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

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License Nos.	DPR-65
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DOMINION NUCLEAR CONNECTICUT, INC.
MILLSTONE POWER STATION UNITS 2 AND 3
RESPONSE TO REQUEST FOR ADDITIONAL INFORMATION
REGARDING REACTOR COOLANT SYSTEM LEAKAGE DETECTION
SYSTEMS LICENSE AMENDMENT REQUEST (LBDCRS 07-MP2-012 AND 07-MP3-032)
(TAC NOS. MD6640 AND MD6641)

Dominion Nuclear Connecticut, Inc. (DNC) submitted a request 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) on August 15, 2007 (Serial No. 07-0449). This TS amendment request would require only one containment radioactivity monitor (particulate channel) to be operable in Modes 1, 2, 3, and 4. The NRC issued a request for additional information (RAI) on April 17, 2008. Based on a May 13, 2008 conversation between Mr. W. D. Bartron of DNC and Mr. J. D. Hughey of the NRC, DNC's response to this RAI was to be provided by May 31, 2008. DNC's response to the RAI is provided as an attachment to this letter.

If you have any questions or require additional information, please contact Ms. M. A. Earle at (804) 273-2768.

Sincerely,

Gerald T. 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 27th day of May, 2008.

My Commission Expires: August 31, 2008

Margaret B. Bennett
Notary Public

MARGARET B. BENNETT
Notary Public 354302
Commonwealth of Virginia
My Commission Expires Aug 31, 2008

Attachment

Commitments made in this letter: None.

cc: U.S. Nuclear Regulatory Commission
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ATTACHMENT

RESPONSE TO REQUEST FOR ADDITIONAL INFORMATION REACTOR COOLANT SYSTEM LEAKAGE DETECTION SYSTEMS

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

RESPONSE TO REQUEST FOR ADDITIONAL INFORMATION MILLSTONE POWER STATION UNITS 2 AND 3

In reviewing the Dominion Nuclear Connecticut, Inc. license amendment request (LAR) dated August 15, 2007 (Agencywide Documents Access and Management System (ADAMS) Accession No. ML072330309), regarding reactor coolant system (RCS) leakage detection systems for Millstone Power Station, Unit Nos. 2 and 3 (MPS2 and MPS3), the Nuclear Regulatory Commission (NRC) staff has determined that the following information is needed in order to complete its review:

NRC Question No. 1

The above-mentioned LAR proposes a completion time of 7 days with all of the required leakage detection systems inoperable. The LAR cites precedent for removing the containment atmosphere gaseous radioactivity monitor from the specifications based on Braidwood, Byron and South Texas Project yet these plants require entry into limiting conditions for operation (LCO) 3.0.3 when all leakage detection systems are inoperable. In addition, Section 3.3 and 4.1 of the LAR refer to consistency of the amendment request to NUREG 1432, Revision 3.1 "Standard Technical Specifications Combustion Engineering Plants Specifications." However, NUREG 1432 also specifies entry in LCO 3.0.3 when all leakage detection systems are inoperable. This is based on no automatic means of leakage detection available to the operator.

1. Provide additional technical justification to support continued plant operation when all automatic leakage detection systems are inoperable.

DNC Response

By adopting the proposed technical specification (TS) change, DNC will be reducing the number of TS required RCS leakage instrumentation from three systems (containment gaseous radioactivity monitoring, containment particulate radioactivity monitoring and containment sump level monitoring) to two systems (containment particulate radioactivity monitoring and containment sump level monitoring). Since the number of monitoring systems would now be more restrictive, the potential of having two systems inoperable versus three systems inoperable is greater. It is therefore appropriate to identify which actions to take in the event both RCS leakage detection systems become inoperable.

For Millstone Power Station Unit 2 (MPS2), additional non-TS diverse means of leakage detection are available as part of the overall leakage detection capability. Alternate leakage detection monitoring includes Volume Control Tank (VCT) level indication, containment temperature indication, containment pressure indication, and the containment atmosphere gaseous radioactivity monitoring indication that is the subject of

this submittal. These instruments provide indication in the main control room and can be trended via the plant process computer or manually. While these indications are not relied upon to quantify leakage rates, changes in these parameters could be indication of RCS leakage to the containment atmosphere (see Table 1 below).

For Millstone Power Station Unit 3 (MPS3), additional non-TS diverse means of leakage detection are available as part of the overall leakage detection capability. Alternate leakage detection monitoring includes VCT level indication, containment temperature indication, containment pressure indication, containment humidity indication, and the containment atmosphere gaseous radioactivity monitoring indication that is the subject of this submittal. These instruments provide indication in the main control room and can be trended via the plant process computer or manually. While these indications are not relied upon to quantify leakage rates, changes in these parameters could be indication of RCS leakage to the containment atmosphere (see Table 1 below).

Non-TS required VCT level is monitored in both control rooms by means of a level indicator. The level indication is sensitive enough to be capable of recording a one gpm leakrate in one hour at steady state conditions. A decrease in VCT level would be detectable by control room operators as a potential leak in the RCS pressure boundary.

The containment humidity detector (MP3) provides another means of measuring overall leakage from water and steam systems within containment, providing yet another means of indication. Additionally, changes in containment air temperature and pressure can also be used to infer RCS leakage. Although containment temperature and pressure fluctuate during normal plant operations, an increase above the normally indicated range of values may be indication of an RCS leak into containment. Although there is no specific correlation of a one gpm RCS leakrate to an instrument indication for temperature, pressure or humidity (MP3) change; these instruments will provide indication of an increasing trend. Alarm signals resulting from these instruments can be valuable in recognizing rapid or sizeable leakage to containment.

Table 1 – Alternate RCS Leakage Detection Methods (for a 1 gpm leakrate)

Indicator	**MPS2**	**MPS3**
Containment Gaseous Radiation Monitor	1 gpm in 9.4 hours *(at current RCS activity levels)*	1 gpm in 17.5 hours *(at current RCS activity levels)*
VCT Level	1.8% decrease per hour	3.1% decrease per hour
Containment Pressure	Note 1	Note 1
Containment Temperature	Note 1	Note 1
Containment Humidity	Not Applicable	Note 1

Note 1: No specific correlation of a one gpm RCS leakrate to an instrument indication is calculable; however, the instrument will provide indication of an increasing trend.

The information listed above for MPS2 and MPS3 is based on engineering judgement and assessments. Should both of the TS required RCS leakage detection systems become inoperable, use of alternate diverse leakage detection methods during the proposed 7-day allowed outage time (AOT) would provide adequate assurance that an increase in the RCS leakrate in containment would be detected.

With respect to the precedent cited in the August 15, 2007 submittal indicating that similar license amendments were approved by the NRC for South Texas Project, Units 1 and 2 (TAC Nos. MC7258 and MC7259) on October 17, 2005, for Byron and Braidwood Stations Units 1 and 2 (TAC Nos. MC0509, MC0510, MC0507, and MC0508) on January 14, 2005, the intent was to identify similar license amendments related to the removal of the containment gaseous radioactivity monitor from TSs. Specifically, the citation was intended to pertain to the proposed TS Actions a and b, only. The deviation from the precedent exists solely with the introduction of Action c when both the containment atmosphere particulate radioactivity monitor system and containment sump level monitor system are inoperable.

NRC Question No. 2

The LAR proposes an action to monitor other alternate leakage detection systems when a condition is entered with all leakage detection instrumentation inoperable. As proposed, there is no clear guidance on what is meant by "monitor alternate leakage detection systems" with regard to an acceptable frequency.

2. Provide additional technical and regulatory justification for the lack of any frequency in which the operator must monitor other alternate leakage detection systems when all leakage detection instrumentation is inoperable.

DNC Response

Currently, both MPS2 and MPS3 have other TS actions that direct the use of alternate methods of monitoring when the normal method is not available (see Table 2). DNC proposes that a similar action be established to direct the operator to monitor for RCS leakage using alternate methods when the normal methods are not available. The alternate leakage detection systems discussed for MPS2 and MPS3 are normally monitored via the plant process computer which permits operator monitoring on a continuous basis. On a loss of the plant process computer, station procedures would direct the operator to monitor the alternate leakage detection systems manually and would also specify the appropriate frequency.

The procedures would direct a frequency for monitoring of parameters at least once every 4 hours to evaluate trends for indications of an increasing leakrate. If trends indicate a potential increase in leakrate, procedures would direct operators to consider a containment entry and, if an RCS leak is identified, the procedure would direct operators to existing RCS leak procedures. Attachments to the procedure for monitoring using

alternate RCS leakage detection systems would include data point forms to document the monitoring and manual recording of the VCT level, containment temperature, containment humidity (MPS3), containment pressure and containment sump level. The frequency specified (i.e., at least once every 4 hours) would provide operators with an indication of an increasing trend in RCS leakage to permit the prompt shutdown of the reactor, if required.

Table 2 - Examples of "Alternate Methods" currently used in MPS2 and MPS3 TSs

MPS2	Technical Specification 3.3.3.1, Table 3.3-6 Action 17
MPS2	Technical Specification 3.3.3.8, Table 3.3-11 Action 4a
MPS2	Technical Specification 3.3.3.8, Table 3.3-11 Action 4b
MPS2	Technical Specification 3.3.3.8, Table 3.3-11 Action 8.3
MPS3	Technical Specification 3.3.3.6 LCO Action c
MPS3	Technical Specification 3.3.3.6 LCO Action f.1

NRC Question No. 3

Additionally, General Design Criterion 4, "Environmental and Dynamic Effects Design Bases," of Appendix A to 10 CFR Part 50 states that structures, systems, and components important to safety shall be appropriately protected against dynamic effects, including the effects of missiles, pipe whipping, and discharging fluids, that may result from equipment failures and from events and conditions outside the nuclear power unit.

However, dynamic effects associated with postulated pipe ruptures in nuclear power units may be excluded from the design basis when analyses reviewed and approved by the Commission demonstrate that the probability of fluid system piping rupture is extremely low under conditions consistent with the design basis for the piping. This exclusion is termed "leak-before-break," and staff guidance for evaluation of the associated analysis is contained in Section 3.6.3, "Leak-Before-Break Evaluation Procedures," of the NRC Standard Review Plan (SRP), NUREG-0800. This SRP Section provides guidance for staff evaluation of leakage detection systems to determine whether they are sufficiently reliable, redundant, and sensitive so that a margin on the detection of unidentified leakage exists for through-wall flaws to support the deterministic fracture mechanics evaluation used for the leak-before-break methodology.

The Final Safety Analysis Reports (FSAR) identify that the NRC staff accepted leak-before-break analyses. Specifically, Appendix 1-A of the MPS2 FSAR states the extent to which MPS2 complies with GDC 4 and identifies leak-before-break analyses accepted for several piping segments at MPS2, including the main reactor coolant system piping and the pressurizer surge line. For MPS3, FSAR Chapters 3 and 19 identify leak-before-break analyses accepted for the main reactor coolant system piping. In accepting these leak-before-break analyses, the NRC staff considered the performance of the available leak detection systems.

3. Accordingly, describe any current reference to the gaseous radiation monitors in the leak-before-break analysis assumptions and identify any impact the proposed amendment has on the analysis assumption for MPS2 and MPS3. Also, identify the available leak detection systems with overall response times (i.e., response times that consider transport and holdup of the measured leakage constituents) adequate to support the leak-before-break analysis assumptions that are provided in addition to the gaseous radiation monitors.

DNC Response

NRC approval of leak-before-break (LBB) for the MPS2 and MPS3 RCS piping is based on the ability to detect RCS leakage by the methods listed in TS 3.4.6.1. Currently, the licensing basis for RCS leakage detection is one gpm in one hour. The LBB guidance provided in NUREG-1061, Volume 3, states that licensees and applicants have the option of requesting a decrease in leakage margin provided they can confirm that their leakage detection systems are sufficiently reliable, redundant, diverse, and sensitive. With the removal of the containment gaseous radioactivity monitoring system from TSs, the basis for NRC's approval of the LBB analysis for MPS2 and MPS3 will continue to be supported by the overall RCS leakage detection capability. Specifically, TS 3.4.6.1 will still require at least two redundant RCS leakage detection systems (i.e., containment particulate radioactivity monitoring system and containment sump level monitoring system) which have been designed, calibrated, and maintained consistent with the requirements of Regulatory Guide (RG) 1.45. Additionally, diverse means of leakage detection are available as part of the overall MPS2 and MPS3 leakage detection scheme (see Table 1). These diverse methods are as follows:

Non-TS required VCT level is monitored in both control rooms by means of a level indicator. The level indication is sensitive enough to be capable of recording a one gpm leakrate in one hour at steady state conditions. A decrease in VCT level would be detectable by control room operators as a potential leak in the RCS pressure boundary.

The containment humidity detector (MP3) provides another means of measuring overall leakage from water and steam systems within containment, providing yet another means of indication. Additionally, changes in containment air temperature and pressure can also be used to infer RCS leakage. Although containment temperature and pressure fluctuate during normal plant operations, an increase above the normally indicated range of values may be indication of an RCS leak into containment. Although there is no specific correlation of a one gpm RCS leakrate to an instrument indication for temperature, pressure or humidity (MP3) change; these instruments will provide indication of an increasing trend. Alarm signals resulting from these instruments can be valuable in recognizing rapid or sizeable leakage to containment.

Lastly, an RCS water inventory balance will be performed in accordance with the proposed TS with one or both RCS leak detection monitoring systems inoperable. The water inventory balance calculated from performing this TS surveillance (4.4.6.2.1 for

MPS2 and 4.4.6.2.1.d for MPS3) at least once per 24 hours will provide licensed operators indication of a one gpm leakrate change during steady state operations.

DNC still intends to maintain the containment gaseous radioactivity monitoring systems functional and available in accordance with normal non-TS equipment practices. The containment gaseous radioactivity monitoring systems provide additional alternate RCS leakage monitoring capability. Even with the removal of the containment gaseous radioactivity monitoring system from TSs, the LBB analyses will continue to be met by the containment sump level monitoring system and the containment atmosphere particulate radioactivity monitoring system. This will ensure that leakage due to through-wall flaws will be identified prior to breakage, and the plant shut down accordingly.

NRC Question 4.

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

As previously stated in response to Question 3 above, TS 3.4.6.1 will still require at least two diverse RCS leakage detection systems (i.e., containment particulate radioactivity monitor and containment sump level monitoring) which have been designed, calibrated, and maintained consistent with the requirements of Regulatory Guide 1.45. Additionally, diverse means of leakage detection are available as part of the overall MPS2 and MPS3 leakage detection scheme. For example, non-TS required VCT level is monitored in both control rooms by means of a level indicator. VCT level indication is sensitive enough to be capable of recording a one gpm leakrate in one hour at steady state conditions. RCS water inventory balance is also performed in accordance with TS surveillance (4.4.6.2.1 for MPS2 and 4.4.6.2.1.d for MPS3) and can provide licensed operators indication of a one gpm leakrate change during steady state operations.

Proposed Actions a and b, which are consistent with the precedents previously cited, describe the appropriate actions when the redundancy or minimal functionality of the TS leak detection instrumentation is not met due to the inoperability of either the containment particulate radioactivity monitoring system or the containment sump level monitoring system. These proposed actions permit continued operation for a limited period of time (i.e., 30 days) when the number of diverse leak monitoring systems is less than the required systems specified in the TS consistent with the requirements of RG 1.45.

Proposed Action c also addresses a condition related to a reduction in the diversity or minimal functionality of the leak detection instrumentation (i.e., both the containment particulate radioactivity monitoring system and the containment sump level monitoring system are inoperable) and specifies an even more limiting AOT (i.e., 7 days). This

proposed action requires grab samples of the containment particulate radioactivity at least once per 24 hours, requires performance of an RCS mass balance at an increased frequency of at least once per 24 hours, and requires the use/monitoring of alternate leak detection systems for indication of an increasing RCS leakrate.

For all these proposed actions, the units would be permitted to continue operation for a limited time when redundancy or minimal functionality of the leak detection instrumentation is reduced below the specified requirements contained in TSs. The LBB analyses are not specific regarding leak detection instrumentation but instead state that the leak detection instrumentation is consistent with the requirements of RG 1.45.