From: Peter Tam
To: Distel, David J.
Date: 6/30/05 11:10AM
Subject: Draft RAI - TMI-1 Proposed Amendment re. Equipment Hatch **(TAC MC4904)**

Dave:

Below please find the current version of the draft RAI. It is identical to what was previously e-mailed to you by Tim Colburn, former Project Manager. When you submit your supplemental information in July, please reference this e-mail.

This draft RAI aims solely to prepare you for a conference call with the NRC staff. It does not formally request for information, nor does it convey a formal NRC staff position. As the result of the phone call we had on 6/29/05, we agreed that you now have sufficient understanding of the staff's information need, and that a formal RAI is not needed.

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DRAFT RAI

REQUEST FOR ADDITIONAL INFORMATION
THREE MILE ISLAND UNIT 1
ELIMINATION OF EQUIPMENT HATCH CLOSURE DURING REFUELING

1. What design-basis parameters, assumptions or methodologies were changed in the radiological design-basis accident analyses as a result of the proposed change? If there are many changes it would be helpful to compare and contrast them in a table. Also, please provide a justification for any changes.

2. Based upon a preliminary review of the proposed amendment the reviewer is unable to match the calculated doses for the accident analyses. It would be helpful if the licensee would provide their design-basis accident calculations. If the calculations are provided, answers to questions provided in this request for additional information (RAI) may reference the calculation.

3. The staff requests further information regarding the assumptions used to model the control room response to the fuel handling accident. Please provide the time dependent flow rates (filtered, unfiltered, recirculation, and pressurization), filtration efficiencies and time to isolate. Please provide justification for the values used.

Section 5.1.3 of Regulatory Guide 1.183 states that: "The numeric values that are chosen as inputs to the analyses required by 10 CFR 50.67 should be selected with the objective of determining a conservative postulated dose ... If a range of values or a tolerance band is specified, the value that would result in a conservative postulated dose should be used." Confirm that the values used (with the tolerance bands (typically +/- 10%)) provide conservative control room doses.

4. Please provide the results of the dose analysis used to support the license amendment.

5. Regulatory Guide 1.183, Appendix B, Regulatory Position 1.2, states: "The fission product release from the breached fuel is based on Regulatory Position 3.2 of this guide and

the estimate of the number of fuel rods breached. All the gap activity in the damaged rods is assumed to be instantaneously released."

a. Final Safety Analysis Report (FSAR) Section 14.2.2.2.1, "Fuel Handling Accident Analysis," states: "Because there is a chance that more than one spent fuel assembly may be damaged during refueling, the probability and consequences of dropping a spent fuel assembly in the core and damaging more fuel pins than the equivalent of one assembly was discussed (Reference 17). The conclusion is that the doses for failure of two assemblies would not be greater than the exposure guidelines of 10CFR 50.67 and no additional restrictions on fuel handling operations and plant operation procedures are needed." Based upon Table 14.2-5, "Postulated Fuel Handling Accident Dose Results (in the Reactor Building)," the Exclusion Area Boundary (EAB) Total Effective Dose Equivalent (TEDE) is 4.20 Rem TEDE. This dose is based upon 1 fuel assembly being damaged. If two fuel assemblies would be damaged, the dose would be double this value or 8.4 Rem TEDE based upon the FSAR analysis. The acceptance criterion given in Regulatory Guide 1.183 in Regulatory Position 4.4 for the EAB is 6.3 Rem TEDE. The amendment request proposes a relaxation of the containment integrity during fuel handling based upon a supporting analysis that potentially exceeds the Regulatory Guide 1.183 acceptance criteria. If the licensing basis of the fuel handling accident includes the damage of two assemblies, the staff does not understand why the resulting doses are not compared to the Regulatory Guide 1.183 acceptance criteria. Please provide justification why the two assemblies are not considered for the proposed design basis analysis supporting the proposed change.

b. FSAR Table 3.2-18, and Section 3.2.3.2.2.1 states that the design radial peaking factor for Three Mile Island, Unit 1 is 1.8. The January 23, 2001 license amendment request provides the parameters used in the analysis used as the justification for the proposed elimination of the equipment hatch. In the analysis that supports the January 23, 2001 amendment the radial peaking factor is given as 1.7. The NRC staff also used 1.7 in the safety evaluation dated October 2, 2001. TMI cites this safety evaluation as the basis for the proposed elimination of the containment equipment hatch during refueling. If the licensing basis for the design peaking factor is 1.8, justify why the previously approved analysis dated October 2, 2001 (that used a radial peaking factor of 1.7) is still valid for the proposed change. Please also explain why the FSAR value of 1.7 continues to be stated as the design basis value for the radial peaking factor for the fuel handling accident.

6. What criteria will be used to determine if closure of the containment is necessary in the event of adverse weather? Has the impact of wind on fuel handling been evaluated (for example, reduced pool visibility due to pool surface disruption)? What steps would be taken in the event of severe weather to minimize the impact of flying debris or missile hazards?

7. The August 22, 2001 RAI response stated that: "AmerGen has performed a bounding assessment of the possible affects on the overall radiological dose results previously submitted. This assessment doubled the iodine release fraction previously used for additional conservatism to compensate for a higher peak pin power burnup and included the conservative assumptions from the original analysis. Particulate cesium and rubidium are retained by the water in the reactor cavity (per Regulatory Guide 1.183, B.3) and are not considered in this assessment. This is considered a bounding conservative assessment of the potential affects of the identified peak pin power burnup condition. The estimated results demonstrate only minimal potential impact, as defined by 10 CFR 50.59, on the previously calculated doses which remain well within the allowable dose criteria as specified in Regulatory Guide 1.183 and 10 CFR 50.67; and therefore, do not affect the original licensing basis analysis submitted on January 23, 2001."

Later in a February 15, 2002 RAI response stated "Additionally although the AmerGen letter

5928-01-20209 (August 22, 2001 letter) did not explicitly state that the noble gas release fractions were doubled, the bounding assessment referred to in that letter doubled halogen and noble gas release fractions as shown in the table above." The table above essentially doubled all the gap fractions used in the January 23, 2001 analysis.

The January 23, 2001, analysis provided the following table for the dose consequences (in TEDE) of the fuel handling accident in containment. These results appear to be the "overall radiological dose results previouslyRing Accident Dose Results (in the Reac submitted" that are referenced in the above August 22, 2001 quotation.

Dose	Control Room	EAB	LPZ
Calculated	6.55E-1	4.20E+0	7.35E-1
Allowable	5.00E+0	6.30E+0	6.30E+0

Based upon this table and the statements made above the staff requests additional clarification. If the August 22, 2001 bounding assessment doubled the iodine and noble gas release fractions then the January 23, 2001 dose analyses would have the following values:

Dose	Control Room	EAB	LPZ
Calculated	1.31E+0	8.40E+0	1.47E+0
Allowable	5.00E+0	6.30E+0	6.30E+0

The EAB doses appear to exceed the Regulatory Guide 1.183 acceptance criteria of 6.3 rem TEDE.

i) Based upon the above information, explain how the doses in the revised analysis stayed below the 6.3 Rem TEDE (given in Regulatory Guide 1.183) when the 1.183 gap fractions were doubled.

ii) Based upon the descriptions provided above, the gap fractions in the fuel handling analysis appear to be double the values given in Regulatory Guide 1.183. Explain why the gap fractions provide in FSAR (Update-16, 4/02) Section, 14.2.2.1, "Fuel Handling Accident," state that the gap activity is based on Regulatory Guide 1.25 assumptions, i.e., 10 percent of the total noble gases other than Kr-85, 30 percent of the Kr-85 and 10 percent of the total radioactive iodine in the rods at the time of the accident."

10. Regulatory Guide 1.183, Appendix A, Regulatory Position 5.3 states: "The staff will generally require that technical specifications allowing such operations [allowing the airlocks or equipment hatch open] include administrative controls to close the airlock, hatch, or open penetration within 30 minutes." TMI requested to use a temporary equipment hatch instead of replacing the equipment hatch. TMI states: "The contingency temporary hatch cover provides an atmospheric ventilation barrier to enable ventilation systems to draw the release from a postulated fuel handling accident in the proper direction such that it can be treated and monitored. The temporary equipment hatch cover is not intended to completely block the opening or be capable of resisting pressure. Therefore, the proposed change is consistent with the administrative controls applied to other previously approved containment openings." The bases state: "When a temporary equipment hatch cover is used in place of the equipment hatch, there are no special requirements for sealing, pressure retention, or complete blocking of the opening for this cover." Also, it states: "There are no special requirements to achieve continuous air flow into the Reactor Building."

These words leave the flexibility to have no hatch in place and do not appear to provide a reliable defense-in-depth measure to block the flow of radiation in the event that a fuel handling accident occurs. Please provide additional justification why the proposed change meets the intents of the Regulatory Position to provide defense in depth against uncertainties in the radiological calculation given: 1) the purge system used to ensure the flow of the radiation is into the reactor building equipment hatch opening is not safety related, 2) the size of the replacement hatch is not defined, 3) the technical specification bases provide no requirements to achieve continuous air flow into the reactor building, and 4) the purge now may allow a flow path that emits more radioactivity into the environment than if no purge were used.

CC: David Helker; Mark Blumberg; R. Brad Harvey

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