REQUEST FOR ADDITIONAL INFORMATION 380-2914 REVISION 1

6/1/2009

US-APWR Design Certification

Mitsubishi Heavy Industries

Docket No. 52-021

SRP Section: 09.03.04 - Chemical and Volume Control System (PWR) (Including Boron Recovery System)
Application Section: 9.3.4

QUESTIONS for Component Integrity, Performance, and Testing Branch 1 (AP1000/EPR Projects) (CIB1)

09.03.04-7

Background

RAI 09.03.04-1 (Reference 1) requested that the applicant describe any pipes or volumes containing 4% (by weight) boric acid (BA) solution. According to the DCD, such locations would be monitored for temperature and maintained above 65°F. However, the DCD also mentions that inventories in the BA storage tank would contain a maximum concentration of 7000 ppm, which is approximately 2.4%. Thus, the BA storage tank would not need to be maintained above 65°F, or even monitored, since it does not contain the threshold 4% concentration. The question arises as to whether or not any location actually would contain 4% solution. If not, then the requirement for monitoring and heat tracing is irrelevant, since no location qualifies.

The applicant's response (Reference 2) mentioned several locations, including the BA tanks and associated equipment would contain 4% BA solutions. However, since the DCD states that this location would only contain 7000 ppm (2.4%), it is unclear what the intended concentration actually is. Furthermore, it is unclear exactly what the minimal concentration is in order to monitor and maintain temperature above 65°F.

Requested Information

1. What is the intended maximum concentration for the BA batching tank, storage tank, transfer pumps, filter, blender, evaporator, and other associated equipment and piping?

2. Does the applicant intend to monitor and maintain the minimum temperature of 65°F for locations that do not approach concentrations of 4% (e.g. the BA storage tank, whose concentration may only be 2.4%)? If so, what other locations would be included?

References

1."Request for Additional Information No. 280-2060 Revision 1, SRP Section: 09.03.04 – Chemical and Volume Control System (PWR) (Including Boron Recovery System), Application Section: 9.3.4" dated March 17, 2009. (ADAMS Accession No. ML090780066)

2. Letter from Yoshiki Ogata, MHI, to NRC dated April 14, 2009; Docket No. 52-021 MHI Ref: UAP-HF-09171; Subject: MHI's Response to US-APWR DCD RAI No. 280-2060 Revision 1 (ADAMS Accession No. ML091060217)

09.03.04-8

Background

RAI 09.03.04-2 (Reference 1) requested that the applicant explain monitoring of the BA solution injected into the RCS. In the applicant's response (Reference 2), it mentions that flow rates of BA solution and makeup water are monitored. It also states, "Indication and deviation alarm are provided." However, it is not clear whether or not a direct measurement is made of the BA concentration and impurities of the solution actually injected into the RCS. The EPRI guidelines (Reference 3) recommend periodic monitoring of solutions, especially for systems that recycle BA.

Requested Information

Describe how the solution in the BA blender is monitored:

1. Are there direct measurements of the BA concentration of the blended solution in the bulk or at the outlet?
2. Are there measurements of impurities in the BA solution going into or out of the BA storage tank?
3. How frequently are such measurements made?

References

1. "Request for Additional Information No. 280-2060 Revision 1, SRP Section: 09.03.04 – Chemical and Volume Control System (PWR) (Including Boron Recovery System), Application Section: 9.3.4" dated March 17, 2009. (ADAMS Accession No. ML090780066)

2. Letter from Yoshiki Ogata, MHI, to NRC dated April 14, 2009; Docket No. 52-021 MHI Ref: UAP-HF-09171; Subject: MHI's Response to US-APWR DCD RAI No. 280-2060 Revision 1 (ADAMS Accession No. ML091060217)

3. *Pressurized Water Reactor Primary Water Chemistry Guidelines*, Vol. 1, Rev. 6, Electric Power Research Institute (December 2007).