

QA AUDIT REPORT NO. 09003
(FINAL REPORT)

DATE: May 22, 2009
09:DP:22

FROM: Quality Systems



TO: M. Dunlap

SUBJECT: AUDIT OF JAPAN ATOMIC ENERGY AGENCY
High-Temperature Engineering Test Reactor (HTTR) Department
Oarai Research and Development Center
4002 Narita-cho,
Oarai-machi, Ibaraki-ken, 311-1393 Japan

Purpose

This audit was performed to evaluate the capabilities of the Japan Atomic Energy Agency (JAEA) to provide Tritium Behavior Testing services during operation of their High-Temperature Engineering Test Reactor (HTTR) at the Oarai Research and Development (R&D) Center, in accordance with the Next Generation Nuclear Plant (NGNP) Conceptual Design Studies Subcontract Statement of Work (SOW) for JAEA, Revision 2, dated March 19, 2009, and applicable requirements of ASME-NQA-1-2000, Quality Assurance (QA) Requirements for Nuclear Facility Applications. The audit was intended to qualify JAEA as a QA-Approved Supplier to provide nuclear testing services to General Atomics (GA), in support of the NGNP Project, managed by the Idaho National Laboratory (INL).

Scope

The audit examined the JAEA facilities and quality system documentation related to the evaluation of tritium behavior in the HTTR. Quality elements evaluated included Organization, Quality Assurance Program including training, Identification and Control of Items, Test Control, Control of Measuring and Test Equipment, Control of Nonconforming Items, Audits, and Software Design Control. The audit focused on activities, equipment and instrumentation described in GA Document No. 911169, Test Specification/Procedure for Evaluation of Tritium Behavior in the HTTR.

Summary

The audit was performed April 20 through April 22, 2009 at the JAEA HTTR Department offices located within the Oarai R&D Center. JAEA is a National Laboratory operating under the Japan Ministry of Education, Culture, Sports, Science, and Technology. The main function of the JAEA HTTR Department is to perform engineering tests using the 30 MW (thermal) HTTR. The helium-cooled HTTR reached criticality in 1998, full power operation in 2001, and high-temperature (950°C at core outlet) operation in 2004. The JAEA QA Program is based on Japan Electric Association Code (JEAC) 4111-2003, Safety of Nuclear Power Plants, Quality Assurance Code, which is in turn based on the International Atomic Energy Agency (IAEA) Safety Series 50-C/SG-Q (1996) and the Japan Standard JIS 9001:2000 (equivalent to ISO 9001:2000). The JAEA-HTTR QA Program is described in the Oarai R&D Center-wide Quality Management Plan and supporting Manuals, and in HTTR Department Quality Management Manuals.

The audit included a review of Oarai Quality Management Plan and Manuals and of HTTR Quality Management Manuals; interviews with HTTR personnel; examining objective evidence of implementing the JAEA QA Program on irradiation testing projects; and a tour of the HTTR facility. The audit examined examples of work for other projects that were similar to the work that is expected to be performed by the HTTR Department for the current and future phases of the NGNP.

The audit verified that JAEA Quality Management Plan and Manuals address the applicable requirements of ASME-NQA-1-2000 and that JAEA HTTR personnel are effectively implementing their own QA requirements as well as the applicable QA requirements contained in ASME-NQA-1-2000. Accordingly, JAEA will be placed on the GA QA-Approved Suppliers List as a supplier of nuclear testing services.

The audit results were discussed with JAEA HTTR personnel at the post-audit conference on April 22, 2009.

Audit details are discussed in Attachment 1.

Audit Findings

There were no adverse Findings.

Follow-up

A follow-up audit is not required; this audit is closed.

xc: H. Burdick
N. Fujimoto (JAEA)
K. Jacobs
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Audit 09003 file

ATTACHMENT 1
QA AUDIT REPORT NO. 09003
AUDIT CONDUCT DETAILS

<u>Audit Team:</u>	<u>Dates</u>	<u>Controlling Documents</u>
Lead Auditor:  V. Nicolayeff ^{1,2}	4/20/09	ASME NQA-1-2000
Auditor: K. Partain ^{1,2}	to	
Auditor M. Richards ^{1,2}	4/23/09	<u>JAEA Documents</u> Oarai Quality Management Plan, 1 April, 2009 5 Oarai Quality Management Procedures* 16 HTTR Quality Management Procedures* * Called Manuals by JAEA

Personnel Contacted

N. Fujimoto^{1,2}, R. Hino¹, T. Iyoku, Y. Komori, K. Kunitomi^{1,2}, T. Nishihara^{1,2}, H. Ohashi^{1,2}, H. Owada, N. Sakaba^{1,2}, N. Sato, M. Shinozaki, Y. Tachibana^{1,2}, and X. Yan

¹ Attended Pre-audit Conference

² Attended Post-audit Conference

Audit Conduct

1. Requirement 1, Organization - Reviewed the organizational structure to verify that senior management has been assigned responsibility for Quality Assurance and that quality achievement is verified by those not directly responsible for performing the work. Verified that QA responsibility for the HTTR Department was assigned to Dr. N. Fujimoto, General Manager, HTTR Project Management Section, reporting to the HTTR Department Director, and that QA audits of HTTR Projects are performed by certified auditors from another department. Verified that lines of communication have been established between GA and HTTR personnel that will be assigned to the Tritium Behavior Test.
2. Requirement 2, Quality Assurance Program - Reviewed the Oarai Quality Management Plan and Manuals and HTTR Quality Management Manuals, to verify that they comply with the applicable requirements of ASME-NQA-1-2000. Examined the planned and executed training records to verify that Tritium Behavior Test project key personnel are or will be trained in the testing procedures and applicable procedures/documents prior to the start of the testing and that training matrices and records are complete and up-to-date. Examined qualification records of lead auditors, and inspectors to verify that they are up-to date and in compliance with the items in Requirement 2 in ASME-NQA-1-2000.
3. Requirement 8, Identification and Control of Materials – Examined purchase orders, delivery tickets, and procedure checklists for receipt of tanker trucks of helium gas for addition to the permanent system to verify materials are properly identified and controlled upon delivery to the reactor site. Observed the storage and control of cylinders of various gases used in the HTTR reactor system to verify they are protected from environmental decay per ASME-NQA-1-2000.

4. Requirement 11, Test Control – Reviewed the six procedures in the Tritium Measurement Manual in High Temperature Parallel Operations, HP-11-2, draft, to verify there is a valid test plan and procedures for controlling the reactor operations, proper sample collection/identification, competent analyses of the tritium samples, and field changes to those procedures. Examined the tritium bubbler collection system to verify proper setup for sample collection and analysis.
5. Requirement 12, Control of Measuring and Test Equipment – Examined calibration procedures and records, including a recall list, plus observed calibration stickers on flow meters, pressure gauges, temperature gauges, mass flow controllers, etc. while on a facility tour, to verify all equipment used in the tritium behavior testing is in calibration prior to the start of the testing.
6. Requirement 15, Control of Nonconforming Items – Reviewed the “HTTR Operations Manual,” the Oarai “Nonconformity, Corrective Action, and Preventive Action Management Manual,” and the HTTR “Nonconformity Management Manual.” Examined three abnormal event records and three HTTR Nonconformance reports to verify that the reports were properly prepared, and the items dispositioned, tracked, and the reports closed out and that the control methods used by JAEA at the Oarai R&D Center comply with ASME-NQA-1-2000 requirements.
7. Requirement 17, Quality Assurance Records – Reviewed the HTTR Documents and Records Management Manual and several related to QA records to verify that they comply with the requirements of ASME-NQA-1-2000. Examined several examples of QA records to verify they are maintained, retrievable, legible, valid, and properly classified, as required by ASME-NQA-1-2000.
8. Requirement 18, Audits – Reviewed the Oarai Internal Audit Manual and government and internal audit reports to verify that the HTTR Department is audited periodically and to evaluate the audit results. Verified that the Oarai R&D Center and the HTTR Department are audited by the government every three months and by independent internal auditors once a year. The government audits verify compliance with the technical specifications and QA requirements. Examined lead auditor qualification records, and several audit files to verify that audits were performed as scheduled, by qualified lead auditors, and in accordance with applicable procedures; and that the audit records were complete and included the audit plan, audit report, audit findings, and record of completion of corrective action. Noted that there have not been any significant quality problems at JAEA HTTR Department during the last three years.
9. Requirement 3, Section 800, Software Design Control and Subpart 2.7 QA Requirements for Computer Software. Note: This part of the audit was performed to evaluate the existing status of software control at JAEA in anticipation of future contracts dealing with software development and validation. Current NGNP contract with JAEA has no software development tasks.

Reviewed JAEA Computer Program Control Manual, the THYTAN code test report and THYTAN Code (users’) Manual to verify compliance with ASME-NQA-1-2000. Noted that JAEA procedures do not address software design control. In order to achieve full compliance with ASME-NQA-1-2000 requirements JAEA would need to prepare a procedure on software design control and software design modifications. This would be necessary only if JAEA is awarded a contract for design, development and validation of computer software. No action is needed at this time.