

## US-APWRRRAIsPEm Resource

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**From:** Buckberg, Perry  
**Sent:** Wednesday, March 19, 2014 7:59 AM  
**To:** 'us-apwr-rai@mhi.co.jp'; US-APWRRRAIsPEm Resource  
**Cc:** Lee, Samuel; Ward, William; Jung, Ian; Phan, Hanh  
**Subject:** US-APWR Design Certification Application RAI 1091-7447 (07 - I & C)  
**Attachments:** US-APWR DC RAI 1091 ICE2 7447.pdf

MHI,

The attachment contains an I&C related request for additional information (RAI). This RAI was sent to you in draft form on March 13, 2014 resulting in no need for clarification. A technically correct and complete response will be expected when your staff is again active in this technical area.

Please submit your RAI response to the NRC Document Control Desk.

Thanks,

**Perry Buckberg**

Senior Project Manager

phone: (301)415-1383

fax: (301)415-6406

[perry.buckberg@nrc.gov](mailto:perry.buckberg@nrc.gov)

U.S. Nuclear Regulatory Commission

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**From:** Buckberg, Perry

**Created By:** Perry.Buckberg@nrc.gov

**Recipients:**

"Lee, Samuel" <Samuel.Lee@nrc.gov>  
Tracking Status: None  
"Ward, William" <William.Ward@nrc.gov>  
Tracking Status: None  
"Jung, Ian" <Ian.Jung@nrc.gov>  
Tracking Status: None  
"Phan, Hanh" <Hanh.Phan@nrc.gov>  
Tracking Status: None  
"us-apwr-rai@mhi.co.jp" <us-apwr-rai@mhi.co.jp>  
Tracking Status: None  
"US-APWRRRAIsPEm Resource" <US-APWRRRAIsPEm.Resource@nrc.gov>  
Tracking Status: None

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# REQUEST FOR ADDITIONAL INFORMATION 1091-7447

Issue Date: 3/19/2014

Application Title: US-APWR Design Certification - Docket Number 52-021

Operating Company: Mitsubishi Heavy Industries

Docket No. 52-021

## 07 - Instrumentation and Controls - Overview of Review Process

### **QUESTIONS:**

#### **07-1**

Chapter 7 of the US-APWR DCD Revision 4 specifies that MHI has used the PRA results and insights in support of the US-APWR design. The staff acknowledges the MHI's intent in using the PRA to help improve the reactor design. However, in order to reach its safety conclusion on the Chapter 7 review and the acceptability of the reliability goals mentioned in Chapter 7, the staff needs additional information to understand the correlation between US-APWR DCD Chapter 7 and Chapter 19 information. Specifically:

1. Page 7.1-20, subsection 7.1.3.16, of the US-APWR DCD Revision 4 states that "As described in the probabilistic risk assessment (PRA) the RPS meets the plant reliability goals with only three channels in operation except the neutron flux monitoring function. Refer to the PRA Technical Report (Reference 7.1-16)." Please define the term "plant reliability goals" mentioned in the above statement, justify the acceptability of these goals, and explicitly identify the US-APWR PRA (Reference 7.1-16) section(s) which supports the use of only three channels in operation to meet those goals.
2. Page 7.5-7, subsection 7.5.1.1.4 (5), states that "The US-APWR PRA directly models instrument reliability using generic data, and the PRA is used to analyze the plant design to confirm that system reliability goals, such as those set for the maintenance rule, are acceptable. PAM instruments will be procured with sufficient reliability to be consistent with the generic reliability data used in the PRA, Chapter 7 of MUAP-07030." Please clearly define the term "system reliability goals," justify the acceptability of these goals, and describe the relationship with the maintenance rule. Describe how the PRA is used to confirm the system reliability goals.
3. Page 7.8-5, subsection 7.8.1.2.1, states that "The four pressurizer pressure signals are interfaced from each of the four PSMS trains. This configuration allows the DAS to meet the target reliability of the PRA with one channel continuously bypassed or inoperable." Please define the term "target reliability of the PRA," and clarify which section(s) of the PRA evaluates and discusses this issue.

#### **07-2**

The staff requests that MHI provide further clarification for the following PRA-related information referenced in the MHI Technical Report MUAP-07004-P(R8), "Safety I&C System Description and Design Process:"

1. Page 71, Section 5.1.10 first full bullet on the page, states that "...the reliability of the safety function is sufficient to achieve the plant level probabilistic risk assessment (PRA) goals for core damage frequency (CDF) and large early release frequency (LERF). Refer to MUAP-07030 Attachments 6A.12 and 6A.13." Please specifically identify which section(s) of the MUAP-07030 Attachments 6A.12 and 6A.13 evaluates and supports the above conclusion. Furthermore, describe how the "plant large early release frequency (LERF)" versus "large release frequency (LRF)" is used in support of the US-APWR DC application as mentioned in the statement.

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2. Page 95, Appendix A, section A.4.9, states that “The reliability analysis methods for the PSMS are described in Section 6.5.2. This analysis ensures that the PSMS meets the reliability requirements assumed in the Probabilistic Risk Assessment (PRA).” Please explicitly identify and describe the “reliability requirements assumed in the PRA” mentioned in the above statement.