November 19, 2009

MEMORANDUM TO: Hossein Hamzehee, Chief
US-APWR Projects Branch
Division of New Reactor Licensing
Office of New Reactors

FROM: Michael Takacs, Project Manager ***/RA/***
US-APWR Projects Branch
Division of New Reactor Licensing
Office of New Reactors

SUBJECT: AUDIT REPORT REGARDING THE PHYSICAL SECURITY COMPONENT USED TO SUPPORT THE U.S. ADVANCED PRESSURIZED WATER REACTOR DESIGN CERTIFICATION

The U.S. Nuclear Regulatory Commission (NRC) staff conducted a site audit of the Mitsubishi Physical Security component for the U.S. Advanced Pressurized-Water Reactor (US-APWR) design on September 8 - 9, 2009. The purpose of the audit was to examine the supporting documentation for Mitsubishi Heavy Industries Technical Reports: US-APWR Design Certification Physical Security Element Review (UAP-SGI-08001 R1) and US-APWR High Assurance Assessment Evaluation Report (UAP-SGI-08002 R0), submitted on October 2, 2008. The results of the audit are documented in the enclosed report. The NRC audit team found the applicant's staff very cooperative and forthcoming in their support of this audit.

Docket No. 52-021

Enclosure:
Audit Report

CONTACT: Michael Takacs, NRO/DNRL/NMIP
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AUDIT REPORT

The U.S. Nuclear Regulatory Commission (NRC) Staff Audit of Chapter 13, Physical Security, for the U.S. Advanced Pressurized-Water Reactor (US-APWR) Design Certification Application

INTRODUCTION

The NRC staff conducted an audit of the Physical Security component, mostly Safeguards Information (SGI), of Chapter 13 for the US-APWR Design Certification Application. The audit was conducted at the Mitsubishi Nuclear Energy Systems' ("the applicant") office in Arlington, Virginia during the period of September 8 – 9, 2009. The staff conducted the audit in accordance with NRC Office of New Reactors (NRO) Office Instruction NRO-REG-108. The plan for this audit is documented and can be found in the Agencywide Document Access and Management System (ADAMS) under accession number ML092360548, dated September 1, 2009.

PARTICIPANTS

The following NRC staff members from the NRO and the Office of Nuclear Security and Incident Response participated in the audit:

- Mike Takacs (Audit Team Leader)
- Pete Lee (Lead Technical Reviewer)

The following NRC contractors from Information Systems Laboratories participated in the audit:

- Bruce Mrowca
- Chris Chwasz

The following key individuals from the applicant's organization participated in the audit:

- Ron Reynolds (Principal Engineer)
- Paul Gaukler (Consultant)
- Andrew Johnson (Principal Engineer)

DOCUMENTS REVIEWED

- US-APWR Technical Report – Design Certification Physical Security Element Review (UAP-SGI-08001 R1)

- US-APWR Technical Report – High Assurance Evaluation Assessment (UAP-SGI-08002 R0)

- US-APWR Design Control Document (DCD Revision1), Chapter 19, Probabilistic Risk Assessment and Severe Accident Evaluation

Enclosure

- US-APWR Technical Report - Probabilistic Risk Assessment (MUAP-07030 R0)
- Mitsubishi Heavy Industries Ltd. (MHI) responses, containing SGI, to Requests for Additional Information (RAI) 282-1984 & 283-2200

Audit Activities

MHI presented information on the process applied to identifying vital equipment and developing target sets. No supporting documentation of this process was provided to the staff for review. MHI did not provide any mark-up of planned changes to the DCD submitted for certification or formal supporting documentation of RAI responses during the audit for NRC staff to review.

NRC Staff Observations

Overall, the audit provided information to the NRC staff for understanding MHI's process in evaluating and determining vital equipment and target sets.

Exit Briefing

The following is a summary of concerns and issues that the staff communicated to MHI during the audit and reiterated at the exit briefing. The path to closure for these specific areas of concern will be documented by follow-up RAIs, which will be issued in November, 2009.

1. Vital Equipment – The NRC staff noted some weaknesses in the assumptions used to develop this list including an assumption associated with mitigation systems. NRC staff clarified the expectation that all safety-related mitigation systems must be included consistent with the definition of vital equipment. Title 10 *Code of Federal Regulations* (10 CFR) 73.2 defines vital equipment as any equipment, system, device, or material, the failure, destruction, or release of which could directly or indirectly endanger the public health and safety by exposure to radiation. Equipment or systems which would be required to function to protect public health and safety following such failure, destruction, or release are also considered to be vital. Safety-related systems providing mitigation of 10 CFR 100 release are, by definition, identified as vital equipment. The vital equipment list currently on the docket is not complete and accurate. The staff had previously issued RAIs on the subject of a complete and accurate list of vital equipment as defined by 10 CFR 73.2. The staff expects that a revised vital equipment list will be submitted that addresses the identified concerns.

2. Target Sets – The NRC staff found that MHI identified target elements at a system/functional level as opposed to identifying specific sub-systems and components, along with their locations. Due to the planned protective strategy for the standard US-APWR design in this design center, the functional approach was found to be acceptable. However, some implementation weaknesses were noted during the audit associated with the safe-shutdown matrix used in this approach. These weaknesses are expected to be addressed in the planned revision to the US-APWR's High Assurance Evaluation report with respect to

target sets. The revision should include the documentation of how MHI arrived at the safe-shutdown matrix. The staff had previously issued RAIs on the subject. Also, it was noted that some credit is taken for non-vital equipment and operator actions in the determination of target sets. Although credit for these items is consistent with staff guidance, the specific identification of all non-vital equipment and operator actions was not included in the US-APWR's High Assurance Evaluation report. During the audit, staff clarified the expectation that all non-vital equipment and operator actions need to be identified. The staff had previously issued RAIs on this subject. The target set information provided in the RAI response was not complete and accurate.

3. Complete and accurate list of vital equipment – MHI's reference to NUREG 1178 (document was completed in 1986 and published 1988) provides limited assumptions (e.g., one train of equipment, limited modes of reactor operation, limited protection of cable runs in trays and conduit). The guidance provided in RG 5.76, section 4.10.3, results in identifying only a limited number of safety-related systems as vital equipment. MHI's technical report, UAP-SGI-08001, did not provide a complete and accurate list of vital equipment as defined in 10 CFR 73.2. This will impact the completeness and accuracy of the subsequent determination of target sets for all modes of reactor operation that must be protected against the design basis threat of radiological sabotage.

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