August 26, 2008

MEMORANDUM TO: Larry Burkhart, Branch Chief
USAPWR Projects Branch (NMIP)
Division of New Reactor Licensing
Office of New Reactors

FROM Stephen R. Monarque, Project Manager ***/RA/***
USAPWR Projects Branch (NMIP)
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Office of New Reactors

SUBJECT: TRIP REPORT – MEETING WITH MITSUBISHI ON US-APWR CONTROL ROOM SIMULATOR AND HUMAN FACTORS ENGINEERING ON JUNE 4, 2008

On June 4 2008, members of the U.S. Nuclear Regulatory Commission (NRC) staff met with Mitsubishi in Warrendale, PA to observe the US-APWR control room simulator and to discuss the human factors engineering aspect of the US-APWR design. Mitsubishi presented handouts that are shown on Enclosures 1, 2, 3, and 4. These handouts can be accessed through the Agencywide Documents Access and Management System (ADAMS) Accession Numbers ML082140696, ML082140697, ML082140698, and ML082170490.

Mitsubishi gave a brief overview of their organization both in the United States and in Japan. Mitsubishi was formed in 1921 and at one time consisted of over forty companies. However, each company is now a separate entity that operates independently. Refer to Enclosure (2).

The subject of human factors was discussed in detail. Mitsubishi explained that the US-APWR human system interface (HSI) system was developed from the Japanese standard HSI system. In developing the US-APWR HSI system, Mitsubishi considered U.S. operating methods and procedures, U.S. ergonomic and cultural differences, and plant-specific human factors engineering analysis. The Japanese HSI standard includes all of the elements from NUREG-0711, "Human Factors Engineering Program Review Model," and this standard has been validated by approximately 200 nuclear plants in Japan.

The US-APWR human factor engineering program will consist of three phases. Mitsubishi stated that Phases 1a and 1b will be part of the US-APWR design certification. The purpose of Phase 1a is to identify any changes from the Japanese HSI system. Mitsubishi plans to present these changes in a design acceptance criteria report to be submitted to the NRC staff by December 2008. During Phase 1b, Mitsubishi plans to incorporate identified design changes to the US-APWR HSI system and have these changes validated. A HSI design Technical Report, which describes these validated design changes is scheduled to be submitted to the NRC staff by June 2009. Subsequently, Mitsubishi stated that by the end of Phase 1, the US-APWR basic HSI system will have been developed. Phase 2 is scheduled to occur during the development of the ITAAC for the US-APWR design certification. During Phase 2, Mitsubishi plans to perform expanded validation and verification activities on the US-APWR simulator in Warrendale, PA. For Phase 3, which is scheduled to take place during the review of the Comanche Peak combined license application, the new Comanche Peak simulator will be used to perform plant specific verification and validation analysis. The NRC staff provided

feedback and indicated that they would need to review the technical reports for the function allocation, task analysis, and human reliability report analysis.

Afterwards, Mitsubishi conducted a tour of the new US-APWR digital instrumentation and control room simulator. Luminant reactor plant operators have been testing and developing the simulator. Presently, the control room is modeled as OHI, a Japanese four loop pressurized water reactor plant. However, Mitsubishi is using the Luminant operators to convert the control room model to the US-APWR design. Mitsubishi demonstrated the use of digital instrumentation and control and demonstrated the handling of a postulated steam generator tube rupture event. After this event, the NRC staff interacted on the controls for the simulator.

In conclusion, the NRC staff thanked Mitsubishi and Luminant for providing the presentation and noted that this information will assist the staff in completing its review of the US-APWR digital instrumentation and control system.

Enclosures:
1. Introduction and Agenda for the Day
   (ML082140697)
2. Mitsubishi Family of Companies and MEPPI Introduction
   (ML082140698)
3. Human Factors Engineering Program for the US-APWR
   (ML082140696)
4. US-APWR Human-System Interface (HSI)
   System Description (ML082170490)

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