February 9, 2005

Mr. David A. Christian
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SUBJECT: MILLSTONE POWER STATION, UNIT NO. 3 - REQUEST FOR ADDITIONAL INFORMATION REGARDING USE OF ALTERNATE SOURCE TERM (TAC NO. MC3333)

Dear Mr. Christian:

By letter dated May 27, 2004, you requested an amendment to the Millstone Power Station, Unit No. 3 (MP3) Technical Specifications. The amendment would allow for use of an alternate source term for MP3.

The Nuclear Regulatory Commission staff is reviewing your application and has determined that additional information is required. The enclosed request for additional information (RAI) was forwarded electronically to Mr. Paul Willoughby of your staff on December 14, 2004. I understand that you intend to respond to this RAI by February 28, 2005. If you have any questions, I can be reached at (301) 415-1494.

Sincerely,

/RA/

George F. Wunder, Project Manager, Section 2
Project Directorate I
Division of Licensing Project Management
Office of Nuclear Reactor Regulation

Docket No. 50-423

Enclosure: As stated

cc w/encl: See next page

Millstone Power Station, Unit No. 3

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REQUEST FOR ADDITIONAL INFORMATION

MILLSTONE POWER STATION, UNIT NO. 3

DOCKET NO. 50-423

USE OF ALTERNATE SOURCE TERM (AST)

General Questions

1. What is the basis for assuming that the control room ventilation system isolation timing is the same for the fuel handling accident as for the entire spectrum of accidents at Millstone Power Station, Unit No. 3 (MP3)?

2. The control room analyses need to consider the doses to the Millstone Power Station, Unit No. 2 (MP2) control room operators. Provide those consequences and the operating mode and conditions of the control room ventilation systems in response to the MP3 accident. Provide the manner in which the MP2 control room ventilation systems are initiated for the MP3 accident and the timing associated with that initiation.

3. What is the impact of MP2 accidents on the doses to the MP3 control room operators as a result of these changes to MP3?

4. What is the basis for two-spray operation during the recirculation phase of the loss-of-coolant accident (LOCA)?

5. Describe what the neutral operating conditions are for the MP3 control room. What is the basis for assuming 350 cfm of unfiltered inleakage? What were the American Society for Testing Materials E741 test results when the control room was tested in this condition?

Section 1.3 Analysis Assumptions and Key Parameter Values

1. There is a discussion in Section 1.3.1 about the radiological consequences of the waste gas system failure and the radioactive liquid waste system leak or failure (atmospheric release). It is stated that these analyses will be retained in Chapter 11 of the MP3 final safety analysis report and that the whole-body and thyroid doses will be converted to total effective dose equivalent (TEDE). These two analyses originate out of Standard Review Plans (SRPs) 15.7.1 and 15.7.2 of NUREG-75/087. The acceptance criteria for these two events was 500 mrem whole-body which was the Title 10 of the *Code of Federal Regulations* (10 CFR) Part 20 limit at the time. Additional guidance on the consequences of a waste gas decay tank leak is provided in Branch Technical Position 11-5 of SRP 11.3. If there is to be a conversion to TEDE, the acceptance criterion for the conversion should be based upon the criterion for the present 10 CFR Part 20, 100 mrem TEDE rather than the Part 100 criterion. In addition, any change to a TEDE dose criterion should not be limited to only the consequences from noble gases and iodides but also include the other isotopes associated with Regulatory Guide (RG) 1.183 and the AST.

2. Provide the basis for increasing the acceptance criterion for methyl iodine penetration of the control room emergency air filtration system in surveillance requirements (SRs) 3/4.7.7.c.2 and 3/4.7.7.d from 2.5% to 5%.

3. What is the basis for the high efficiency particulate air filter and charcoal adsorber efficiencies for the control room emergency ventilation system and why are they inconsistent with the values of RG 1.52?

Section 3.1 Design Basis LOCA Reanalysis

1. Section 3.1.4 provides a discussion of the manner in which containment sprays are utilized during the course of a LOCA and the manner in which their use was modeled in the determination of the radiological consequences. The manner in which the information in this Section and in Table 3.1-4 were incorporated in the calculations, however, is unclear. Please provide a table which notes the time post-LOCA when the sprays were initiated and stopped, the spray removal coefficient for elemental and particulate forms of iodine utilized during these periods, when the sprays were terminated, and the decontamination factor (DF) at the time of termination.

2. Was the Powers model used for aerosols in the sprayed region after the quench spray was secured and after it was assumed that there was no removal of iodine by the sprays?

3. How is the tripping of the non-nuclear safety grade exhaust fan accounted for in the assessment of the control room operators dose?

4. In Table 3.1-4, what is the rationale for concluding that the containment's leak rate will be reduced after 1 hour for the control room consequences but only after 24 hours for the offsite consequences?

5. Provide your calculations demonstrating the time at which the particulate and elemental iodine DF are achieved. If these calculations do not describe how the DF is defined, provide the definition.

6. At what time does the spray removal coefficients for particulate become 1.27 and 1.61? What regions of containment do these spray removal coefficients apply?

7. Table 3.1-5 provides information on contaminated inflow to the rad waste storage tank (RWST). Is the time information in the Table the duration of the inflow from a given source or is it the time the leak begins post-accident?

8. How full are each of the lines to the RWST when the backflow begins? What is the volume of each line?

9. Table 3.1-6 provides information on contaminated inflow to the RWST. Similar to Table 3.1-5, it provides a summary of times. However, as with Table 3.1-6, it is unclear whether the time information in the Table is the duration of the inflow from a given source or is the time the leak begins post-accident.
It is also unclear what SIS R is and why the volume for the SIS R is shown to be zero.

Clarify this table.

10. Provide the calculation which demonstrates how the RWST airflow rate of 8.7 cfm was determined.

11. What iodine isotopes contributed to the value of 10,000 grams of iodine in the core? Provide the calculation for this number.

12. The discussion of backleakage to the RWST in Section 3.1.5.3 of the application describes the amount of leakage and the resulting iodine concentration in the tank. The discussion does not provide a value for the pH of the solution in the RWST or the amount of iodine in the air space. Since the iodine concentration and the pH influence the potential release of radioactive iodine, please discuss the pH in the RWST and the amount of iodine released to the air space in the tank during the 30-day LOCA period. If pH calculations were performed, please provide the results, inputs, and explanation of the inputs. If pH calculations were not performed, please explain why this was considered unnecessary for assuring that elemental iodine would not be evolved from the tank.

Section 3.2 Fuel Handling Accident (FHA)

1. What is the control building isolation signal based upon?

2. It is proposed that no credit is taken for the control room envelope (CRE) pressurization system. Therefore, the system can be deleted from the technical specification (TS). In fact, credit is taken for the pressurization system. The analyses which support this amendment request base the inleakage characteristics of the CRE for the first hour of the FHA and other accidents upon the pressurization system working. If the pressurization system is not operating, the inleakage characteristics of the CRE will be different. What is the inleakage characteristics of the CRE with the normal control room ventilation system operating, with no system operating, or with the pressurization system operating? Which results in the worst case condition? Is the proposed deletion of the pressurization system from the TSs still appropriate?

3. What is the limiting CRE inleakage characteristics during this accident? Did the determination of the limiting inleakage characteristics consider the FHA scenario with and without the loss of offsite power? This would seem important since the inleakage characteristics of the CRE will be affected by the ventilation systems operating internal and external to the CRE.

Section 3.3 Steam Generator Tube Rupture (SGTR) Accident

1. Why are there no steam releases from 0.8183 hours until 2 hours? What precipitates the steaming of the affected steam generator at 2 hours and not before?

2. What isolates the control room on a SGTR?

3. Is the CRE pressurization system assumed to operate in the event of a SGTR?

4. Was the iodine spike assumed to occur during the entire duration of the accident?

5. Why was it assumed that there was no flashing of the break flow from 0.927 hours until 1.554 hours?

Section 3.4 Main Steam Line Break Analysis

What was the duration of the iodine spike for this accident?

Section 3.5 Locked Rotor Accident

1. Has the closure of the stuck-open atmosphere dump valve within 20 minutes been demonstrated to be a reasonable action for the control room operators, or has it been maintained because it is part of the existing licensing basis?

2. Table 3.5-1 provides, as a function of time, the total steam flows to atmosphere and the mass flow rates from the three intact steam generators. The total steam flow to atmosphere seems to reflect the release from two steam generators and not three. How are these numbers calculated?

Section 3.6 Control Rod Ejection Accident

1. What is the basis for assuming that the primary system pressure is less than the secondary side after 20 minutes?

2. Why are there no steam releases from 20 minutes to 2 hours?

Section 7.0 TS and Bases Change

1. The use of the thyroid dose conversion factors is acceptable; however, the staff believes that the proposed definition of dose equivalent I-131 should be changed. The licensee should consider whether they agree to the following definition change (note the words in bold):

> DOSE EQUIVALENT I-131 shall be that concentration of I-131 (micro curie per gram) which alone would produce the same **TEDE** dose as the quantity and isotopic mixture of I-131, I-132, I-133, I-134, and I-135 actually present. The thyroid dose conversion factors used for this calculation shall be those listed **under Inhalation** in Federal Guidance Report No. 11 (FGR 11), "Limiting Values of Radionuclide Intake and Air Concentration and Dose Conversion Factors for Inhalation, Submersion and Ingestion."

A change to SRs c.2 and d of TS 3/4.7.7, “Control Room Emergency Air Filtration System,” was proposed which would increase the acceptance criteria for methyl iodide penetration from 2.5% to 5%. The basis for this change appears to be revised AST analysis which decreased the adsorber efficiency for the elemental and organic forms of iodine to 90% and 70%, respectively. This proposed change in adsorber efficiency and associated change to the SRs are unacceptable. RG 1.52 details the adsorber

efficiencies which should be assigned based upon the various depths of charcoal. The adsorber efficiencies selected for the elemental and organic forms of iodide are inconsistent with this guidance. Therefore, this decrease in adsorber efficiency cannot be approved nor can the acceptance criteria for SRs c.2 and d, unless justification is provided which satisfactorily explains the basis for the change.

It has been proposed that TS 3/4.7.8, "Control Room Envelope Pressurization System," be deleted since it is no longer credited in the accident analyses for AST. All of the AST accident analyses have assumed operation of the CRE pressurization system. It appears that the analyses of the control room operators dose assumed that the control room would be in a neutral pressure condition even though the CRE should be pressurized by the CRE pressurization system. The AST amendment request did not elaborate on what control room ventilation systems would be operating if the CRE pressurization system did not operate. The assessment of the control room operators dose must account for the manner of operation during the course of the action. Since it is proposed to delete the CRE pressurization system as an engineered safeguards features (ESF) system intended to protect the control room operators in the event of a radiological accident, an assessment needs to be performed which identifies the various configuration of control room ventilation systems that may be functioning following a radiological event. For example, it has been proposed that the CRE pressurization system, while no longer ESF grade, will be functioning during the first hour post-accident. What is the CRE's inleakage characteristics when it is? What if the CRE pressurization system does not operate? Now what control room ventilation systems are operating and what is the CRE's inleakage characteristics when they are operating? What is the effect upon CRE cooling under these scenarios?

The following are comments on the BASES Section.

1. In 3/4.6.1.1 General Design Criteria (GDC) 19 should not be replaced with RG 1.183. GDC 19 does apply.

2. In 3/4.7.7 it specifies that the control room emergency ventilation system may be operated in either the isolation and recirculating mode of operation or in the pressurization mode of operation. However, the AST analyses reflects only a pressurization and recirculating mode of operation. The BASES should reflect the actual intended modes of operation for the system. If these other modes of operation are possible then the dose consequences associated with these other modes need to be provided as well as the inleakage characteristics of the CRE during these modes of operation. In addition, in various sections there is reference to modes of operation which are inconsistent with the mode of operation described in the AST analyses. Examples include the background and SR 4.7.7.e.2.