Drain Sump Monitoring System to OPERABLE status, and

    2. Appropriate grab samples of the containment atmosphere are obtained and analyzed for particulate radioactivity within 6 hours and at least once per 6 hours thereafter, and

    3. A Reactor Coolant System water inventory balance is performed per SR 4.4.6.2.1.d within 6 hours and at least once per 6 hours thereafter.

    Otherwise, be in at least HOT STANDBY within the next 6 hours and in COLD SHUTDOWN within the following 30 hours.

Discussion

The proposed action statement (TS 3.4.6.1 Action c) provides a 72 hour AOT when both the containment atmosphere particulate radioactivity monitoring system and containment sump level monitoring system are inoperable. The 72 hour AOT is appropriate since additional actions will be taken during this limited time period to ensure RCS leakage, in excess of the unidentified leakage TS (TS 3.4.6.2) limit of 1 gallon per minute (gpm), will be readily detectable. This provides reasonable assurance that any significant RCS pressure boundary degradation will be detected soon after leak

occurrence and therefore minimize the potential for subsequent growth propagation to a gross failure. This is consistent with the requirements of General Design Criteria (GDC) 30 and also Criterion 1 of 10 CFR 50.36(d)(2)(ii) which requires installed instrumentation to detect, and indicate in the control room, a significant abnormal degradation of the reactor coolant pressure boundary. The RCS water inventory balance calculation determines the magnitude of RCS unidentified leakage by use of instrumentation readily available to the control room operators. However, the proposed additional actions will not restore the continuous monitoring capability normally provided by the inoperable equipment.

The RCS water inventory balance is capable of identifying a one gpm RCS leak rate. The containment grab samples will also identify an increase in RCS leak rate which would then be quantified by the RCS water inventory balance. Since these additional actions are sufficient to ensure RCS leakage is within TS limits, it is appropriate to provide a limited time period to restore at least one of the TS-required leakage monitoring systems.

In addition, control room operators regularly monitor numerous plant parameters capable of providing indication of a 1 gpm unidentified RCS leak. MPS2 utilizes constant positive displacement charging pumps with variable letdown flow. A 1 gpm leak would result in a decrease in letdown flow such that a 1.8% decrease in Volume Control Tank (VCT) level over a one hour period would be observed. Conversely, MPS3 utilizes variable centrifugal charging pumps and constant letdown flow. A 1 gpm leak would result in an increase in charging flow such that a 3.1% decrease in VCT level over a one hour period would be observed. Such changes are well beyond the expected variation of these parameters during normal operation.

Lastly, operation during this limited time period with both the containment atmosphere particulate radioactivity monitoring system and containment sump level monitoring system inoperable, within the constraints identified in revised Action c, will not adversely impact the ability to detect a small RCS leak in sufficient time to prevent excessive flaw propagation consistent with LBB analysis. For primary water stress corrosion cracking (PWSCC), evaluation has shown (see Flaw Growth section below) that it will take more than 70 days for a flaw or crack to extend its initial length by 0.25 inches. Similarly, for fatigue crack growth, many fatigue cycles would be necessary to grow the flaw from its incipient stage to a length that would challenge flaw stability. Hence, the proposed 72 hour AOT to restore at least one TS leakage detection instrument to service is well within this time frame such that significant crack or flaw propagation is not expected to occur.

Detection Sensitivity

The following additional information is provided for the sensitivities of the additional actions specified in Action c.

The RCS water inventory balance is sensitive enough to detect a one gpm leak rate in one hour. In addition, this is the primary method used to verify compliance with the RCS leakage limits specified by TS 3.4.6.2. Due to the time to take and analyze the plant data this is not a continuous monitoring method. However, by reducing the time between calculations to once every 6 hours, there will be no significant loss of monitoring capability during the limited time period allowed by the proposed Action c.

VCT level, which is a key input to the RCS water inventory balance, is monitored in both control rooms by means of a level indicator and the plant process computer. A decrease in VCT level, beyond normal plant response would be readily detected by control room operators as a potential leak in the RCS pressure boundary. For MPS2, a loss of 60 gallons over a one hour period at steady state conditions will result in a VCT level decrease of 1.8%. Similarly, for MPS3, a loss of 60 gallons over a one hour period at steady state conditions will result in a 3.1% decrease in VCT level. Although VCT level is not TS-required equipment and was not intended to meet Regulatory Guide (RG) 1.45, it does meet requirements of RG 1.45 with regards to detection sensitivity.

A containment grab sample is comparable to the containment particulate radiation monitor with respect to the ability to detect RCS leakage. Due to the time to take and analyze the grab sample this is not a continuous monitoring method. However, by reducing the time between grab samples to once every 6 hours, there will be no significant loss of monitoring capability during the limited time period allowed by the proposed Action c.

Flaw Growth

As discussed in the teleconference call between DNC and NRC staff on June 17, 2008, the following additional information is provided regarding the potential for flaw growth during the period between when leakage is minimally detectable and 6 hours after the increased periodicity of RCS leak detection monitoring commences per proposed Action c.

LBB is applicable to both MPS2 and MPS3. At MPS2, the LBB analyses applies to both the loop piping and the 12-inch branch piping, while at MPS3, LBB applies to the loop piping only.

The original LBB evaluations that were submitted in support of the GDC 4 exemption determined that overloading mechanisms such as water hammer were not credible and that fatigue would not actively cause a small flaw to propagate through-wall. The

evaluation at the time also considered stress corrosion cracking mechanisms to be unlikely due to material selection and chemistry control. It is now known however that PWSCC is a possible mechanism for nickel-based alloys and may be the mechanism that causes the initial flaw to go through-wall. After the flaw is postulated to go through-wall, by whatever mechanism, the possible mechanisms for flaw extension would be limited to fatigue crack growth (FCG) and/or PWSCC. Flaw growth by erosion has not been seen to date in operating experience for austenitic or nickel-based material piping and is not considered credible for the short time period under consideration. Therefore the only credible mechanisms to consider for flaw extension after going through-wall are FCG and PWSCC.

For the purpose of discussion, a flaw growth on the order of 0.25 inches is considered significant. For a flaw to progress to the point of challenging flaw stability, its size must first progress from a short length that causes an incipient detectable leak, to a size that causes 10 gpm leakage. The size that would allow a 10 gpm leak rate is on the order of about 5 inches long for a branch pipe and larger for the loop piping. Even at the 10 gpm size, the LBB methodology ensures a margin of 2.0 on the limiting flaw size for stability. Therefore a small flaw extension that is a small fraction of the 5 inch long 10 gpm leak size, approximately 0.25 inches, is a reasonable measure of flaw growth significance.

Using this measure of acceptable flaw growth, an acceptable duration can be determined once the flaw growth velocity is estimated. Addressing PWSCC growth first, its flaw growth rate (at non-overlayed nickel-based alloy locations) is very slow. Electric Power Research Institute (EPRI) report MRP-55[1] Figure 5-2 plots a large number of measured crack growth rates against the applied stress intensity factor. All data are bounded by a rate of 1.0 E-09 meters/second, or 1.25 inches/year even at very high stress intensity factors. At this rate, more than 70 days would be required for the flaw to extend by 0.25 inches. Therefore, for a duration of only 6 hours, only negligible flaw growth is possible by the PWSCC mechanism.

For FCG, many fatigue cycles would be necessary to grow the flaw from its incipient stage to a length that would challenge flaw stability. Startup/shutdown cycles are infrequent and branch line transients (e.g., shutdown cooling flow on the safety injection branch lines for MPS2) are only slightly more frequent. Most transients affecting a branch line occur in conjunction with a plant shutdown, after which the leakage would be discovered by the normal reactor building walkdown. If an earthquake occurred during normal power operations it would still contribute only about 50 cycles, not enough for significant flaw growth for a flaw that is less than half the critical flaw size for design basis seismic loads. Therefore, significant flaw growth due to FCG in a 6 hour period is not credible.

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[1] Materials Reliability Program (MRP) Crack Growth Rates for Evaluating Primary Water Stress Corrosion Cracking (PWSCC) of Thick-Wall Alloy 600 Materials (MRP-55) Revision 1, EPRI, Palo Alto, CA: 2002. 1006695

In conclusion, considering the credible mechanisms of FCG and PWSCC, neither mechanism is capable of causing significant flaw extension within the 6 hour monitoring periodicity specified in Action c.

Clarification of Change to MPS2 TS 3.4.6.1.a

As discussed in the teleconference call between DNC and NRC staff on June 17, 2008, the following information is provided to address the proposed change to MPS2 TS 3.4.6.1.a as requested in letter dated August 15, 2007 (Serial No. 07-0449). The proposed change modifies the wording in the current TS from *"A containment atmosphere particulate radioactivity monitoring system,"* to *"One of two containment atmosphere particulate radioactivity monitoring channels."*

As stated in DNC's license amendment request dated August 15, 2007 (Serial No. 07-0449), the proposed change to MPS2 TS 3.4.6.1(a) was requested to clarify that only one of the two containment atmosphere particulate radioactivity monitoring channels is required to be operable in MODES 1, 2, 3, and 4. Table 3.3-6, "Radiation Monitoring Instrumentation," shows that a minimum of one channel is required for operability of the containment atmosphere particulate monitoring system. Hence, this change is only intended to clarify the existing limiting condition for operation requirements for MPS2 TS 3.4.6.1.a.

ATTACHMENT 2

LICENSE AMENDMENT REQUEST (LBDCR 07-MP2-012)

RCS LEAKAGE DETECTION SYSTEMS

REVISED MARKED-UP TECHNICAL SPECIFICATION PAGES

DOMINION NUCLEAR CONNECTICUT, INC.
MILLSTONE POWER STATION UNIT 2

August 1, 1975

REACTOR COOLANT SYSTEM

3/4.4.6 REACTOR COOLANT SYSTEM LEAKAGE

LEAKAGE DETECTION SYSTEMS

LIMITING CONDITION FOR OPERATION

3.4.6.1 The following Reactor Coolant System leakage detection systems shall be OPERABLE:

a. One of two containment atmosphere particulate radioactivity monitoring channels ~~system~~, and

b. The containment sump level monitoring system, and

c. A containment atmosphere gaseous radioactivity monitoring system.

APPLICABILITY: MODES 1, 2, 3 and 4.

ACTION:

Insert A

a. With one of the above radioactivity monitoring leakage detection systems inoperable, operations may continue for up to 30 days provided:

1. The other two above required leakage detection systems are OPERABLE, and

2. Appropriate grab samples are obtained and analyzed at least once per 24 hours;

otherwise, be in COLD SHUTDOWN within the next 36 hours.

b. With the containment sump level monitoring system inoperable, restore the inoperable system to OPERABLE status within 7 days or be in COLD SHUTDOWN within the next 36 hours.

SURVEILLANCE REQUIREMENTS

4.4.6.1 The leakage detection systems shall be demonstrated OPERABLE by:

a. Containment atmosphere gaseous and particulate monitoring system performance of CHANNEL CHECK, CHANNEL CALIBRATION and CHANNEL FUNCTIONAL TEST at the frequencies specified in Table 4.3-3, and

b. Containment sump level monitoring system-performance of CHANNEL CALIBRATION TEST at least once per 18 months.

Millstone Power Station Unit 2
Technical Specification 3.4.6.1
Leakage Detection Systems
Page 3/4 4-8

Insert A

a. With both of the containment atmosphere particulate radioactivity monitoring channels inoperable, operation may continue for up to 30 days provided:

    1. Appropriate grab samples of the containment atmosphere are obtained and analyzed for particulate radioactivity at least once per 24 hours, or

    2. A Reactor Coolant System water inventory balance is performed per SR 4.4.6.2.1 at least once per 24 hours during steady state operation.

    Otherwise, be in COLD SHUTDOWN within the next 36 hours.

b. With the containment sump level monitoring system inoperable, operation may continue for up to 30 days provided:

    1. A Reactor Coolant System water inventory balance is performed per SR 4.4.6.2.1 at least once per 24 hours during steady state operation.

    Otherwise, be in COLD SHUTDOWN within the next 36 hours.

c. With both the containment atmosphere particulate radioactivity monitoring channels inoperable and the containment sump level monitoring system inoperable, operation may continue for up to 72 hours provided:

    1. Immediate action is initiated to restore either a containment atmosphere particulate radioactivity monitoring channel or the containment sump level monitoring system to OPERABLE status, and

    2. Appropriate grab samples of the containment atmosphere are obtained and analyzed for particulate radioactivity within 6 hours and at least once per 6 hours thereafter, and

    3. A Reactor Coolant System water inventory balance is performed per SR 4.4.6.2.1 within 6 hours and at least once per 6 hours thereafter.

    Otherwise, be in COLD SHUTDOWN within the next 36 hours.

ATTACHMENT 3

LICENSE AMENDMENT REQUEST (LBDCR 07-MP3-032)

RCS LEAKAGE DETECTION SYSTEMS

REVISED MARKED-UP TECHNICAL SPECIFICATION PAGES

DOMINION NUCLEAR CONNECTICUT, INC.
MILLSTONE POWER STATION UNIT 3

March 16, 2006

REACTOR COOLANT SYSTEM

3/4.4.6 REACTOR COOLANT SYSTEM LEAKAGE

LEAKAGE DETECTION SYSTEMS

LIMITING CONDITION FOR OPERATION

3.4.6.1 The following Reactor Coolant System Leakage Detection Systems shall be OPERABLE:

a. Either the Containment Atmosphere Gaseous or Particulate Radioactivity Monitoring System, and

b. The Containment Drain Sump Level or Pumped Capacity Monitoring System

APPLICABILITY: MODES 1, 2, 3, and 4.

ACTION:

Insert B

a. With both the Containment Atmosphere Gaseous and Particulate Radioactivity Monitors inoperable, operation may continue for up to 30 days provided the Containment Drain Sump Level or Pumped Capacity Monitoring System is OPERABLE and gaseous grab samples of the containment atmosphere are obtained at least once per 12 hours and analyzed for gross noble gas activity within the subsequent 2 hours; otherwise, be in at least HOT STANDBY within the next 6 hours and in COLD SHUTDOWN within the following 30 hours.

b. With the Containment Drain Sump Level or Pumped Capacity Monitoring System inoperable, operation may continue for up to 30 days provided either the Containment Atmosphere Gaseous or Particulate Radioactivity Monitoring System is OPERABLE; otherwise, be in at least HOT STANDBY within the next 6 hours and in COLD SHUTDOWN within the following 30 hours.

SURVEILLANCE REQUIREMENTS

4.4.6.1 The Leakage Detection Systems shall be demonstrated OPERABLE by:

a. Containment Atmosphere Gaseous and Particulate Radioactivity Monitoring System performance of CHANNEL CHECK, CHANNEL CALIBRATION, and ANALOG CHANNEL OPERATIONAL TEST at the frequencies specified in Table 4.3-3, and

b. Containment Drain Sump Level and Pumped Capacity Monitoring System-performance of CHANNEL CALIBRATION at least once per 24 months.

Millstone Power Station Unit 3
Technical Specification 3.4.6.1
Leakage Detection Systems
Page 3/4 4-21

Insert B

a. With the Containment Atmosphere Particulate Radioactivity Monitor inoperable, operations may continue for up to 30 days provided:

    1. Appropriate grab samples of the containment atmosphere are obtained and analyzed for particulate radioactivity at least once per 24 hours, or

    2. A Reactor Coolant System water inventory balance is performed per SR 4.4.6.2.1.d at least once per 24 hours during steady state operation.

    Otherwise, be in at least HOT STANDBY within the next 6 hours and in COLD SHUTDOWN within the following 30 hours.

b. With the Containment Drain Sump Monitoring System inoperable, operation may continue for up to 30 days provided:

    1. A Reactor Coolant System water inventory balance is performed per SR 4.4.6.2.1.d at least once per 24 hours during steady state operation.

    Otherwise, be in at least HOT STANDBY within the next 6 hours and in COLD SHUTDOWN within the following 30 hours.

c. With the Containment Atmosphere Particulate Radioactivity Monitor inoperable and the Containment Drain Sump Monitoring System inoperable, operation may continue for up to 72 hours provided:

    1. Immediate action is initiated to restore either the Containment Atmosphere Particulate Radioactivity Monitor or the Containment Drain Sump Monitoring System to OPERABLE status, and

    2. Appropriate grab samples of the containment atmosphere are obtained and analyzed for particulate radioactivity within 6 hours and at least once per 6 hours thereafter, and

    3. A Reactor Coolant System water inventory balance is performed per SR 4.4.6.2.1.d within 6 hours and at least once per 6 hours thereafter.

    Otherwise, be in at least HOT STANDBY within the next 6 hours and in COLD SHUTDOWN within the following 30 hours.

ATTACHMENT 4

LICENSE AMENDMENT REQUEST (LBDCRS 07-MP2-012 and 07-MP3-032)

RCS LEAKAGE DETECTION SYSTEMS

REVISED MARKED-UP BASES PAGES (INFORMATION ONLY)

DOMINION NUCLEAR CONNECTICUT, INC.
MILLSTONE POWER STATION UNITS 2 AND 3

3/4.4.6 REACTOR COOLANT SYSTEM LEAKAGE

3/4.4.6.1 LEAKAGE DETECTION SYSTEMS

The RCS leakage detection systems required by this specification are provided to monitor and detect leakage from the Reactor Coolant Pressure Boundary. These detection systems are consistent with the recommendations of Regulatory Guide 1.45, "Reactor Coolant Pressure Boundary Leakage Detection Systems."

Insert C

3/4.4.6.2 REACTOR COOLANT SYSTEM LEAKAGE

Industry experience has shown that while a limited amount of leakage is expected from the RCS, the unidentified portion of this leakage can be reduced to a threshold value of less than 1 GPM. This threshold value is sufficiently low to ensure early detection of additional leakage.

The 10 GPM IDENTIFIED LEAKAGE limitation provides allowance for a limited amount of leakage from known sources whose presence will not interfere with the detection of UNIDENTIFIED LEAKAGE by the leakage detection systems.

The steam generator tube leakage limit of 0.035 GPM per steam generator ensures that the dosage contribution from the tube leakage will be less than the limits of General Design Criteria 19 of 10CFR50 Appendix A in the event of either a steam generator tube rupture or steam line break. The 0.035 GPM limit is consistent with the assumptions used in the analysis of these accidents.

PRESSURE BOUNDARY LEAKAGE of any magnitude is unacceptable since it may be indicative of an impending gross failure of the pressure boundary. Therefore, the presence of any PRESSURE BOUNDARY LEAKAGE requires the unit to be promptly placed in COLD SHUTDOWN.

The IDENTIFIED LEAKAGE and UNIDENTIFIED LEAKAGE limits listed in LCO 3.4.6.2 only apply to the reactor coolant system pressure boundary within the containment.

In accordance with 10 CFR 50.2 "Definitions" the RCS Pressure Boundary means all those pressure-containing components such as pressure vessels, piping, pumps and valves which are (1) Part of the Reactor Coolant System, or (2) Connected to the Reactor Coolant System, up to and including any and all of the following: (i) The outermost containment isolation valve in system piping which penetrates primary reactor containment, (ii) The second of two valves normally closed in system piping which does not penetrate primary reactor containment, or (iii) The reactor coolant safety and relief valves.

The definitions for IDENTIFIED LEAKAGE and UNIDENTIFIED LEAKAGE are provided in the Technical Specifications definitions section, definitions 1.14 and 1.15 respectively.

Leakage outside of the second isolation valve for containment which is included in the RCS Leak Rate Calculation is not considered RCS leakage and can be subtracted from RCS UNIDENTIFIED LEAKAGE.

The safety significance of RCS leakage varies widely depending on its source, rate, and duration. Therefore, detecting and monitoring RCS leakage into the containment area is necessary. Quickly separating IDENTIFIED LEAKAGE from the UNIDENTIFIED LEAKAGE is necessary to provide quantitative information to the operators, allowing them to take corrective action should a leak occur. LCO 3.4.6.2 deals with protection of the reactor coolant pressure boundary from degradation and the core from inadequate cooling, in addition accident analysis radiation release assumptions from being exceeded.

Millstone Power Station Unit 2
Technical Specification Bases 3.4.6.1
Leakage Detection Systems
Page B3/4 4-3

Insert C

Action c provides a 72 hour allowed outage time (AOT) when both the containment atmosphere particulate radioactivity monitoring channels are inoperable and containment sump level monitoring system is inoperable. The 72 hour AOT is appropriate since additional actions will be taken during this limited time period to ensure RCS leakage, in excess of the unidentified leakage TS limit of 1 gpm (TS 3.4.6.2), will be readily detectable. This will provide reasonable assurance that any significant reactor coolant pressure boundary degradation is detected soon after occurrence to minimize the potential for propagation to a gross failure. This is consistent with the requirements of General Design Criteria (GDC) 30 and also Criterion 1 of 10 CFR 50.36(d)(2)(ii) which requires installed instrumentation to detect, and indicate in the control room, a significant abnormal degradation of the reactor coolant pressure boundary. The RCS water inventory balance calculation determines the magnitude of RCS unidentified leakage by use of instrumentation readily available to the control room operators. However, the proposed additional actions will not restore the continuous monitoring capability normally provided by the inoperable equipment.

The RCS water inventory balance is capable of identifying a one gpm RCS leak rate. The containment grab samples will also indicate an increase in RCS leak rate which would then be quantified by the RCS water inventory balance. Since these additional actions are sufficient to ensure RCS leakage is within TS limits, it is appropriate to provide a limited time period to restore at least one of the TS-required leakage monitoring systems.

3/4.4.6 REACTOR COOLANT SYSTEM LEAKAGE

3/4.4.6.1 LEAKAGE DETECTION SYSTEMS

The RCS Leakage Detection Systems required by this specification are provided to monitor and detect leakage from the reactor coolant pressure boundary. These Detection Systems are consistent with the recommendations of Regulatory Guide 1.45, "Reactor Coolant Pressure Boundary Leakage Detection Systems," May 1973.

Insert D

LCO 3.4.6.1.b. Containment Sump Drain Level or Pumped Capacity Monitoring System

The intent of LCO 3.4.6.1.b is to have a system able to monitor and detect leakage from the reactor coolant pressure boundary (RCPB). The system can use sump level, pump capacity or both as the LCO implies. It does not have to have two separate systems. The "Containment Drain Sump Level or Pumped Capacity Monitoring" System is defined as any one of the following three Systems:

Insert E

A. 3DAS-P10, Unidentified Leakage Sump Pump, and associated local and main board annunciation.

B. 3DAS-P10, Unidentified Leakage Sump Pump, and computer point 3DAS-L39 and CVLKR2.

C. 3DAS-P2A or 3DAS-P2B, Containment Drains Sump Pump, and computer points 3DAS-L22 and CVLKR2 or CVLKR3I.

To meet Regulatory Guide 1.45 recommendations, the Containment Drain Sump Level or Pumped Capacity Monitoring System must meet the following five criteria:

1. Must monitor changes in sump water level, changes in flow rate or changes in the operating frequency of pumps.

2. Be able to detect an UNIDENTIFIED LEAKAGE rate of 1 gpm in less than one hour.

3. Remain OPERABLE following an Operating Basis Earthquake (OBE).

4. Provide indication and alarm in the Control Room.

5. Procedures for converting various indications to a common leakage equivalent must be available to the Operators.

The three Containment Drain Sump Level or Pumped Capacity Monitoring Systems identified above meet these five requirements as follows:

A. 3DAS-P10, Unidentified Leakage Sump Pump, and associated main board annunciation.

1. Sump level is monitored at two locations by the starting and stopping of 3DAS-P10, Unidentified Leakage Sump Pump. Flow is measured as a function of time between pump starts/stops and the known sump levels at which these occur.

Millstone Power Station Unit 3
Technical Specification Bases 3.4.6.1
Leakage Detection Systems
Page B3/4 4-4

Insert D

Action c provides a 72 hour allowed outage time (AOT) when both the containment atmosphere particulate radioactivity monitor and the containment drain sump monitoring system, are inoperable. The 72 hour AOT is appropriate since additional actions will be taken during this limited time period to ensure RCS leakage, in excess of the unidentified leakage TS limit of 1 gpm (TS 3.4.6.2), will be readily detectable. This will provide reasonable assurance that any significant reactor coolant pressure boundary degradation is detected soon after occurrence to minimize the potential for propagation to a gross failure. This is consistent with the requirements of General Design Criteria (GDC) 30 and also Criterion 1 of 10 CFR 50.36(d)(2)(ii) which requires installed instrumentation to detect, and indicate in the control room, a significant abnormal degradation of the reactor coolant pressure boundary. The RCS water inventory balance calculation determines the magnitude of RCS unidentified leakage by use of instrumentation readily available to the control room operators. However, the proposed additional actions will not restore the continuous monitoring capability normally provided by the inoperable equipment.

The RCS water inventory balance is capable of identifying a one gpm RCS leak rate. The containment grab samples will also indicate an increase in RCS leak rate which would then be quantified by the RCS water inventory balance. Since these additional actions are sufficient to ensure RCS leakage is within TS limits, it is appropriate to provide a limited time period to restore at least one of the TS-required leakage monitoring systems.

Insert E

No changes to Insert E originally identified in license amendment request (Serial No. 07-0449) dated August 15, 2007.