

June 26, 2006

Mr. Ray Tsukimura, President
Aerotest Operations, Inc.
3455 Fostoria Way
San Ramon, CA 94583

SUBJECT: NRC INSPECTION REPORT NO. 50-228/2006-201

Dear Mr. Tsukimura:

On June 5 - 8, 2006, the U.S. Nuclear Regulatory Commission (NRC) completed an inspection at your Aerotest Radiography and Research Reactor facility. The enclosed report documents the inspection results, which were discussed on June 8, 2006, with you and other members of your staff.

The inspection examined activities conducted under your license as they relate to safety and compliance with the NRC's rules and regulations and with the conditions of your license. The inspector reviewed selected procedures and records, observed activities, and interviewed personnel. Based on the results of this inspection, no findings of significance were identified.

In accordance with Section 2.390, "Public inspections, exemptions, and requests for withholding," of Title 10 of the *Code of Federal Regulations*, a copy of this letter, its enclosure, and your response (if any) will be available electronically for public inspection in the NRC Public Document Room or from the Publicly Available Records component of NRC's Agencywide Documents Access and Management System (ADAMS). ADAMS is accessible from the NRC Web site at <http://www.nrc.gov/reading-rm/adams.html> (the Public Electronic Reading Room).

Sincerely,

/RA/

Johnny H. Eads, Jr., Branch Chief
Research and Test Reactors Branch B
Division of Policy and Rulemaking
Office of Nuclear Reactor Regulation

Docket No. 50-228
License No. R-98

Enclosure: NRC Inspection Report

cc w/encl: See next page

Aerotest Operations, Inc.

Docket No. 50-228

cc w/encl:

Director, Energy Facilities Siting Division
Energy Resources Conservation & Development Commission
1516 9th Street
Sacramento, CA 95814

California Department of Health
ATTN: Chief, Environmental Radiation Control Unit
Radiologic Health Section
714 P Street, Room 498
Sacramento, CA 95814

Mr. Chris Bauman, Reactor Supervisor
Aerotest Operations, Inc.
3455 Fostoria Way
San Ramon, CA 94583

Test, Research and Training
Reactor Newsletter
University of Florida
202 Nuclear Sciences Center
Gainesville, FL 32611

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U.S. NUCLEAR REGULATORY COMMISSION
OFFICE OF NUCLEAR REACTOR REGULATION

Docket No: 50-228

License No: R-98

Report No: 50-228/2006-201

Licensee: Aerotest Operations, Inc.

Facility: Aerotest Radiography and Research Reactor

Location: 3455 Fostoria Way
San Ramon, CA 94583

Dates: June 5-8, 2006

Inspector: Craig Bassett

Approved by: Johnny H. Eads, Jr., Branch Chief
Research and Test Reactors Branch B
Division of Policy and Rulemaking
Office of Nuclear Reactor Regulation

EXECUTIVE SUMMARY

Aerotest Operations, Inc.
Aerotest Radiography and Research Reactor
Report No: 50-228/2006-201

The primary focus of this routine, announced inspection was the on-site review of selected aspects of the licensee's Class II research reactor administrative and safety programs including: organizational structure and staffing, review and audit and design change functions, procedures, radiation protection, environmental protection, and shipment of radioactive material since the last NRC inspection of this facility. The licensee's programs were acceptably directed toward the protection of public health and safety and in compliance with NRC requirements.

Organizational Structure and Staffing

- The Aerotest Radiography and Research Reactor organization and staffing met the requirements specified in the Technical Specifications (TSs).

Review and Audit and Design Change Functions

- The Reactor Safeguards Committee conducted reviews and audits in compliance with the requirements specified in the TSs.
- No changes had been made at the facility since the last NRC inspection but the 50.59 process of Title 10 of the *Code of Federal Regulations* (10 CFR) for design change at the facility was in place and would be followed as required if changes were initiated.

Procedures

- Facility procedural review, revision, control, and implementation satisfied TS requirements.

Radiation Protection Program

- Surveys and associated checks were completed and documented acceptably to permit evaluation of the radiological conditions present in the facility.
- Notices and postings at entrances to work areas met the regulatory requirements.
- Personnel dosimetry was worn as required and doses were within the licensee's procedural action levels and NRC's regulatory limits.
- Radiation monitoring equipment was maintained and calibrated as required.
- Training was provided as required covering the topics outlined in 10 CFR 19.12.
- The Radiation Protection and As Low As Reasonably Achievable (ALARA) Programs satisfied regulatory requirements.

Environmental Monitoring

- Effluent monitoring satisfied license and regulatory requirements, and releases were within the specified regulatory and TS limits.

Transportation of Radioactive Materials

- The program for transportation of radioactive materials satisfied NRC requirements.

REPORT DETAILS

Summary of Plant Status

The Aerotest two hundred and fifty kilowatt (250 kW) TRIGA research reactor continued to be operated in support of neutron radiography, surveillance, and reactor operator training. During this inspection, the reactor was started up and operated several hours per day at 132 kW to complete neutron radiographic operations. Although the maximum authorized power level was 250 kW, the licensee opted to reduce the operating power of the reactor to achieve several goals including the reduction of personnel radiation exposures.

1. Organizational Structure and Staffing

a. Inspection Scope (Inspection Procedure (IP) 69001)

The inspector reviewed the following regarding the licensee's organization and staffing to ensure that the requirements of Sections 10.0 and 12.1 of Technical Specifications (TSs), Change No. 8, dated October 22, 1974, were met:

- C management and staff responsibilities
- C staffing for safe operation of the reactor facility
- C Aerotest Operations, Inc. organizational structure and staffing
- C Annual Summary of Changes, Tests, and Experiments at Aerotest Radiography and Research Reactor (ARRR) for the periods from July 1, 2003, to June 30, 2004, and from July 1, 2004, to June 30, 2005

b. Observations and Findings

Through discussions with licensee representatives the inspector determined that management responsibilities and the organization at the facility had not changed since the previous NRC inspection of radiation protection in August 2004 (NRC Inspection Report Number 50-228/2004-201). The inspector determined that the Reactor Supervisor retained direct control and overall responsibility for management of the facility as specified in the TS. The Reactor Supervisor reported to the President, Aerotest Operations, Inc. Also, the Radiological Safety Officer (RSO) reviewed and approved all procedures and experiments involving radiological safety as required.

Through review of records and logs, as well as discussions with licensee personnel, the inspector determined that the current staffing at the facility was acceptable to support the workload and ongoing activities. Staff personnel also met the qualification requirements of the TS for effective reactor operations and radiation protection.

c. Conclusions

The licensee's organization and staffing met the requirements specified in the TS.

2. Review and Audit Functions

a. Inspection Scope (IP 69001)

The inspector reviewed the following to ensure that the audits and reviews stipulated in the requirements of TS Section 12.1.3, and the design change functions, also outlined in that Section, were completed:

- C Operations Request Forms file
- C Reactor Safeguards Committee (RSC) Charter dated March 17, 1978
- C TS defined duties of the RSC including the review and audit functions
- C RSC meeting minutes for the past two years
- C Section I of the ARRR Procedures Manual entitled, "Administrative Procedures," Procedure Change Notice (PCN) Number (No.) 2, RSC approval dated June 28, 1990, and last reviewed May 15, 2006

b. Observations and Findings

(1) Review and Audit Functions

The inspector determined that the RSC membership satisfied the TS requirements and the Charter stipulations. The inspector reviewed the RSC's meeting minutes from November 2004 through present. The minutes showed that the RSC met annually as required and considered the types of topics outlined by the TS, including as low as reasonably achievable (ALARA) challenges faced by the facility.

The inspector noted that the RSC Chairman had completed annual audits of various aspects of the reactor facility operations and programs as stipulated in the TS. The audits, as well as the resulting findings, were appropriate and the licensee's response and corrective actions, if needed, were acceptable.

(2) Design Changes

Through review of applicable records, which included the latest Operations Request Forms and interviews with licensee personnel, the inspector determined that no changes had been initiated and/or completed at the facility since the last NRC inspection. However, the inspector verified that changes or modifications to the facility would be analyzed by the staff and the results of the analyses would be presented to and reviewed by the RSC, and approved as required if the changes were determined to be acceptable.

c. Conclusions

Audits and reviews were being conducted acceptably by the RSC according to the requirements specified in the TS. No changes had been made at the facility since the last inspection but the process was in place so that changes or modifications would be reviewed and approved by the RSC as required.

3. Procedures

a. Inspection Scope (IP 69001)

The inspector reviewed the following to ensure that the requirements of TS Section 12.2 were met concerning written procedures:

- C Procedure Approval Sheets
- C PCN forms
- C Section I of the ARRR Procedures Manual entitled, "Administrative Procedures," PCN No. 2, RSC approval dated June 28, 1990, and last reviewed May 15, 2006, which detailed the process used to review, revise, and approve all facility procedures
- C Section II of the ARRR Procedures Manual entitled, "Operating Procedures," PCN No. 2, RSC approval dated June 28, 1990, and last reviewed May 15, 2006
- C Section III of the ARRR Procedures Manual entitled, "General Emergency Procedures," PCN No. 4, RSC approval dated January 28, 2005, and last reviewed May 15, 2006
- C Section VI of the ARRR Procedures Manual entitled, "Radiological Safety Procedures," PCN No. 3, RSC approval dated April 29, 1996, and last reviewed May 15, 2006

b. Observations and Findings

The inspector verified that procedures had been developed and were implemented for reactor operations and radiation safety. Procedures were being reviewed biennially and revised as needed. The latest review had been completed May 15, 2006. Procedure Approval Sheets were maintained and PCN forms were completed when changes were made as required. The inspector also noted that, when procedures were revised, the revisions were presented to the RSC for review and approval. The current facility procedures were acceptable for the current operation.

c. Conclusions

Facility procedural review, revision, control, and implementation satisfied TS requirements.

4. Radiation Protection Program

a. Inspection Scope (IP 69001)

The inspector reviewed the following to verify compliance with 10 CFR Part 20 and the requirements in TS Sections 6.2, 7.0, and 12.1.2:

- C Special Work Permits - Numbers 2004-1 through 2005-5
- C dosimetry records for facility personnel for the past two years
- C radiological signs and posting at the entrances and barriers for restricted areas

- C calibration and periodic check records for portable and fixed radiation monitoring instruments
- C Training Log records documenting radiological safety training for facility personnel from 2004 to the present
- C radiation protection and reactor surveillance and survey data from 2004 to the present recorded on:
 - Swipe Count Sheet forms
 - ARRR Pool Water Analysis forms
 - Neutron Instrument Calibration forms
 - Air Filter Paper Counting Sheet forms
 - Aerotest Operations, Inc. Monthly Radiation Survey forms
 - Aerotest Operations, Inc. Quarterly Instrument Calibration forms
 - Aerotest Operations, Inc. Quarterly Maintenance Check List forms
- C Section VI of the ARRR Procedures Manual entitled, "Radiological Safety Procedures," PCN No. 3, RSC approval dated April 29, 1996, and last reviewed May 15, 2006
- C Section VIII of the ARRR Procedures Manual entitled, "Maintenance Procedures," PCN No. 2, RSC approval dated January 14, 1993, and last reviewed May 15, 2006

The inspector also observed the use of dosimetry and radiation monitoring equipment during tours of the facility and conducted a radiation survey of various offices, support areas, and the Reactor Bay using an NRC instrument.

b. Observations and Findings

(1) Surveys

Quarterly radiation and contamination survey results indicated that licensed activities were being conducted in accordance with operating procedures. The results were documented on the applicable forms and were evaluated as required. When contamination survey results were noted that exceeded set action levels, corrective actions were taken and the area re-surveyed to demonstrate that there was no longer any contamination present. The inspector noted that these quarterly surveys were often conducted every month which was more frequently than required.

(2) Postings and Notices

During tours of the facility, the inspector observed that caution signs, postings, and controls in the controlled areas were acceptable for the hazards involving radiation, high radiation, and contamination and were posted as required by 10 CFR Part 20, Subpart J. Through observations of and interviews with licensee staff, the inspector confirmed that personnel complied with the signs, postings, and controls. The facility's radioactive material storage areas were noted to be properly posted. No unmarked radioactive material was detected in the facility.

Copies of current notices to workers were posted in various areas in the facility. Radiological signs were typically posted at the entrances to controlled areas.

Other postings also characterized the industrial hygiene hazards that were present in the areas as well. During one facility tour, the inspector noted that the copy of NRC Form-3, "Notice to Employees," that was posted at the facility, as required by 10 CFR Part 19.11, was not the current version. This issue was brought to the attention of the licensee and a copy of the correct version was immediately retrieved from the Internet. The copy was then posted on the Bulletin Board by the main entrance to the Reactor Bay. Caution signs, postings, and controls for radiation areas were as required in 10 CFR Part 20.

(3) Dosimetry

The licensee used dosimetry that was supplied by a National Voluntary Laboratory Accreditation Program accredited vendor, Radiation Detection Company. The dosimetry was used to measure whole body and extremity exposures of facility personnel. Through direct observation, the inspector determined that dosimetry was acceptably used by facility personnel.

An examination of the records for the past two years, through April of 2006, showed that all whole body exposures were within NRC limits and within licensee action levels. Extremity monitoring, accomplished through the use of finger ring thermoluminescent dosimeters (TLDs), also showed doses to the hands of staff members which were within the established limits. The highest annual whole body exposure received by a single individual for 2004 was 3,270 millirem (mrem) deep dose equivalent (DDE). The highest annual extremity exposure for 2004 was 16,398 mrem shallow dose equivalent (SDE). The highest annual whole body exposure received by a single individual for 2005 was 1,825 mrem DDE and the highest annual extremity exposure for 2005 was 9,659 mrem SDE.

The inspector verified that NRC Form-5 reports had been completed and provided to each employee who had received exposure at the facility during 2004 and 2005.

(4) Radiation Monitoring Equipment

Examination of selected survey meters indicated that the instruments had the acceptable up-to-date calibration sticker attached. The instrument calibration records indicated calibration of portable survey meters was typically completed by licensee personnel and occasionally by a contractor. The inspector verified that portable instruments were being checked and calibrated quarterly as required by procedure. Calibration records were being maintained as required.

(5) Training

Training records showed that personnel were acceptably trained in radiation protection practices. Annual refresher training was provided to all staff members by the facility RSO. The most recent refresher training was completed March 31, 2006.

(6) Documentation of the Radiation Protection and ALARA Programs

The Radiation Protection Program was established and described in the ARRR Procedures Manual, Section VI, entitled "Radiological Safety Procedures," and in the ARRR Reactor Operator Training Manual, Volume 5, entitled "Radiological Safety." The program had not changed since the last inspection. The licensee reviewed the Radiation Protection Program at least annually in accordance with 10 CFR 20.1101(c). The last review, which was completed August 3, 2005, included all areas of the program and no weaknesses were reported. The ALARA Program was outlined in a licensee document entitled, "ALARA Program for Aerotest Operations, Inc." The latest review of the ALARA Program was also completed on August 3, 2005.

The licensee did not have or require a Respiratory Protection Program or Planned Special Exposure Program.

(7) Radiation Work Permit Program

Special Work Permits (SWPs) were required to be prepared for special operations typically performed by non-Aerotest maintenance and other support personnel performing who were required to work in radiation areas. The inspector verified that SWPs were being prepared and used in accordance with the requirements specified in the licensee's "Radiological Safety Procedures." The controls and safety precautions specified were appropriate for the work conducted under the SWPs.

(8) Facility Tours

As noted above, during a tour of the facility the inspector conducted a radiation survey of various offices, support areas, the Reactor Bay, and mezzanine area and compared the readings noted with those found by the licensee. The results detected by the inspector were comparable to those found by the licensee. No anomalies or discrepancies were noted.

c. Conclusions

The inspector determined that the Radiation Protection and ALARA Programs, as implemented by the licensee, satisfied regulatory requirements because: 1) surveys and associated checks were completed and documented acceptably to permit evaluation of the radiation hazards present; 2) postings met regulatory requirements; 3) personnel dosimetry was being worn as required and recorded doses were within the NRC's regulatory limits; 4) radiation survey and monitoring equipment was being maintained and calibrated as required; and 5) radiation protection training was being conducted for facility personnel.

5. Effluent and Environmental Monitoring

a. Inspection Scope (IP 69001)

The inspector reviewed the following to verify compliance with the requirements of 10 CFR Part 20 and TS Sections 3.1, 7.2, and 7.3:

- C Air Filter Paper Counting Sheets for the past two years
- C environmental dosimetry records for the past two years
- C Radioactive Liquid Waste Holding Tank release records
- C selected ARRR Operations Log Sheets for the past two years
- C Section VI of the ARRR Procedures Manual entitled, "Radiological Safety Procedures," PCN No. 3, RSC approval dated April 29, 1996, and last reviewed May 15, 2006, outlining the licensee's environmental monitoring program

b. Observation and Findings

The inspector reviewed the calibration records of the area, water, and stack monitoring systems. These systems had been calibrated semiannually in accordance with procedure. The inspector also reviewed the records documenting liquid and airborne releases to the environment for the past two years. Gaseous releases were monitored as required by TS. The results indicated that the releases were within 10 CFR, Appendix B, Table 2 concentrations, and TS limits. To demonstrate compliance with the annual dose constraints of 10 CFR 20.1101(d), the licensee used the COMPLY computer code. The highest calculated dose that could be received by a member of the public as a result of gaseous emissions from reactor operations was 1.7 E-3 millirem per year (mr/yr) for 2004 and 1.4 E-3 mr/yr for 2005. These doses were well below the 10 mr/yr limit set in 10 CFR 20.1101(d).

The licensee had released one tank of wastewater from the Radioactive Liquid Waste Holding Tank during the past two years in accordance with procedure. The RSO reviewed and approved the release after analyses, which were reviewed and verified by the Central Contra Costa Sanitary District, State of California, indicated that the release met regulatory requirements for discharge into the sanitary sewer.

On-site and off-site gamma radiation monitoring was completed using environmental TLDs in accordance with the applicable procedures. The data indicated that there were no measurable doses above any regulatory limits. Through observation of the facility, the inspector did not identify any new potential release paths.

c. Conclusion

Effluent monitoring satisfied license and regulatory requirements and releases were within the specified regulatory and TS limits.

6. Transportation

a. Inspection Scope (IP 86740)

In order to verify compliance with the requirements of 10 CFR 71.5 for shipments of licensed material, the inspector reviewed the following:

- C shipping records for the facility
- C selected operations records from 2004 through the present
- C Training Log records documenting transportation safety training for facility personnel from 2004 to the present

The inspector also interviewed licensee personnel regarding shipments of radioactive material.

b. Observations and Findings

Staff interviews and record reviews showed that the licensee had not completed any radioactive material shipments since the last inspection. The inspector reviewed the licensee's program for transportation of radioactive material and determined that it was adequate. The inspector noted that three staff members had completed the training for shipping hazardous materials and one person had completed the "Shipping Dangerous Goods" training.

c. Conclusions

The program for transportation of radioactive materials satisfied NRC requirements.

7. Exit Interview

The inspection scope and results were summarized on June 8, 2006, with members of licensee management. The inspector described the areas inspected and discussed the inspection findings. No dissenting comments were received from the licensee. Although proprietary information was reviewed during the inspection, no such material is included in this report.

PARTIAL LIST OF PERSONS CONTACTED

Licensee Personnel

C. Bauman, Reactor Supervisor
A. Meren, Manager, Neutron Radiography
R. Tsukimura, President and Chief Operating Officer, Aerotest Operations, Inc.
S. Warren, Radiological Safety Officer and Manager, Quality Assurance

INSPECTION PROCEDURES USED

IP 69001 Class II Non-Power Reactors
IP 86740 Inspection of Transportation Activities

ITEMS OPENED, CLOSED, AND DISCUSSED

Opened

None

Closed

None

LIST OF ACRONYMS USED

ALARA	As low as reasonably achievable
ARRR	Aerotest Radiography and Research Reactor
10 CFR	Title 10 of the <i>Code of Federal Regulations</i>
DDE	Deep dose equivalent
IP	Inspection Procedure
kW	kilowatt
mr/yr	millirem per year
mrem	millirem
No.	Number
NRC	Nuclear Regulatory Commission
PCN	Procedure Change Notice
RSC	Reactor Safeguards Committee
RSO	Radiological Safety Officer
SDE	Shallow dose equivalent
SWP	Special Work Permit
TLD	Thermoluminescent dosimeter
TS	Technical Specification