

U. S. NUCLEAR REGULATORY COMMISSION

REGION V

Report No. 50-228/82-02

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

Licensee: Aerotest Operations Incorporated

3455 Fostoria Way

San Ramon, California 94583

Facility Name: Aerotest Research Reactor Facility

Inspection at: San Ramon, California

Inspection conducted: August 30 and September 2, 1982

Inspector: *F. Wenslawski* 9/14/82  
for M. Cillis, Radiation Specialist Date Signed

Approved by: *F. A. Wenslawski* 9/14/82  
F. A. Wenslawski, Chief, Reactor Radiation Date Signed  
Protection Section

Approved by: *H. E. Book* 9/14/82  
H. E. Book, Chief, Radiological Safety Branch Date Signed

Summary:

Inspection on August 30 and September 2, 1982 (50-228/82-02)

Areas Inspected: Routine unannounced inspection of the radiation protection program including organization, personnel monitoring, posting and labeling, surveys, procedures, effluent releases, instrument calibration, audit of records/reports; emergency planning program; radioactive material transportation activities; and the environmental monitoring program. The inspection involved 16 hours of onsite inspection effort by one NRC inspector.

Results: Of the areas inspected, no items of noncompliance or deviations were identified.

## DETAILS

### 1. Persons Contacted

- \*R. Newacheck, President Aerotest Corporation
- \*R. Tsukimura, Radiation Safety Officer
- J. Haskins, Reactor Supervisor

Other members of the Aerotest staff.

\*Denotes those attending the exit interview.

### 2. Reactor Operations - General

- a. The Aerotest Research Reactor is a TRIGA pool type reactor with a fixed core and special facilities for neutron radiographic operations. The reactor normally operates at 200-250 KW power, averaging five hours of operation per day.

The facility expansion discussed in Region V Inspection Report 50-228/81-01 has been completed and shielding arrangement around the reactor has been modified since the previous inspection. The expansion and shielding modifications were accomplished as part of the licensee's efforts to reduce personnel exposure in its ALARA program.

- b. The organizational structure and personnel responsible for the organization, radiation protection program, and administration of Aerotest Operations remain substantially unchanged from that previously reported.

No items of noncompliance or deviations were identified.

### 3. Radiation Protection Program

#### a. Posting and Labeling

Posting and labeling practices at the facility were observed and found to be consistent with the requirements of 10 CFR 19.11 and 10 CFR 20.203.

#### b. Radioactive Waste

Reactor operations generate small quantities of low level activity solid and liquid wastes. The solid wastes are collected and transferred to a commercial waste contractor for ultimate disposal. Liquid wastes are collected in a storage holdup-tank and sampled prior to disposal. Disposal of liquids is via the sanitary sewer. The licensee obtains a monthly sample of the reactor pool water in addition to sampling of the storage tank. A review of the reactor pool water analysis records was conducted. As a matter of reference, the review did not disclose any liquid samples which

exceeded 10 CFR 20, Appendix B, Table II limits. The licensee also reported that no releases have been made from the liquid storage holdup tank since the last NRC inspection.

A review of waste disposal records also revealed that the licensee had not disposed of any solid or liquid radioactive waste since the last NRC inspection.

No items of noncompliance or deviations were identified.

c. Audit and Review Program

The inspector examined records and reports that were prepared by Reactor Safety Committee that is described in Section 12.1.3 of the Technical Specification (T.S.). The review disclosed that the five member committee had conducted periodic audits on three different occasions during 1982 as specified in Section 12.1.3.4 of the T.S.. The results of the audits were well documented. The audits included an in depth review of reactor operations, records and radiation protection program to determine compliance to the regulatory requirements.

The inspection also included the review of the committee's annual meeting minutes for 1981 and 1982.

No items of noncompliance or deviations were identified.

d. Surveys

Routine radiation, contamination and airborne surveys of Aerotest operations are performed by the licensee. Radiation and contamination surveys are performed on a monthly basis and airborne surveys are performed on a weekly basis. Additionally, the licensee conducts special surveys, such as for shipments of irradiated samples and whenever changes to the reactor shielding and/or operating parameters are made. The radiation surveys normally consist of beta-gamma and neutron measurements.

Survey records for the period of January 1981 through July 1982 were examined. The results of contamination and airborne particulate surveys revealed no activity above normal background levels. The aforementioned surveys also include the results of leak tests of calibration check sources which are checked for contamination on a quarterly basis. Radiation levels throughout the facility vary greatly. Results of the radiation survey are dependent upon the reactor power level, shielding conditions and the aperture opening of the neutron radiography beam. The results of survey records reviewed were slightly lower than those reported in paragraph 3.b of Region V IE Inspection Report

50-228/81-01. The decreases were attributable to the rearrangement of the reactor shielding. General radiation levels varied from less than 0.1 mrem/hr beta-gamma and 0.05 mrem/hr neutron to 80 mrem/hr beta-gamma and 40 mrem/hr neutron. The highest levels were within the reactor's shielding complex or at locations over the top of the reactor. Radiation levels measured during handling of irradiated samples ranged from 0.5 mrem/hr to 18 mrem/hr. The RSO indicated that the licensee was investigating the possibility of providing additional shielding over the reactor's top in an attempt to further reduce the radiation levels.

No items of noncompliance or deviations were identified.

e. Instrumentation

The licensee maintains a supply of fixed and portable radiation detection instruments for monitoring neutron, beta-gamma radiation levels and process and effluent monitoring equipment specified under sections 6 and 7 of the T.S..

The inspector observed the instruments during a tour of the facility and examined the licensee's records and operating logs to verify the calibrations and functional tests required by the T.S. are being accomplished.

The inspection disclosed that the licensee calibrates the portable beta gamma and neutron survey instruments specified in section 7.3 and 7.4 of the T.S., on a quarterly basis.

A fission product continuous radiation monitor which is attached to the process water cleanup system (demineralizer) provides readout in the control room. This instrument was observed operating during the inspector's tour. This monitor is set to annunciate an alarm if radiation levels exceed a pre-determined value (less than or equal to 20 mr/hr) to indicate the possibility of a fuel failure.

Two fixed area radiation monitors are installed in the control room and reactor room. The monitors are set to alarm whenever levels exceed 10 mrem/hr and serve both as an area radiation monitor and a criticality alarm. The monitor in the control room will annunciate through an automatic monitoring system to the San Ramon Fire Department and actuate a siren within the reactor building whenever the alarm point is exceeded. The inspector verified that the licensee was performing the monthly test of this monitor as required by section 7.1 of the T.S..

The inspector examined records associated with the calibration of the continuous gas monitor specified in section 7.2 of the T.S.. The examination revealed that calibration of the continuous gas monitor was checked at a quarterly frequency.

Although there are no applicable regulatory requirements governing the calibration of radiation monitoring instruments the RSO stated that the licensee has established a calibration program that is partially consistent with the guidelines described in ANSI N323-1978, "Radiation Protection Instrumentation Test and Calibration". The review of calibration records associated with the liquid, gas and area radiation monitors revealed the following:

- (1) The licensee could not verify whether or not the calibration sources are National Bureau of Standards (NBS) traceable or are Derived Standards as recommended in Section 5.1 of ANSI-N323-1978. The licensee implemented action during the inspection to verify if calibration sources are either a Derived Standard or NBS traceable.
- (2) The licensee does not maintain any records of a vendors initial calibration of the continuous gas monitor or fission product water monitor. The current practice for calibrating these monitors is solely with a Cesium-137 check source. The licensee is considering the possibility of checking the continuous gas monitor calibration with a known gas source.
- (3) Calibration procedures have not been developed.
- (4) Calibration records primarily consisted of the dates when the calibrations were performed. Data such as results of pre and post calibration, date of last battery replacement or maintenance records are not maintained.

The above matters were brought to the licensee's attention and the desirability for maintaining a calibration program that is consistent with the Industry Standards or ANSI-N323-1978 was emphasized at the exit interview.

f. Radiation Safety Procedures

The licensee's operations are accomplished in accordance with Standard Operating Procedures that are reviewed and approved in accordance with Section 12 of the T.S. No radiological related problems were identified in the review of the following procedures:

- . Administrative Procedures
- . Operating Procedures
- . Critical Experiments and Power Calibration Procedures
- . Security Procedures

- . Radiological Safety Procedures
- . Experiment Review and Approval
- . Maintenance

Also reviewed was the licensee's Emergency Procedures. The results of this review are discussed under Section 5 of this report.

No items of noncompliance or deviations were identified.

g. Personnel Monitoring

A review of the licensee's personnel monitoring program was conducted during the inspection. The program remains unchanged from that described in Section 3.e of Region V Inspection Report 50-228/81-01.

Personnel dosimetry records for calendar years 1981 and 1982 to date were examined. Recorded doses which include the neutron dose contribution discussed in Sections 3.e, 8 and 10 of inspection report 50-228/81-01 indicated that personnel exposures for 1982 ranged from minimum detectable to 1.41 Rem. Personnel exposures for 1981 did not exceed 3.0 Rem. The annual exposures when compared to previous years appeared to be lower. This was attributed to: (1) emphasis of the ALARA criterion; (2) rearrangement of the reactor shielding and (3) expansion into the new addition to the facility.

Discussions with the RSO indicated that personnel exposures are carefully reviewed for the purpose of identifying unusual trends. The RSO stated that he personally investigates and discusses any unusual trend identified with each employee.

No items of noncompliance or deviations were identified.

4. Transportation Activities

The licensee maintains current copies of Department of Transportation (DOT) 49 CFR Part 100-199, "Transportation" regulations for ensuring compliance to shipping requirements. The licensee's operations involve sample irradiations for outside organizations which are transferred as radioactive material. Records of transfers between the period March 1981 and August 1982 were examined. A total of 73 shipments were made during the period. The Radiation Safety Officer (RSO) verifies that the outside organization is authorized to receive radioactive materials. Copies

of outside organization authorizing documents and licenses are kept on file by the RSO. Radiation and contamination levels associated with the shipments were well within DOT regulatory limits. The inspection disclosed that no radioactive waste shipments were made since the previous inspection.

No items of noncompliance or deviations were identified.

5. Emergency Planning

The inspector reviewed the licensee's Emergency Planning procedure discussed in Section 3.f of this report. The review disclosed that the Emergency Plan was outdated. Discussions with the licensee revealed that they were aware that the Emergency Plan was obsolete; however, the licensee representative stated that the plan was in the process of being completely revised pursuant to 10 CFR 50.54(r) requirements. The revised plan which will be submitted to the NRC for approval is expected to be completed by mid October of 1982. The RSO stated that during the interim personnel have been instructed to the changes that have occurred and are constantly apprised of any new changes at daily meetings.

The inspection disclosed that the licensee maintains a close liaison with the San Ramon Fire Department. Fire Department personnel are provided with periodic tours of the Aerotest facilities.

The inspection also disclosed that the licensee periodically verifies the emergency call out list of telephone numbers.

The licensee utilizes an automatic emergency telephone dialing system for providing prompt notifications of off-site emergency response groups.

The inspection included observations of the licensee's emergency equipment specified in the plan. The dedicated equipment appeared to be adequate.

No items of noncompliance or deviations were identified.

6. Tour of Facility

The inspector and RSO conducted a tour of the licensee's facility. Independent measurements were obtained with a Model 36100 Keithly survey meter, Serial Number NRC 008917 due for calibration on August 1983. The inspector also conducted a contamination (swipe) survey of the licensee's facility during the tour. The swipes were analyzed on a NRC Nuclear Measurements Scaler Model PC-55. The swipes were analyzed for gross alpha and beta-gamma activity. The results of radiation surveys confirmed that the licensee's posting and labeling practices were consistent with 10 CFR 20 requirements. The results of contamination surveys did not reveal any levels above background.

No items of noncompliance or deviations were identified.

7. Environmental Monitoring

There are no T.S. requirements for an environmental monitoring program. The licensee has placed integrating radiation detectors (film badges) at two locations on the east and west perimeter fence. The badges are processed on a monthly schedule. The film badge results for 1981 and 1982 (to date) were reviewed and found to be within 10 CFR 20.105 limits. The maximum level noted for 1981 was 210 mrem. Discussions with the RSO disclosed that the licensee is considering the installation of badges on the north and south fence and decrease the frequency for processing the badges from monthly to quarterly.

Argon 41 releases are estimated from a calculation of reactor operations in which air or gas volumes might be activated. The licensee indicated that every effort is used to minimize Argon 41 production and the estimated releases are considered the maximum possible. These values are substantiated with the continuous gas monitor. Records of Argon 41 releases indicated releases for the year 1981 were less than 400 microcuries. A review of the reactor operating log for the period January 1982 through August 1982 revealed the continuous gas monitor daily readings only increased several counts per minute above normal background levels during reactor operations. This value is equivalent to approximately  $2E-10$  uCi/ml.

No items of noncompliance or deviations were identified.

8. Exit Interview

The inspector met with licensee representatives (denoted in Paragraph 1) at the conclusion of the inspection on September 2, 1982. The inspector summarized the scope and findings of the inspection. The licensee was informed that there were no apparent items of noncompliance or deviations.