

REQUEST FOR ADDITIONAL INFORMATION NO. 127-1641 REVISION 0

12/16/2008

US-APWR Design Certification

Mitsubishi Heavy Industries

Docket No. 52-021

SRP Section: 03.05.01.01 - Internally Generated Missiles (Outside Containment)
Application Section: 3.5.1.1 - Internally Generated Missiles (Outside Containment)

QUESTIONS for Balance of Plant Branch 1 (AP1000/EPR Projects) (SBPA)

03.05.01.01-1

RAI 3.5.1.1-01

Section 3.5.1.1.2.1 of the US-APWR DCD Tier 2, Revision 1, provides the rationale to exclude certain types of equipment from consideration as credible missile sources outside the containment. For example, missiles originating from valves, threaded connections and piping in high energy systems would not be credible due to ASME code criteria that control quality from production through operation, material characteristics, and in-service inspections. Qualitative discussions are also used to exclude other types of equipment (e.g. piping and valves of non-high energy fluid systems, gas explosions, gravitation missiles such as crane drops and falling objects resulting from non-seismic SSCs during a seismic event, secondary missiles, and unsecured maintenance equipment) from consideration as credible missile sources. However, the DCD does not provide the analysis to demonstrate that these missiles are of insufficient energy to cause unacceptable impact or to cause unacceptable damage. Also, it is not clear to the staff whether the applicant has followed the guidance described in SRP 3.5.1.1 for probabilistic analyses to determine which missiles may be non-credible by demonstrating that the event is not statistically significant if the product of the probability of missile occurrence, probability of impact on a significant target, and probability of significant damage is less than 1×10^{-7} per year.

Where the Tier 2 DCD has excluded equipment items from consideration as credible missile sources based on design features and other qualitative considerations, demonstrate how these design features and qualitative considerations would ensure a level of protection from missiles that is equivalent to the probability criteria described in SRP 3.5.1.1, Section II, "SRP Acceptance Criteria," Item 1. Include this information in the DCD and provide a markup in your response.

RAI 3.5.1.1-02

10 CFR 52.47(b) (1) requires that a DC application contain, "The proposed inspections, tests, analyses, and acceptance criteria (ITAAC) that are necessary and sufficient to provide reasonable assurance that, if the inspections, tests, and analyses are performed and the acceptance criteria met, a facility that incorporates the design certification has been constructed and will be operated in conformity with the design certification, the provisions of the (Atomic Energy) Act, and the Commission's rules and regulations."

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US-APWR DCD Tier 2, Revision 1, Section 3.5.1.1, describes the approach to identify potential missiles, determine the potential credible and not credible missiles, and provide measures for SSCs requiring protection against the effects of missiles outside containment. However, DCD Tier 1 Chapter 2.0, "Design Descriptions and ITAAC," does not contain an ITAAC to verify that SSCs outside containment are designed and constructed in accordance with the requirements as described in DCD Tier 2 Section 3.5.1.1 to prevent or mitigate the effects of internally generated missiles outside containment.

Provide an ITAAC that requires COL applicant to perform a walk-down of the SSCs to ensure that SSCs described in the above cited section are protected from internally generated missiles (outside containment) in accordance with the requirements as described in DCD Tier 2 Section 3.5.1.1. Also, the DCD needs to identify which of the SSCs are outside and which of the SSCs are inside the containment. Include this information in the DCD and provide a markup in your response.

RAI 3.5.1.1-03

SRP 3.5.1.1, Section III, Items 4 and 5 require the applicant to address the procedures, analysis, and design to ensure that pressurized gas bottles will not become missiles capable of damaging SSCs important to safety to the extent that safety related functions are compromised. Portable compressed gas cylinders located/stored outside containment pose a significant missile hazard if not properly controlled. US-APWR DCD Tier 2, Revision 1, Section 3.5.1.1.2.1, describes the installation and storage of the hydrogen supply system and gas bottles to prevent the buildup of hydrogen concentrations to explosive levels, thereby preventing a gas explosion that could result in missile generation. However, the DCD does not provide any procedures, analysis or design details to ensure that pressurized gas cylinders will not become/generate missiles that may adversely impact safety-related SSCs during seismic events.

Revise DCD Tier 2, Section 3.5.1.1 to describe in detail any design features for missile protection from pressurized gas cylinders and revise Tier 2, Chapter 1, Table 1.8-2, "Compilation of All Combined License Applicant Items for Chapters 1-19," to include a COL information item which requires the COL applicant to establish/provide procedures to ensure that portable pressurized gas cylinders located/stored outside containment will not become/generate missiles that may adversely impact safety-related SSCs during seismic events. Include this information in the DCD and provide a markup in your response.

RAI 3.5.1.1-04

With regard to unsecured maintenance equipment, DCD Tier 2, Revision 1, Section 3.5.1.1.2.1 specifies a COL action item that requires the applicant to address implementation of procedures to remove unsecured maintenance equipment from containment prior to operations, to a location where it is not potential hazard to SSCs important to safety or seismically restrained to prevent it from becoming a missile. This COL action item is also specified in Chapter 1, Table 1.8-2 of the Tier 2 DCD. However, there is not specified a COL action item to address implementation of procedures to remove unsecured maintenance equipment located/stored outside containment prior to operations.

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Provide an assessment of potential gravitational missiles generated outside containment from unsecured maintenance equipment and discuss the measures provided to prevent the impact of a falling object on safety-related equipment necessary to achieve a safe shutdown. Also revise DCD Tier 2, Chapter 1, Table 1.8-2 to include a COL action item which requires the COL applicant to establish/provide procedures to ensure that unsecured maintenance equipment (outside containment) must be removed prior to operations to prevent those items from becoming missiles during seismic events. Include this information in the DCD and provide a markup in your response.

RAI 3.5.1.1-05

US-APWR DCD Tier 2, Revision 1, Section 3.5.1.1, "Internally Generated Missiles (Outside Containment)," stated that the following components also have the potential to produce missiles:

- Reactor vessel
- Control rod drive mechanism
- Fittings of reactor vessel

It is not clear to the staff how the above cited components located inside the containment would become potential sources of missiles outside the containment. Therefore, provide detailed discussion to demonstrate that the above cited components would become potential sources of missiles outside the containment. Include this information in the DCD and provide a markup in your response.