

June 29,2006

Dr. John S. Bennion  
Reactor Supervisor  
Idaho State University  
P.O. Box 8060  
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SUBJECT: NRC INSPECTION REPORT NO. 50-284/2006-201

Dear Dr. Bennion:

This letter refers to the inspection conducted on June 13-15, 2006, at the Idaho State University Aerojet General Nucleonics-201M Research Reactor Laboratory. The inspection included a review of activities authorized for the facility. The enclosed report presents the results of that inspection.

Areas examined during the inspection are identified in the report. Within these areas, the inspection consisted of selective examinations of procedures and representative records, interviews with personnel, and observations of activities in progress. Based on the results of this inspection, no safety concerns or noncompliance with U.S. Nuclear Regulatory Commission (NRC) requirements were identified. No response to this letter is required.

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

Should you have any questions concerning this inspection, please contact Mr. Kevin M. Witt at 301-415-4075.

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. 50-284  
License No. R-110

Enclosure: NRC Inspection Report No. 50-284/2006-201

cc w/encl: See next page

Idaho State University

Docket No. 50-284

cc:

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

Docket No: 50-284

License No: R-110

Report No: 50-284/2006-201

Licensee: Idaho State University (ISU)

Facility: ISU Aerojet General Nucleonics-201M Research Reactor Laboratory

Location: Pocatello, Idaho

Dates: June 13-15, 2006

Inspector: Kevin M. Witt

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

### Idaho State University AGN-201M Research Reactor Laboratory NRC Inspection Report No.: 50-284/2006-201

The primary focus of this routine, announced inspection was the on-site review of selected aspects and activities since the last NRC inspection of the licensee's Class II non-power reactor safety programs including: organization and staffing, operations logs and records, procedures, operator requalification, surveillance and limiting conditions for operations, experiments, radiation protection program, design changes, committees, audits and reviews, emergency preparedness, maintenance logs and records, and fuel handling.

The licensee's programs were acceptably directed toward the protection of public health and safety and in compliance with NRC requirements.

#### Organization and Staffing

- The organization and staffing were consistent with Technical Specification (TS) requirements.

#### Operations Logs and Records

- Operational activities were consistent with applicable TS and procedural requirements.

#### Procedures

- Procedural control and implementation satisfied TS requirements.

#### Operator Requalification

- The licensee's requalification program was implemented satisfactorily, the program was up-to-date, and plan requirements were met. An Inspector Follow-up Item was issued to ensure that the licensee administers additional training to an individual who has not participated in the requalification program.

#### Surveillance and Limiting Conditions for Operation (LCOs)

- The licensee's program for completing surveillance inspections and LCO confirmations generally satisfied TS and licensee administrative controls.

#### Experiments

- The approval and control of experiments met TS and applicable regulatory requirements.

#### Radiation Protection Program

- Surveys were being completed and documented acceptably to permit evaluation of the radiation hazards present.

- Postings met the regulatory requirements specified in 10 CFR Parts 19 and 20.
- Personnel dosimetry was worn as required and doses were well within the licensee's procedural action levels and NRC's regulatory limits.
- Radiation monitoring equipment was maintained and calibrated as required.
- The Radiation Protection Program satisfied regulatory requirements.
- Effluent monitoring satisfied license and regulatory requirements and releases were within the specified regulatory and TS limits.

#### Design Changes

- Based on the records reviewed, the inspector determined that the licensee's design change program was being implemented as required.

#### Committees, Audits and Reviews

- Review and oversight functions required by the TSs were acceptably completed by the Reactor Safety Committee.

#### Emergency Preparedness

- The emergency preparedness program was conducted in accordance with the requirements stipulated in the Emergency Plan.

#### Maintenance Logs and Records

- Maintenance logs, records, and performance satisfied TS and procedure requirements. The inspector confirmed that a problem with the safety rod drive was of low safety significance.

#### Fuel Handling

- Fuel handling and control rod inspection activities were completed and documented as required by TS and facility procedures.

#### Follow-up on Previous Open Items

- The issue regarding the licensee's actions to modify the safety rod drive logic circuits to allow manual scrambling of the reactor was closed.
- The issue regarding the completion of the reactor console upgrade project remains open.
- The issue regarding the completion of the planned actions regarding the failure of the cladding capsule on Safety Rod 1 was closed.

## REPORT DETAILS

### Summary of Plant Status

The licensee's Idaho State University (ISU) Aerojet General Nucleonics-201M (AGN-201M) Research Reactor Laboratory, licensed to operate at a maximum steady-state thermal power of 5 Watts (W), continues to be operated in support of operator training, surveillance, and minor utilization. During the inspection, the reactor was operated at 1.5 W for the purpose of conducting two NRC operator licensing examinations. The licensee indicated that there has been no transportation of radioactive materials since the previous inspection.

### 1. Organization and Staffing

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

The inspector reviewed the following to verify compliance with the staffing requirements in Technical Specification (TS) Sections 6.1 and 6.2:

- organization and staffing
- qualifications
- management responsibilities
- administrative controls
- ISU AGN-201M Procedure, "General Operating Rules," Revision (Rev) 4, dated October 7, 1994
- ISU AGN-201M Operating Procedure (OP)-1, "AGN-201 Operating Procedure No. 1," Rev 3, dated April 26, 1994
- ISU AGN-201M OP-2, "AGN-201 Operating Procedure No. 2," Rev 3, dated April 26, 1994
- ISU AGN-201 Reactor Facility Master Log #2, dated from July 6, 2002, to April 19, 2005
- ISU AGN-201 Reactor Facility Master Log #3, dated from April 20, 2005, to present
- ISU AGN-201M Reactor Facility Annual Operating Report for Calendar Year 2003
- ISU AGN-201M Reactor Facility Annual Operating Report for Calendar Year 2004
- TS for the ISU AGN-201M Research Reactor Laboratory, Amendment No. 4, dated May 17, 1989

#### b. Observations and Findings

The ISU AGN-201M Research Reactor Laboratory organizational structure and the responsibilities of the reactor management and staff had not changed since the last inspection (see NRC Inspection Report No. 50-284/2004-202). Current licensed staff consisted of the Reactor Supervisor (RS) and one faculty member. All of the licensed staff are qualified Senior Reactor Operators (SROs).

The ISU staff's qualifications satisfied the training and experience requirements stipulated in the TS. The operations log and associated records confirmed that shift staffing met the minimum requirements for duty personnel. Review of

records verified that management responsibilities were administered as required by TS and applicable procedures. The annual reports summarized the required information and was issued at the frequency specified in TS Section 6.9.1. No special reports were submitted pursuant to TS Sections 6.9.2 or 6.9.3.

During the inspection, the NRC conducted a licensing examination for one Reactor Operator and one SRO that have been training at the facility for approximately one year. A separate report will be sent to the licensee and the candidates summarizing the results of the examination.

c. Conclusion

The organization and staffing were consistent with TS requirements.

**2. Operation Logs and Records**

a. Inspection Scope (IP 69001)

The inspector reviewed the following to ensure that selected records were maintained as required by TS Section 6.10:

- ISU AGN-201M Procedure, "General Operating Rules," Rev 4, dated October 7, 1994
- ISU AGN-201M OP-1, "AGN-201 Operating Procedure No. 1," Rev 3, dated April 26, 1994
- ISU AGN-201M OP-2, "AGN-201 Operating Procedure No. 2," Rev 3, dated April 26, 1994
- ISU AGN-201 Reactor Facility Master Log #2, dated from July 6, 2002, to April 19, 2005
- ISU AGN-201 Reactor Facility Master Log #3, dated from April 20, 2005, to present
- 2004 Annual Report for the AGN-201M Reactor for dates July 1, 2003, to June 30, 2004
- 2005 Annual Report for the AGN-201M Reactor for dates July 1, 2004, to June 30, 2005

b. Observations and Findings

The inspector verified that reactor operating characteristics, and other TS and procedure required entries, were recorded on the operations log. A review of the logs indicated that TS operational limits had not been exceeded. The information required for the startup checkout and the shutdown checklist are included in the operations log. Operations records confirmed that shift staffing met the minimum requirements for duty personnel. The inspector determined that reactor operations were carried out following written procedures and TS requirements.

Unintentional scrams that occurred during reactor operations were recorded in the master log. There were several scrams that had occurred during the



inspection period, all of which were caused by incidental noise in the safety channels. When a scram occurs, the root cause analysis is completed by the RS before the resumption of operations.

The inspector conducted observations of the reactor staff operating the reactor on June 12 and 13, 2006, and reviewed the master log and the operating logs. The inspector noted that the licensed operator and trainee on duty were knowledgeable and competent. Observation of operational activities also confirmed that reactor operations were carried out in accordance with written procedures and TS requirements.

c. Conclusions

Operational activities were consistent with applicable TS and procedural requirements.

**3. Procedures**

a. Inspection Scope (IP 69001)

The inspector reviewed the following to ensure that the requirements of TS Section 6.6 were being met concerning written procedures:

- administrative controls
- procedural implementation
- selected administrative and operations procedures
- records of changes and temporary deviations to procedures
- ISU AGN-201M Procedure, "General Operating Rules," Rev 4, dated October 7, 1994

b. Observations and Findings

The inspector determined that written procedures were available for the activities delineated in TS Section 6.6 and were approved by the RSC before they were implemented. The clarity and detail in the procedures was acceptable. Temporary procedures that do not change the intent of previously approved procedures and do not involve any unreviewed safety question may be employed upon approval by the RS. ISU reactor staff conducted TS activities in accordance with applicable procedures. The RS noted that names of specific individuals had been updated in the emergency plan and the physical security plan. The licensee also stated that there are going to be new procedures for the installation and implementation of a new reactor control system. The licensee stated that the new procedures will be completed before the reactor control system is tested.

c. Conclusions

Procedural control and implementation satisfied TS requirements.

#### 4. Operator Requalification

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

The inspector reviewed the following to verify compliance with the requirements in 10 CFR Part 55 and the Requalification Program:

- Reactor Operator Requalification Program for the ISU Reactor, Rev 2, dated August 17, 1995
- ISU Nuclear Engineering Laboratory Requalification Program Progress Checklist, Rev 2, dated August 17, 1995
- ISU AGN-201M Experimental Plan (EP)-2, "Operator Training," Rev 1, dated January 31, 1990
- ISU AGN-201 Reactor Facility Master Log #2, dated from July 6, 2002, to April 19, 2005
- ISU AGN-201 Reactor Facility Master Log #3, dated from April 20, 2005, to present
- Memorandum entitled, "Reactor Operator Decertification," dated February 23, 2005
- requalification training records for the last two requalification cycles
- operator active license status
- operator physical examination records
- reactivity manipulation records

##### b. Observations and Findings

The licensee's requalification program is described in the program submitted to the NRC. The inspector reviewed the requalification program records of the two SROs currently employed at the facility. The licensee indicated that one of the SROs has not participated in the requalification program recently and has not completed the most recent requalification cycle. The individual also did not complete the required biennial medical examination. The most recent medical examination was completed on July 8, 2003, which is a period of almost 36 months. The most recent written examination for the SRO was completed on June 20, 2003. The most recent operating examination for the SRO was completed on May 22, 2003. The RS has sent a letter to the individual stating that until certain actions are completed, the individual is classified as decertified. Due to the lack of participation of the other SRO in the requalification program, the RS has not been able to take or write the required annual written and operations examinations. The most recent written examination for the RS was completed on February 2, 2004, which was written by the reactor administrator. The most recent operating examination for the RS was completed on February 9, 2001. The requalification program states that the RS is exempt from the annual written examination.

According to Title 10 of the *Code of Federal Regulations* (10 CFR) 55.59(b), "Additional training. If the requirements of paragraphs (a) (1) and (2) of this section are not met, the Commission may require the licensee to complete additional training and to submit evidence to the Commission of successful

completion of this training before returning to licensed duties.” The licensee provided the inspector with a letter to the individual that summarizes the requirements the individual will have to complete before returning to licensed duties. The licensee stated that the individual will complete this program as soon as possible. This issue will be considered by the NRC as an Inspector Follow-up Item (IFI) and will be reviewed during the next inspection at the facility (IFI 50-284/2006-201-01).

The RS is responsible for the implementation of the requalification program and administers the written and operating examinations. The inspector verified that physical examinations of the RS was conducted biennially as required. The inspector also verified that the RS was reviewing the contents of all abnormal and emergency procedures on an annual basis. The number of hours in the facility performing licensed duties were recorded on the training records to ensure that all operators met the required minimum number of hours operating the reactor. The inspector confirmed that the requalification program was being administered to the minimum extent necessary to ensure that the RS continues to be thoroughly proficient in the operations of the reactor facility.

c. Conclusions

The licensee’s requalification program was implemented satisfactorily, the program was up-to-date, and plan requirements were met. An IFI was issued to ensure that the licensee administers additional training to an individual who has not participated in the requalification program.

**5. Surveillance and Limiting Conditions for Operation**

a. Inspection Scope (IP 69001)

The inspector reviewed the following to ensure that the surveillance requirements and limiting conditions for operation (LCOs) specified in TS Section 4.0 were met:

- ISU AGN-201M Surveillance Procedure (SP)-1, “Channel 1 Calibration,” Rev 0, dated January 31, 1990
- Completed ISU SP-1A forms, “SP-1 Checkoff Sheet,” dated May 30, 2006, June 10, 2005, and September 6, 2004
- ISU AGN-201M Procedure SP-2, “Channel 2 Calibration,” Rev 0, dated January 31, 1990
- ISU AGN-201M Procedure SP-3, “Channel 3 Calibration,” Rev 0, dated January 31, 1990
- Completed ISU SP-3A forms, “SP-3 Checkoff Sheet,” dated May 30, 2006, June 10, 2005, and September 6, 2004
- ISU AGN-201M Procedure SP-4, “Shield Water Level Calibration,” Rev 0, dated June 23, 1998
- ISU AGN-201M Procedure SP-5, “Shield Water Temperature Calibration,” Rev 0, dated June 23, 1998

- ISU AGN-201M Procedure SP-6, "Seismic Displacement Interlock Calibration," Rev 0, dated June 23, 1998
- ISU AGN-201M Maintenance Procedure (MP)-1, "AGN-201 Rod Maintenance Procedure," Rev 5, dated June 15, 1994
- Completed ISU MP-1 forms, "AGN-201 Rod Maintenance Procedure," dated August 10, 2005 and October 27, 2004
- ISU AGN-201 Reactor Facility Master Log #2, dated from July 6, 2002, to April 19, 2005
- ISU AGN-201 Reactor Facility Master Log #3, dated from April 20, 2005, to present

b. Observations and Findings

The inspector noted that daily, semiannual, and annual channel checks, tests, and/or calibrations for TS-required surveillance were completed as required. The LCO verifications were completed on schedule and in accordance with licensee procedures. All of the recorded results were within the TS and procedurally prescribed parameters. The records and logs were noted to be complete and were being maintained as required. The procedures for the surveillances provided clear and concise direction and control of reactor operational tests and surveillances.

The inspector observed the licensee complete the startup checkout form for TS required items on June 13, 2006. All of the items on the startup checkout form were carried out appropriately and the personnel conducting the tests did so in a safe and knowledgeable manner. The inspector verified that all of the checks conducted were in compliance with TS required values and parameters.

c. Conclusions

The licensee's program for completing surveillance inspections and LCO confirmations generally satisfied TS and licensee administrative controls.

**6. Experiments**

a. Inspection Scope (IP 69001)

The inspector reviewed selected aspects of the following to verify compliance with TS Section 3.3:

- Rules and Procedures Governing Isotope Production and Disposition (IPD)
- selected IPD Forms
- Isotope Production Logs
- experimental administrative controls and precautions
- approved reactor experiments documentation
- review and approval process for experiments

b. Observations and Findings

One of the experiments conducted at ISU is the infrequent irradiation of various materials. The most frequently used experimental facility is the glory hole position. Samples can be loaded and unloaded from the sample irradiation position while the reactor is at the desired power level. Samples that have been irradiated at ISU include various metal foils, fuel material, and detectors. Other experiments conducted at the ISU AGN-201M reactor facility include various reactor physics demonstrations. The RS approves all routine samples to be irradiated in accordance with the TS limitations. No new experiments had been initiated, reviewed, or approved since the previous inspection at the facility. If any new experiments were to be initiated, they would be reviewed and approved by the RSC. The inspector confirmed that all of the experiments conducted were in accordance with TS limits and procedural requirements.

c. Conclusions

The approval and control of experiments met TS and applicable regulatory requirements.

**7. Radiation Protection Program**

a. Inspection Scope (IP 69001)

The inspector reviewed the following to verify compliance with 10 CFR Part 19 and Part 20 and the applicable TS requirements:

- Memorandum of Understanding (MOU) Between the Idaho State University, College of Engineering (AGN-201 and Special Nuclear Materials Licenses) and the ISU Radiation Safety Committee/Technical Safety Office, Rev 4, dated January 7, 2003
- Reactor Full Power Surveys, dated February 23, 2005, and May 25, 2006
- quarterly dosimetry records for staff and students for 2004 through present
- quarterly dosimetry records for reactor room for 2004 through present
- Radiation Safety Manual (RSM) and Procedures, 3<sup>rd</sup> Revision, dated June 2000
- Review of Radiation Safety Program by the Chair of the ISU Radiation Safety Committee, dated November 23, 2004
- Joint Review of Radiation Safety Programs for Licensed Materials by the Radiation Safety Office and the Chair of the Radiation Safety Committee, dated December 23, 2005
- radiation protection training records
- instrument calibration records
- maintenance and calibration of radiation monitoring equipment
- organization and staffing
- radiological signs and posting

b. Observations and Findings

The Radiation Safety Officer applies the radiation protection program uniformly to the two licensed activities on campus (broad scope and the reactor) through the Technical Safety Office (TSO). The licensee's program for radiological health and safety related to the reactor license was evaluated during this inspection.

(1) Surveys

The inspector reviewed annual radiation and contamination surveys of the licensee's controlled areas while the reactor was at power in accordance with TS 4.4.c. The inspector also reviewed the licensee's radiation wipe surveys of the reactor facility. The results were documented on the appropriate forms, evaluated as required, and corrective actions taken when readings or results exceeded set action levels. The number and location of survey points was adequate to characterize the radiological conditions. Surveys by the TSO staff were conducted in accordance with the appropriate procedure and logged on the appropriate forms. No elevated readings were discovered.

(2) Postings and Notices

The inspector reviewed the postings required by 10 CFR Part 19 at the entrances to various controlled areas including the Reactor Bay and radioactive material storage areas. The postings were acceptable and indicated the radiation and contamination hazards present. The facility's radioactive material storage areas were noted to be properly posted. No unmarked radioactive material was found in the facility.

(3) Dosimetry

The licensee used a National Voluntary Laboratory Accreditation Program-accredited vendor, to process personnel dosimetry. Through direct observation, the inspector determined that dosimetry was used in an acceptable manner by facility personnel. For visitors to the facility, a direct read pocket dosimeter is issued to individuals for general tours. If radioactive materials are to be handled by the visitors to the facility, an Optically Stimulated Luminescence Dosimeter (OSLD) is issued to the individuals. Records indicate that no abnormal readings were obtained.

An examination of the records for the inspection period showed that all exposures were well within NRC limits and within licensee action levels. 14 individuals are currently monitored at the facility. All of the students and staff associated with the facility wear OSLD badges and received an annual deep dose exposure less than 70 millirem (mrem) for 2004 and 2005. The licensee investigates any dosimetry readings that indicate a quarterly exposure above 25 mrem for whole body. The inspector noted

that there was one incident where the RS received a quarterly exposure above this level, although the exposure was less than 100 mrem.

(4) Radiation Monitoring Equipment

The calibration verification of portable survey meters and friskers was completed by staff in the TSO. The fixed area radiation detector was also checked at the TSO using a Cs-137 source. The calibration records of portable survey meters and fixed radiation detectors in use at the facility were reviewed. Calibration frequency met the requirements established in TS 4.4.a while records were being maintained as required. The inspector observed that proper precautions are always used to maintain doses for calibrations as low as reasonably achievable (ALARA).

(5) Radiation Protection Program

The inspector verified that the radiation protection program was being reviewed annually as required. No issues related to the radiation protection program at ISU were identified in the review of the program.

The Radiation Safety Manual (RSM) requires that all personnel who work with radioactive materials receive training in radiation protection, policies, procedures, requirements, and the facilities prior to having unescorted access at the facility. The TSO is responsible for conducting the training and all of the training is typically conducted with the Health Physicists on staff at the TSO. A test is administered at the end of the training to verify that the individuals understood the material presented. Refresher training is required for all personnel on an annual basis. The training covered the topics required to be taught in 10 CFR Part 19 and the review of training materials and tests indicated that the staff were instructed on the appropriate subjects.

(6) Facility Tours

The inspector toured the reactor facility and the accompanying facilities. Control of radioactive material and control of access to radiation and high radiation areas were acceptable. The postings and signs for these areas were appropriate. The inspector also determined that there were no measurable releases of gaseous or liquid radioactive material from the reactor facility.

(7) Environmental Monitoring

The licensee ensures compliance with NRC regulations for environmental monitoring by ensuring that all doses at the site boundary are less than the dose limits specified in 10 CFR 20.1301. Several OSLDs are strategically placed in several locations around the perimeter of the Reactor Bay. Records for 2004 and 2005 indicate slightly elevated doses

that are generally below the applicable requirements. The licensee has stated that the levels measured outside of the facility are within the regulatory requirements. There were no liquid nor gaseous effluents discharged from the facility for 2004 and 2005.

c. Conclusions

The inspector determined that: (1) surveys were being completed and documented acceptably to permit evaluation of the radiation hazards present, (2) postings met the regulatory requirements specified in 10 CFR Parts 19 and 20, (3) personnel dosimetry was being worn as required and doses were well within the licensee's procedural action levels and NRC's regulatory limits, (4) radiation monitoring equipment was being maintained and calibrated as required, (5) the radiation protection program satisfied regulatory requirements, and (6) effluent monitoring satisfied license and regulatory requirements and releases were within the specified regulatory and TS limits.

**8. Design Changes**

a. Inspection Scope (IP 69001)

In order to verify that any modifications to the facility were consistent with 10 CFR 50.59, the inspector reviewed selected aspects of:

- facility design changes and records
- facility configuration and associated records

b. Observations and Findings

Through review of applicable records and interviews with licensee personnel, the inspector determined that no changes had been initiated and/or completed at the facility since the last NRC operations inspection. The licensee is currently in the process of constructing a new control console which should be implemented and installed and anticipates completion by the end of 2006. The licensee plans to complete a 10 CFR 50.59 review before the changes are implemented to ensure that the change will not require prior NRC approval. The inspector verified that changes or modifications to the facility would be analyzed by the staff, presented to and reviewed by the RSC, determined to be acceptable, and approved as required.

c. Conclusions

Based on the records reviewed, the inspector determined that the licensee's design change program was being implemented as required.



## 9. Committees, Audits, and Reviews

### a. Inspection Scope (IP 69001)

The inspector reviewed the following to ensure that the audits and reviews stipulated in TS Section 6.4 were being completed by the RSC:

- ISU RSC Charter, Rev 1, dated May 7, 1993
- RSC Member Roster, dated March 8, 2006
- Minutes of the ISU RSC, dated March 8, 2006, February 1, 2005, and February 3, 2004
- TS duties specified for the RSC including audit and review functions
- RSC Audit Performance, dated June 7, 2006
- audits and reviews completed by the RSC since July 2004 to present
- Audit of the Conformance of the ISU Reactor Facility to TSs, dated June 13, 2006, November 22, 2005, and July 28, 2004

### b. Observations and Findings

The RSC is defined in the TSs and the inspector verified that the committee is following all aspects of the requirements. The RSC had annual meetings and a quorum was always present as required. Review of the minutes indicated the RSC provided guidance, direction and oversight, and ensured suitable use of the reactor. The minutes provided an acceptable record of RSC review functions and of RSC safety oversight of reactor operations.

The RSC conducted audits of the items required by TS 6.4.3 during the annual meetings. Minor issues that were not safety related were noted in the audit reports and meeting minutes and the inspector observed that any safety related items were properly controlled. The inspector noted that there were no significant issues discovered and that the licensee took appropriate corrective actions in response to the audit findings. The inspector noted that the safety reviews and audits, and the associated findings, were acceptably detailed and that the licensee responded and took corrective actions as needed. The licensee maintains a list of required audits and the dates that the respective audits were completed. The inspector reviewed this list and determined that a majority of the audits were completed within the TS required time frame.

### c. Conclusions

Review and oversight functions required by the TSs were acceptably completed by the RSC.

## 10. Emergency Preparedness

### a. Scope (IP 69001)

The inspector reviewed selected aspects of:

- Emergency Plan (E-Plan) for the Nuclear Facility at Lillibridge Engineering Lab at ISU, Rev 5, dated April 26, 1994
- ISU AGN-201 Reactor Facility Emergency Notification Roster, dated April 12, 2006
- Memorandum to file entitled, "Synopsis and Critique of the 2005/2006 Emergency Drill Scenario: Unusual Situation at the Reactor Facility," dated March 10, 2006
- Memorandum to file entitled, "Synopsis and Critique of the 2004/2005 Emergency Drill Scenario: Unusual Situation at the Reactor Facility," dated May 30, 2005
- Memorandum to file entitled, "Synopsis and Critique of the 2003/2004 Emergency Drill Scenario: Unusual Situation at the Reactor Facility," dated March 12, 2004
- Memorandum to file entitled, "Training for On-Site Emergency Responders," dated February 11, 2006, and February 11, 2005
- Memorandum to file entitled, "Training for Pocatello Fire Department Personnel," dated April 1, 2005
- Test/Inventory of Emergency Equipment dated March 24, 2006 and May 31, 2005
- emergency response facilities, supplies, equipment, and instrumentation
- MOU with the City of Pocatello Police and Fire Departments, dated February 24, 2005
- MOU with the Idaho State Police, dated February 24, 2005
- MOU with the Portneuf Medical Center, dated February 24, 2005

b. Observations and Findings

The inspector reviewed the E-Plan in use at the ISU AGN-201M Research Reactor Laboratory and verified that the E-Plan was being properly implemented at the facility. The inspector reviewed the emergency facilities, instrumentation, and equipment and verified that the off-site emergency response equipment was as described in the E-Plan. The inspector verified that several MOUs had been established with the City of Pocatello Police and Fire Departments, the Idaho State Police, and the Portneuf Medical Center.

Through direct observation, records review, and interviews with emergency organization personnel, the inspector determined that they were capable to respond, and knowledgeable of the proper actions to take in case of an emergency. The facility staff is responsible for responding to an emergency during all hours and making initial assessment and corrective and protective actions. The responsibility and authority for directing and coordinating emergency response activities are assigned to the RS, acting as the emergency director. All facility personnel receive annual emergency response training. The inspector verified that the licensee has continually reviewed the E-Plan and conducted an inventory of the emergency response equipment. Emergency drills had been conducted annually as required by the E-Plan. The drills for 2004 and 2005 were both practical exercises and basically tested the notification and response of emergency personnel. Critiques were written and discussed following the drills to document any problems identified during the exercises.

The inspector visited the Portneuf Medical Center on June 14, 2006, and talked to the Emergency Preparedness Coordinator about the supplies and equipment at the hospital site that would be available in case of an emergency. The coordinator stated that designated individuals in the emergency room had radiation training and if additional support is needed, other support staff more familiar with treating radiologically contaminated individuals can respond. The inspector observed that there appeared to be a good working relationship between the licensee and the hospital. The Coordinator stated that the Portneuf Medical Center is also a secondary treatment facility for the Idaho National Laboratory complex, which is the site of a 250 MegaWatt test reactor. The inspector confirmed that the hospital was well prepared to handle a variety of injuries that could happen at the AGN-201M reactor facility.

c. Conclusions

The emergency preparedness program was conducted in accordance with the requirements stipulated in the E-Plan.

**11. Maintenance Logs and Records**

a. Inspection Scope (IP 69001)

To verify that the licensee was complying with the applicable regulations, the inspector reviewed selected aspects of:

- ISU AGN-201 Reactor Facility Master Log #2, dated from July 6, 2002, to April 19, 2005
- ISU AGN-201 Reactor Facility Master Log #3, dated from April 20, 2005, to present
- 2004 Annual Report for the AGN-201M Reactor for dates July 1, 2003, to June 30, 2004
- 2005 Annual Report for the AGN-201M Reactor for dates July 1, 2004, to June 30, 2005
- ISU AGN-201M Procedure MP-1, "AGN-201 Rod Maintenance Procedure," Rev 5, dated June 15, 1994

b. Observations and Findings

The inspector reviewed the maintenance records related to 2004 and 2005 scheduled and unscheduled preventive and corrective maintenance activities. Routine/preventive maintenance was controlled and documented in the master log. Annual maintenance is also performed on the control rods, which is documented on a separate check sheet. For all maintenance activities requiring a design change, the activity is reviewed by the Reactor Administrator and the RSC. These documents indicated that all maintenance activities were controlled and documented in accordance with the requirements in 10 CFR 50.59.

The inspector noted that the licensee was experiencing intermittent problems with the Safety Rod 1 (SR-1) drive lowering after a reactor scram. The inspector

observed this problem twice during reactor operations, once when the reactor was shutting down after operations and once during the startup checks. The inspector also noted that there were several entries in the master log for this same issue dating back to March 2006. The licensee plans to conduct routine surveillance for the control rods as prescribed in procedure MP-1. The licensee believes that this routine maintenance will correct the problem. The inspector confirmed that this maintenance issue was of low safety significance, since the problem does not affect the SR-1 fuel capsule's ability to immediately withdraw from the reactor upon receipt of a scram signal.

All maintenance of reactor systems were reviewed by the RS. Implementation of changes to equipment, systems, tests, or experiments are generally done by the staff at the facility. After all maintenance items are completed, system operational checks are performed to ensure the affected systems function before returning them to service. During a facility tour, the inspector noted that in general, Control Room and Reactor Room equipment was operational.

c. Conclusions

Maintenance logs, records, and performance satisfied TS and procedure requirements. The inspector confirmed that a problem with the SR-1 drive was of low safety significance.

**12. Fuel Handling**

a. Inspection Scope (IP 69001)

To verify that TS and procedural requirements were being met, the inspector reviewed selected aspects of:

- ISU AGN-201 Reactor Facility Master Log #2, dated from July 6, 2002, to April 19, 2005
- ISU AGN-201 Reactor Facility Master Log #3, dated from April 20, 2005, to present
- ISU AGN-201M Procedure MP-1, "AGN-201 Rod Maintenance Procedure," Rev 5, dated June 15, 1994
- fuel handling equipment and instrumentation
- fuel movement records

b. Observations and Findings

The licensee conducts control rod fuel movements for annual routine maintenance. The reactor core tank has not been opened since 1995 for fuel movements. The inspector determined that the licensee was maintaining the records of the control rod fuel movements that had been completed and verified that the movements were conducted and recorded in compliance with procedure. The inspector determined that the procedures and the controls specified for these operations were acceptable.

c. Conclusions

Fuel handling and control rod inspection activities were completed and documented as required by TS and facility procedures.

**13. Follow-up on Previous Open Items**

a. Inspection Scope (IP 69001)

The inspector reviewed the actions taken by the licensee following identification of three IFIs during previous inspections.

b. Observations and Findings

- (1) IFI 50-284/2001-201-02 - Follow-up on the licensee's actions to modify the safety rod drive logic circuits to allow manual scrambling of the reactor.

In September 1997, the licensee reported a problem concerning the failure of the SR-2 dashpot. The licensee took immediate corrective actions and committed to take further actions in the future. These additional corrective actions were to include: 1) replacing all existing dashpots with new units, 2) performing annual inspections of the control elements with particular emphasis on the end region of the capsule for any evidence of weld cracking or other signs of deterioration, and 3) modifying the safety rod drive logic circuits to allow the safety rods to be manually withdrawn at the conclusion of reactor operation instead of scrambling the reactor.

NRC Inspection Report No. 50-284/2001-201, dated August 9, 2001, addressed the situation. During that inspection, the inspector noted that progress had been made concerning the above noted corrective actions. More intensive inspections were being performed of the control rods to check for weld cracking or other signs of deterioration. The licensee had replaced the older dashpots and had fabricated new dashpots following a design that was developed for the AGNs at Texas A&M University and the University of New Mexico. The issue with the dashpots was resolved at the time of the inspection, however, the safety rod drive logic circuits have not been modified in the existing control console because this action is awaiting implementation of the console upgrade project that is still pending.

During this inspection, the inspector determined that the licensee was diligently working on the new control console and will install the new console when the NRC approves the licensee's submitted license renewal application. This issue is considered closed due to the existence of another IFI (#50-284/2001-201-03) tracking the same issue.

- (2) IFI 50-284/2001-201-03 - Follow-up on completion of the reactor console upgrade project.

During the September 1997 inspection, it was noted that an upgrade to the reactor console was being considered by the RSC. At that time it was thought that the upgrade would not constitute a unreviewed safety question. NRC Inspection Report No. 50-284/2001-201, dated August 9, 2001, addressed the situation. During that inspection, the inspector determined that the console upgrade has been reviewed extensively by the RSC and questions about its installation have been resolved. The inspector determined at that time that the reactor console upgrade project was still ongoing. The inspector communicated to the licensee that the NRC will follow the completion of this project and will review the installation, testing, and approval of the new console.

During this inspection, the inspector determined that the licensee was diligently working on the new control console and will install the new console when the NRC approves the licensee's submitted license renewal application and the system is ready to be installed. This issue will stay open until future inspections confirm that the system has been installed and verified to be working properly.

- (3) IFI 50-284/2004-201-01 - Follow-up on completion of the planned future actions regarding the failure of the cladding capsule on SR-1.

NRC Inspection Report No. 50-284/2004-202, dated August 12, 2004, outlined the situation. On May 25, 2004, the licensee initiated maintenance on the reactor control rod (CR) drive system as required by procedure MP-1. During the routine, scheduled inspection and maintenance, as SR-1 was being removed from the CR drive assembly (CRDA), it was discovered that the cladding of SR-1 had failed. Due to the failure, a small portion of the fuel contained within the CR was exposed. Upon recognizing the abnormal circumstance, the capsule was carefully removed from the CRDA and it was determined that the end cap had detached from the SR-1 cladding capsule and that it was resting on the armature plate of the CRDA. Approximately 1.5 centimeters (cm) of the 3.8-cm fuel disk was protruding from the end of the cladding capsule.

In a letter to the NRC dated July 16, 2004, the licensee outlined actions that were planned to minimize similar events. The licensee anticipates replacing the SR-1 capsule by loading the fuel from the existing CR into a spare unit obtained from Oregon State University. Future actions planned by the licensee also include: 1) Having the cladding analyzed to determine the probable cause of failure, 2) Implementing a more aggressive CR capsule inspection frequency - semiannual visual inspection, and 3) Implementing a new CR drive logic circuit for all the safety rods so that they can be manually withdrawn from the reactor at shutdown.

During this inspection, the inspector confirmed that the licensee had properly completed these checks and was intensively managing the issue to prevent future occurrences. This issue is considered closed.

c. Conclusions

The issue regarding the licensee's actions to modify the safety rod drive logic circuits to allow manual scrambling of the reactor was closed. The issue regarding the completion of the reactor console upgrade project remains open. The issue regarding the completion of the planned actions regarding the failure of the cladding capsule on SR-1 was closed.

**14. Exit Meeting**

The inspector presented the inspection results to licensee management at the conclusion of the inspection on June 15, 2006. The inspector discussed the findings for each area reviewed. The licensee acknowledged the findings and did not identify as proprietary any of the material provided to or reviewed by the inspector during the inspection.

## PARTIAL LIST OF PERSONS CONTACTED

### Licensee

M. Balzer, Assistant Radiation Safety Officer  
J. Bennion, Reactor Supervisor  
R. Brey, Radiation Safety Officer  
S. Chatterton, Director of Public Safety  
K. Hart, Test Engineer  
D. Montenegro, Research Assistant  
M. Vaughn, Reactor Safety Committee Member  
G. Vickers, Emergency Preparedness Coordinator, Portneuf Medical Center

## INSPECTION PROCEDURES USED

IP 69001 CLASS II NON-POWER REACTORS

## ITEMS OPENED, CLOSED, AND DISCUSSED

### OPENED:

50-284/2006-201-01 IFI Follow-up on the licensee's actions to requalify the SRO who has not participated in the requalification program.

### CLOSED:

50-284/2001-201-02 IFI Follow-up on the licensee's actions to modify the safety rod drive logic circuits to allow manual scrambling of the reactor.

50-284/2004-201-01 IFI Follow-up on completion of the planned future actions regarding the failure of the cladding capsule on SR-1.

### DISCUSSED:

50-284/2001-201-03 IFI Follow-up on completion of the reactor console upgrade project.

## LIST OF ACRONYMS USED

10 CFR	Title 10 of the <i>Code of Federal Regulations</i>
ADAMS	Agencywide Documents Access and Management System
AGN	Aerojet General Nucleonics
ALARA	As Low As Reasonably Achievable
CR	Control Rod
CRDA	Control Rod Drive Assembly
EP	Experimental Plan
IFI	Inspector Follow-up Item
IP	Inspection Procedure
IPD	Isotope Production and Disposition



ISU	Idaho State University
LCO	Limiting Condition for Operation
MREM	Millirem
MOU	Memorandum of Understanding
MP	Maintenance Procedure
NRC	Nuclear Regulatory Commission
OP	Operating Procedure
OSLD	Optically Stimulated Luminescence Dosimeter
Rev	Revision
RS	Reactor Supervisor
RSC	Reactor Safety Committee
RSM	Radiation Safety Manual
SP	Surveillance Procedure
SR	Safety Rod
SRO	Senior Reactor Operator
TS	Technical Specification
TSO	Technical Safety Office
W	Watts