

July 12, 2012

Ms. Sandra Warren, General Manager
Aerotest Operations, Inc.
3455 Fostoria Way
San Ramon, CA 94583

SUBJECT: AEROTEST OPERATIONS, INC. – NRC ROUTINE INSPECTION REPORT
NO. 50-228/2012-202

Dear Ms. Warren:

From June 12 to 14, 2012, the U.S. Nuclear Regulatory Commission (NRC or the Commission) completed an inspection at your Aerotest Radiography and Research Reactor facility (Inspection Report No. 50-228/2012-202). The enclosed report documents the inspection results, which were discussed on June 14, 2012, 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 Commission'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. No response to this letter is required.

In accordance with Title 10 of the *Code of Federal Regulations*, Section 2.390, "Public inspections, exemptions, and requests for withholding," 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 NRC's document system (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).

Should you have any questions concerning this inspection, please contact Craig Bassett at (301) 466-4495 or by electronic mail at Craig.Bassett@nrc.gov.

Sincerely,

/RA/

Gregory T. Bowman, Chief
Research and Test Reactors Oversight Branch
Division of Policy and Rulemaking
Office of Nuclear Reactor Regulation

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

Enclosure: NRC Inspection Report No. 50-228/2012-202
cc w/encl: See next page

Aerotest Operations, Inc.

Docket No. 50-228

cc w/encl:

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

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DATE	6/20/2012	7/10/2012	7/12/12

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

Docket No: 50-228

License No: R-98

Report No: 50-228/2012-202

Licensee: Aerotest Operations, Inc.

Facility: Aerotest Radiography and Research Reactor

Location: 3455 Fostoria Way
San Ramon, CA 94583

Dates: June 12-14, 2012

Inspector: Craig Bassett

Approved by: Gregory T. Bowman, Chief
Research and Test Reactors Oversight Branch
Division of Policy and Rulemaking
Office of Nuclear Reactor Regulation

EXECUTIVE SUMMARY

Aerotest Operations, Inc.
Aerotest Radiography and Research Reactor
Report No: 50-228/2012-202

The primary focus of this routine, announced inspection was the onsite review of selected aspects of the Aerotest Operations, Inc. (the licensee's) 250 kilowatt Class II research reactor safety program including: 1) organizational structure and staffing, 2) review and audit and design change functions, 3) procedures, 4) radiation protection, 5) environmental monitoring, and 6) transportation of radioactive material since the last U.S. Nuclear Regulatory Commission (NRC) inspection of these areas. The licensee's program was acceptably directed toward the protection of public health and safety, and in compliance with NRC requirements. No violations or deviations were identified.

Organizational Structure and Staffing

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

Review and Audit and Design Change Functions

- The Reactor Safeguards Committee conducted reviews and audits in compliance with the requirements specified in the Technical Specifications.
- No changes had been made at the facility since the last NRC inspection, but a process for design changes 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 Technical Specifications requirements.

Radiation Protection

- Surveys and associated checks were completed and documented acceptably to permit evaluation of the radiological conditions present in the facility.
- Notices and postings at the facility met the regulatory requirements.
- Personnel dosimetry was being worn and doses were within the regulatory limits.
- Radiation monitoring equipment was maintained and calibrated as required.
- Training was provided as required covering the topics outlined in Section 19.12 of Title 10 of the *Code of Federal Regulations*.

- 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 Technical Specifications limits.

Transportation of Radioactive Materials

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

REPORT DETAILS

Summary of Plant Status

Aerotest Operations, Inc. (Aerotest or the licensee) had ceased to operate the TRIGA Conversion research reactor on October 15, 2010. Prior to that time, the reactor had been operated for neutron radiography, to complete surveillance requirements, and for reactor operator training. During this inspection, the reactor remained shutdown and partially defueled.

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 the facility Technical Specifications (TS), Change Number (No.) 8, dated October 22, 1974, were met:

- Management and staff responsibilities
- Staffing for safe maintenance of the reactor facility
- Aerotest Operations, Inc. organizational structure
- Annual Summary of Changes, Tests, and Experiments at Aerotest Radiography and Research Reactor (ARRR) for the period from July 1, 2009, through June 30, 2010, issued July 15, 2010
- Annual Summary of Changes, Tests, and Experiments at Aerotest Radiography and Research Reactor (ARRR) for the period from July 1, 2010, through June 30, 2011, issued July 28, 2011

b. Observations and Findings

Through discussions with licensee representatives, the inspector determined that management responsibilities at the facility had not changed since the previous NRC inspection of radiation protection in May 2010 (NRC Inspection Report Number 50-228/2010-201). The inspector noted that the General Manager was the local official in charge of day-to-day operations at the facility. The Reactor Supervisor (who was also assigned the duties of the Reactor Operations Manager) retained direct control over, and overall responsibility for, management of the reactor as specified in the TS. The General Manager and the Reactor Supervisor reported to the President, Aerotest Operations, Inc.

Through review of records and discussions with licensee personnel, the inspector determined that the staffing at the facility had been cut because the facility was no longer in operation. All of the hourly personnel had been laid off and only the salaried personnel remained. The salaried employees were performing clean-up of the facility and were conducting maintenance and surveillance duties as required by the TS.

c. Conclusion

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

2. Review and Audit and Design Change 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 were being completed and that the design change functions, also outlined in TS Section 12.1.3, were completed:

- Reactor Safeguards Committee (RSC) Charter dated March 17, 1978
- RSC meeting minutes for November 2010 through the present
- Operations Request Forms – Numbers 11-711 through 11-718
- TS defined duties of the RSC, including the review and audit functions
- Section I of the ARRR Procedures Manual entitled, "Administrative Procedures," Procedure Change Notice (PCN) No. 2, RSC approval dated June 28, 1990, and last reviewed May 16, 2011

b. Observations and Findings

(1) Review and Audit Functions

The inspector reviewed the RSC meeting minutes from November 2010 through the present. The minutes showed that the RSC met annually as required and considered the types of topics outlined by the TS. The inspector determined that the review functions required by the TS were being completed by the RSC. Through records review the inspector noted that the RSC membership satisfied the TS requirements and Charter stipulations.

The inspector noted that two members of the RSC had completed annual unannounced audits of various aspects of the reactor facility operations and programs as stipulated in the TS. The audit for 2010 was completed on September 28, 2010, and the audit for 2011 was completed on August 1, 2011. 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 through interviews with licensee personnel, the inspector determined that no changes had been initiated and/or completed at the facility since the last NRC inspection.

The inspector verified that the licensee was aware that changes or modifications to the facility were required to be analyzed by the staff and the results of the analyses presented to the RSC. Following a review, the RSC would then approve them if the changes or modifications were determined to be acceptable.

c. Conclusion

Audits and reviews were being conducted acceptably by the RSC in accordance with the requirements specified in the TS. No changes had been made at the facility since the last inspection, but the process remained in place such 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 were met concerning written procedures:

- Procedure Approval Sheets
- PCN forms
- Section I of the ARRR Procedures Manual entitled, "Administrative Procedures," PCN No. 2, RSC approval dated June 28, 1990, and last reviewed May 16, 2011, which detailed the process used to review, revise, and approve all facility procedures
- Section IV of the ARRR Procedures Manual entitled, "Critical Assembly and Power Calibration Procedures," PCN No. 6A, dated December 12, 2011

b. Observations and Findings

The inspector verified that procedures had been developed and were available for reactor operations and were being implemented for radiation safety at the facility. Procedures were being reviewed biennially as required and revised as needed. The last review had been completed May 16, 2011. Procedure Approval Sheets were maintained and PCN forms were completed as required when changes were made. The inspector also noted that, when procedures were revised, the revisions were presented to the RSC for review and approval. The facility procedures were acceptable.

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 Title 10 of the *Code of Federal Regulations* (10 CFR) Part 20 and the requirements in TS Sections 6.2, 7.0, and 12.1.2:

- Special Work Permit - Numbers 2011-01 through 2011-05
- Dosimetry records for facility personnel for 2010 to the present
- Radiological signs and posting at the entrances to controlled or restricted areas
- Calibration and periodic check records for portable and fixed radiation monitoring instruments
- Training log records documenting radiological safety training for facility personnel from 2010 to the present
- Radiation protection and reactor surveillance and survey data from 2010 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
- Section VI of the ARRR Procedures Manual entitled, "Radiological Safety Procedures," PCN No. 3, RSC approval dated April 29, 1996, and last reviewed May 16, 2011
- Section VIII of the ARRR Procedures Manual entitled, "Maintenance Procedures," PCN No. 2, RSC approval dated January 14, 1993, and last reviewed May 16, 2011
- "ALARA and Radiation Protection Program for Aerotest Operations, Inc.," updated August 14, 2004, and last reviewed August 12, 2011

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 survey meter.

b. Observations and Findings

(1) Surveys

Radiation and contamination survey results indicated that licensed activities were being conducted in accordance with operating procedures. The results of the surveys were documented on the applicable forms and were evaluated as required. No recent surveys showed any contamination above established limits. In the past it was noted that, when contamination survey results indicated that set action levels had been exceeded, corrective actions were taken and the area(s) re-

surveyed to demonstrate that there was no longer any contamination present.

During the inspection the inspector accompanied the RSO on a tour of the facility and conducted a radiation survey. The radiation levels noted by the inspector, using an NRC survey meter, were similar to those detected by the licensee and documented on survey maps. No anomalies were noted.

(2) Postings and Notices

During tours of the facility, the inspector observed that caution signs, postings, and controls in the restricted or 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. Radiological signs were typically posted at the entrances to controlled areas.

Copies of current notices to workers were posted in various areas in the facility including the hallway in the reactor bay just outside the control room. Other postings also characterized the industrial hygiene hazards that were present in the areas as well. The inspector noted that the copies of NRC Form 3, "Notice to Employees," posted at the facility as required by 10 CFR 19.11, were the current version.

(3) Dosimetry

The inspector determined that the licensee used thermoluminescent dosimeters (TLDs) for whole body monitoring of beta and gamma radiation exposure (with an additional component to measure neutron radiation). The licensee also used TLD finger rings for extremity monitoring. The dosimetry was supplied and processed by Radiation Detection Company, a company that was a National Voluntary Laboratory Accreditation Program accredited vendor. An examination of the TLD results indicating radiological exposures at the facility for 2010 to the present showed that the highest occupational doses, as well as doses to the public, were within 10 CFR Part 20 limits.

The records showed that the highest annual whole body exposure received by a single individual for 2010 was 3,035 millirem (mr) deep dose equivalent (DDE). The highest annual extremity exposure for 2010 was 18,371 mr shallow dose equivalent (SDE) and the highest skin or other shallow dose was 3,083 mr SDE. The highest annual whole body exposure received by a single person for 2011 was 276 mr DDE. The highest annual extremity exposure for 2011 was 417 mr SDE and the highest skin or other shallow dose was 276 mr SDE. The highest annual whole body exposure received by a single person to date in 2012 was 28 mr DDE. The highest annual extremity exposure to date in 2012 was 18 mr SDE and the highest skin or other shallow dose was 28 mr SDE. The lower exposure levels in 2011 and 2012 were related to the fact that

the facility had ceased operations and currently no radiography work was being done.

The inspector verified that NRC Form 5, "Occupational Dose Record for Monitoring Period," had been completed and provided to each employee who had received exposure at the facility during 2010 and 2011.

(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 noted that the calibration of portable instruments was being verified quarterly as required by procedure. Calibration records were being maintained as required.

During the inspection the inspector observed the calibration facilities at the ARRR. The RSO explained the process for calibrating instruments at the facility. The inspector noted that proper precautions were required to ensure that doses could be maintained ALARA.

(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 session had been conducted on February 29, 2012. A review of the topics discussed during the training session indicated that the appropriate material had been covered. Each person completed and passed a quiz following the training.

(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 on August 12, 2011, included all areas of the program.

The ALARA Program was outlined in a licensee document entitled, "ALARA and Radiation Protection Program for Aerotest Operations, Inc." The program appeared to be adequate for the facility. The latest review of the ALARA Program was also completed on August 12, 2011.

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 who were required to work in radiation areas. The inspector noted that no SWPs had been issued in 2010. The SWPs that had been used in 2011 had been prepared and implemented 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 SWP. The SWPs dealt with work involving site characterization and fuel inspection.

(8) Facility Tours

The inspector toured the facility on various occasions and observed activities in offices, support areas, the reactor bay, and the mezzanine area. 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.

c. Conclusion

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 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:

- Air filter paper counting sheets for the past two years
- Environmental dosimetry records for the past two years
- Radioactive liquid waste holding tank release records
- Section VI of the ARRR Procedures Manual entitled, "Radiological Safety Procedures," PCN No. 3, RSC approval dated April 29, 1996, and last reviewed May 16, 2011, 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. Releases were monitored as required by TS and the amount of airborne Argon-41 released per year was calculated. The results indicated that the releases were within 10 CFR Part 20, Appendix B, Table 2 concentrations, and TS limits.

To demonstrate compliance with the annual dose constraints on air emissions of radioactive material to the environment stipulated by 10 CFR 20.1101(d), the licensee used the Environmental Protection Agency 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 1.4 E-2 millirem per year (mr/yr) for 2010 and 3.0 E-5 mr/yr for 2011. These doses were well below the 10 mr/yr limit set in 10 CFR 20.1101(d).

Through records review and interviews with licensee personnel, the inspector noted that the licensee had not released any liquid into the sanitary sewer system since 2009.

On-site and off-site gamma radiation monitoring were completed using environmental TLDs in accordance with the applicable procedures. These 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:

- Personnel training records
- Shipping records for the facility
- Selected operations records from 2010 through the present

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

b. Observations and Findings

Staff interviews and records 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 received the training for shipping radioactive material and/or dangerous goods. The most recent training was completed on July 22, 2011.

c. Conclusion

The program for transportation of radioactive materials satisfied NRC requirements.

7. Follow-up on Open Items

a. Inspection Scope

The inspector reviewed the licensee's actions taken in response to an Inspector Follow-up Item (IFI) identified during a previous inspection:

- Dosimetry records for facility personnel
- Selected operations records from 2010 through the present

b. Observation and Findings

IFI - 50-228/2010-201-01 – Follow-up on the licensee's corrective actions to instruct workers in the proper use of extremity dosimetry – finger rings.

During the inspection in May 2010, an issue was discussed with the positioning of workers' extremity monitoring devices, i.e., their finger rings. Workers at the facility were issued ring dosimeters that were used whenever they handled radioactive materials. The dosimeter consisted of a plastic ring containing one thermoluminescent chip enclosed in a protective cover. The dosimeter was intended to be worn on the finger closest to the source of the radiation, with the TLD chip facing the palm side of the hand. Through interviews with licensee personnel, it was noted that workers were wearing their ring dosimeter during work activities, but that sometimes the dosimeter was worn on the thumb or small finger because it would not fit properly on any of the other fingers. On occasion the rings were also being worn with the TLD chip facing the back of the hand. In this configuration, the dosimeter monitored the general area radiation in the vicinity of the hand rather than the dose to the hand. The licensee was cautioned that workers should be instructed to wear their extremity monitors – finger rings properly in order to provide an accurate assessment of the dose to the hands.

During this inspection the inspector reviewed the issue and the actions taken by the licensee in response. The issue had been discussed during a company meeting so that everyone was aware of the proper way to wear a finger ring dosimeter. The subject was subsequently added to the licensee's training program agenda. This issue is considered closed.

c. Conclusion

One IFI was reviewed and is considered closed.

8. Exit Interview

The inspection scope and results were summarized on June 14, 2012, with members of licensee management. The inspector described the areas inspected and discussed the inspection findings. The licensee acknowledged the results of the inspection. 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	Research and Development Manager and Senior Reactor Operator
A. Meren	Reactor Supervisor and Reactor Operations Manager
T. Richey	Neutron Radiography Manager
S. Warren	General Manager and Radiological Safety Officer

INSPECTION PROCEDURES USED

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

ITEMS OPENED, CLOSED, AND DISCUSSED

Opened

None

Closed

50-228/2010-201-01	IFI	Follow-up on the licensee's corrective actions to instruct workers in the proper use of extremity dosimetry – finger rings.
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LIST OF ACRONYMS USED

10 CFR	Title 10 of the <i>Code of Federal Regulations</i>
ALARA	As low as reasonably achievable
ARRR	Aerotest Radiography and Research Reactor
DDE	Deep dose equivalent
IP	Inspection Procedure
mr/yr	millirem per year
mr	millirem
No.	Number
NRC	U.S. 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