December 17, 2008

MEMORANDUM TO: Patrick L. Hiland, Director
Division of Engineering
Office of Nuclear Reactor Regulation

THROUGH: William E. Kemper, Chief */RA/*
Instrumentation and Controls Branch
Division of Engineering
Office of Nuclear Reactor Regulation

FROM: Norbert Carte */RA/*
Instrumentation and Controls Branch
Division of Engineering
Office of Nuclear Reactor Regulation

SUBJECT: REPORT OF FOREIGN TRAVEL TO AUDIT THE FACTORY ACCEPTANCE TEST (FAT) OF OCONEE DIGITAL REPLACEMENT PLATFORM, HELD IN ERLANGEN, GERMANY, FALL, 2008

Attached is a summary trip report of the audit of the AREVA Factory Acceptance Test (FAT) held in Erlangen, Germany, November 5-7, 12-17, 22-29, and December 3-12, 2008.

The purpose of this audit was to witness FAT performance, and to assess conformance with applicable regulations and guidance. In particular, the audit team evaluated those FAT activities that were performed in lieu of validation crediting use of the SIVAT tool.

The content of this report is not likely to be of interest to the Commissioners.

Enclosure: As stated

Contact: Iqbal Ahmed, NRR/DE/EICB
301-415-3252

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NAME	NCarte	WKemper
DATE	12/17/08	12/17/08

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Combined Foreign Travel Quick Look Report and Final Trip Report

Travel Dates:

November 5 – November 7, 2008 (See ML083260476)
November 12 – November 17, 2008 (See ML083290145)
November 22 – November 29, 2008 (See ML083380534)
December 3 – December 12, 2008

Travelers (All from NRR/DE/EICB)**:**

November 5 – November 7, 2008
Jonah Pezeshki
Gursharan Singh

November 12 – November 17, 2008
Norbert Carte
Richard Stattel

November 22 – November 29, 2008
Iqbal Ahmed
Stephen Wyman

December 3 – December 12, 2008
William Kemper
Richard Stattel

Location:

Hosted at AREVA Facility
Erlangen, Germany

Organization/Committee:

AREVA (Contractor on Oconee LAR)

Subject Matter:

The objective of this audit was to verify, via independent evaluation and observation of portions of the Factory Acceptance Test (FAT) performed by AREVA on the Oconee RPS/ESFAS digital safety system, that the tests were conducted in accordance with the FAT plan, specifications, and procedures and that the Oconee safety system design conforms with the applicable regulations, standards, and guidelines. In particular, the audit team evaluated those FAT activities that were performed in lieu of validation crediting use of the SIVAT tool.

Desired Outcome:

The desired outcome of this audit was to determine the extent to which the FAT performance, sufficiently demonstrated adherence with the applicable regulations, standards, and guidelines.

ENCLOSURE

Results Achieved:

Overall, it was determined that FAT performance sufficiently demonstrated adherence with the applicable regulations, standards, and guidelines. All potential issues identified during the audit were documented in AREVA Open Item reports (e.g., O1-xxxx). The closed open item reports will be requested and reviewed as deemed appropriate by the staff.

Summary of Trip:

The FAT audit was conducted in accordance with an approved audit plan by four audit items. Each part of the FAT audit began with introductions in the morning of the first day, followed by safety training. The NRC representatives, typically, used this opportunity to explain that the overall purpose of this FAT audit was to assess the extent to which Independent Verification and Validation Test (IVVT) requirements were satisfied by the FAT. The following summaries are applicable to each part of the audit.

November 5 – November 7, 2008 (Cyber Security)
The audit team witnessed the cyber security testing related to communication and access control. The audit team also reviewed the use and control of RPS/ESPS access keys, electronic access control (e.g., password use, logouts...) and associated physical security of the test area.

AREVA Open Item report number O1-1125 itemizes the discrepancies that were identified during the tests.

NRC representatives noted that the FAT test CYBER03 was insufficient to ensure one-way connectivity through the NetOptics port-tap device. As such, AREVA is required to prove that the one-way connectivity through the NetOptics port-tap device is ensured via physical disconnection before IVVT requirements can be satisfied. In addition, AREVA still lacks a mechanism to ensure that no hidden functions and/or vulnerable features are embedded in the code (per RG 1.152).

November 12 – November 17, 2008 (RPS and GSM)
The audit team witnessed the functional testing of the Reactor Protection System (RPS) and Graphical Service Monitor (GSM).

The test field practices related to unspecified acceptance criteria tolerance, software tool use and electronic file use were observed and discussed. AREVA agreed to provide additional information as described in the “next steps” section below.

November 22 – November 29, 2008 (Hardware Failure)
The tests demonstrated the effects of power failures and communication failures in the RPS/ESFAS channels and the MSI cabinets. The safety function of the RPS/ESFAS system was tested while imposing single failure scenarios into the system during normal operation.

December 3 – December 12, 2008 (ESFAS)
The audit team witnessed the functional testing of the Engineered Safety Features Actuation System (ESFAS).

The FAT procedures and tests observed appear to provide a rigorous test of the ESFAS application software to verify that system requirements have been appropriately incorporated into the system. The test program also appears to provide a comprehensive test of the entire integrated ESFAS software and hardware. However, it was not apparent to the staff how the FAT ensures that unintended functions (or unused code) are discovered and removed. See the "next steps" section below.

The staff evaluated the AREVA V&V test activities to determine the level of independence achieved by the V&V team. Several observations were made during this evaluation. AREVA has agreed to address each of these within the Open Item process.

Documents 62-9066853 GSM Test Spec: & 62-9067378 GSM Test Procedure: The V&V Approval date precedes the review date and one of the two preparer dates.

Documentation does not record the functional group to which the person signing belongs. This created ambiguity for subsequent verification and QA activities. Because of this, it is difficult to verify the level of independence maintained during the test development process.

Next Steps:

The following next steps are applicable to each part of the trip.

November 5 – November 7, 2008 (Cyber Security)
The NRC will review the closure of Open Item O1-1125 with AREVA.

The NRC will follow up with AREVA to obtain evidence that one-way connectivity through the NetOptics port-tap device is physically ensured. In addition, AREVA has informed NRC that testing was done to address that no hidden functions and/or vulnerable features are embedded in the code. NRC will review the test results to evaluate the adequacy of these tests.

November 12 – November 17, 2008 (RPS and GSM)
AREVA has agreed to provide the following information:

1. Results of Test Failure Evaluations when the associated Open Items are resolved. Evaluations are expected to include an extent of condition determination for each issue.
2. Evaluation of the acceptability of using Script files and other software related files for conduct of test activities in lieu of the verified and controlled PDF versions of these files.
3. Documentation of a new Open Item that addresses the unspecified tolerance of 0.3% of full scale being used by test personnel for evaluation of test results.

November 22 – November 29, 2008 (Hardware Failure)
No further action will be required following the submission of this report in regard to the RPS/ESFAS Hardware Failure Factory Acceptance Test.

December 3 – December 12, 2008 (ESFAS)
The staff agreed to initiate an RAI on the subject of how the tests ensure that unintended functions (or unused code) are discovered and removed. AREVA will provide their response to this matter accordingly.

AREVA has agreed to address each of the documentation discrepancies within the Open Item process.

Policy Issues:

No issues were identified that require Commission action or guidance.

Contact Information:

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