IDAHO STATE UNIVERSITY

College of Engineering
Campus Box 8060
Pocatello, Idaho
83209-8060

June 30, 2003

Document Control Desk
U.S. Nuclear Regulatory Commission
Washington, D.C. 20555

Subject: Transmittal of Annual Facility Operating Report for 2002

Dear Madam/Sir:

Enclosed please find a copy of the Annual Operating Report for the Idaho State University AGN-201M Reactor, License No. R-110, Docket No. 50-284, for calendar year 2002. Submission of this report satisfies the requirements of AGN Technical Specification 6.9.1. A copy of this report has also been submitted to the Region IV Administrator, as required by the aforementioned technical specifications.

If you have any questions concerning the report, please call me at (208) 282-3351.

Sincerely,

John S. Bennion
Reactor Manager/Supervisor

Cc: Mr. Daniel E. Hughes, Project Manager
Non-Power Reactors and Decommissioning Project Directorate
Operating Reactor Improvements Program
Office of Nuclear Reactor Regulation

Phone: (208) 282-2902
FAX: (208) 282-4538
E-mail:
engineering@isu.edu

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Idaho State University
AGN-201M Reactor Facility
License R-110, Docket No. 50-284
Annual Operating Report for Calendar Year 2002

1. Narrative Summary.

A. Changes in Facility Design, Performance Characteristics, and Operating Procedures:

There were no changes in facility performance characteristics, and operating procedures relating to reactor safety during the reporting period.

B. Results of Major Surveillance Tests and Inspections:

(1) Channel tests performed on all safety channels and scram interlocks were found to be satisfactory and within specifications.

(2) Power and period calibrations were performed with satisfactory results.

(3) The shield water tank was inspected and no leaks or excessive corrosion were observed.

(4) The seismic displacement interlock was tested satisfactorily.

(5) (a) The control rod drive mechanisms were inspected and tested with satisfactory results.

(b) Ejection times were measured for all scrammable rods and found to be less than 130 milliseconds.

(c) Control element capsules (cladding) were inspected and found to be in good condition with no evidence of deterioration since last inspection.

(d) The reactivity worths of all safety and control rods were measured, as well as the time required to drive each rod to its fully inserted position. Reactivity insertion rates were determined to be less than 0.033% $\Delta k/k\ s^{-1}$ ($0.045 s^{-1}) for each of the safety and control rods.

(e) The shutdown margin was determined to be greater than 1.48% $\Delta k/k$ ($2.00) with both the most reactive scrammable rod and the fine control rod fully inserted.

(f) All surveillances were within the appropriate Technical Specification requirements.

2. Operating History and Energy Output.

The reactor was operated at power levels up to approximately 4.0 watts for a total of 39.6 hours thereby generating 0.545 watt-days (13.1 watt-hours) of thermal energy during this reporting period. A summary of monthly operations for 2002 is given in Table I.

Table I. Summary of Monthly Reactor Operations
(1 January 2002 through 31 December 2002)

Month	Hours	Energy (W-hr)
January	0.0	0.01
February	8.5	1.41
March	16.5	0.02
April	7.1	9.30
May	4.1	0.01
June	0.0	0.00
July	0.0	0.00
August	0.0	0.00
September	0.0	0.00
October	0.0	0.00
November	0.0	0.00
December	3.1	2.34
Total	39.6 hr	13.1 W-hr

3. A. Unscheduled Shutdowns and Corrective Actions Taken.

None.

B. Inadvertent Scrams and Action Taken.

There were 31 inadvertent scrams during the reporting period. Most were caused by voltage fluctuations in the building power to the reactor resulting in trips of the scram circuits. A summary of the scrams, including date and time, cause (where indicated), and action taken, is given below.

2/1/02 - 12:01: Channel No. 1 low-level trip due to suspected voltage fluctuation. Restart.

2/1/02 - 12:11: Channel No. 1 low-level trip due to loss of signal read by Channel No. 1 rate meter. Rate meter was replaced with a spare unit, verified to be operational and the reactor was restarted.

2/15/02 - 10:50: Channel No.1 high-level trip due to switching error by operator. Restart.

2/23/02 - 10:08: No scram indication, suspected power fluctuation. Restart.

2/23/02 - 10:10: Channel No.3 high-level trip due to power fluctuation. Restart.

2/23/02 - 10:15: No scram indication, suspected power fluctuation. Restart.

3/1/02 - 10:43: Channel No.1 low-level trip due to low neutron flux. Reinsert neutron source and restart..

3/1/02 - 11:48: Channel No.1 high-level trip due to switching error by operator. Restart.

3/1/02 - 12:22: No scram indication, suspected power fluctuation. Restart

3/8/02 - 10:08: Channel No.3 high-level trip due to power fluctuation. Restart.

3/15/02 - 11:06: Channel No.3 low-level trip due to power fluctuation. Restart.

3/15/02 - 12:44: Channel No.3 low-level trip due to power fluctuation. Restart.

3/15/02 - 12:47: Channel No.3 low-level trip due to power fluctuation. Restart.

3/15/02 - 12:51: Channel No.3 low-level trip due to power fluctuation. Restart.

3/15/02 - 13:46: Channel No.3 low-level trip due to power fluctuation. Restart.

3/15/02 - 13:48: Channel No.3 low-level trip due to power fluctuation. Restart.

3/16/02 - 12:40: Channel No.3 low-level trip due to power fluctuation. Restart.

3/16/02 - 13:33: Channel No.3 low-level trip due to power fluctuation. Restart.

3/29/02 - 10:02: No scram indication, suspected power fluctuation. Restart.

3/29/02 - 10:48: No scram indication, suspected power fluctuation. Restart.

5/4/02 - 12:13: Channel No.3 high-level trip due to switching error by operator. Restart.

5/4/02 - 12:39: Channel No.1 low-level trip due to low neutron flux. Reinsert neutron source and restart.

5/4/02 - 12:53: Channel No.3 high-level trip due to power fluctuation. Restart.

5/4/02 - 13:13: Channel No.3 high-level trip due to power fluctuation. Restart.

5/7/02 - 19:19: Channel No.3 high-level trip due to power fluctuation. Restart.

5/7/02 - 19:23: Channel No.3 high-level trip due to power fluctuation. Restart.

12/30/02 - 14:55: Channel No.2 high-level trip due to drift of high-level trip point. Restart and operate at lower power level.

12/30/02 - 15:03: Channel No.2 high-level trip due to drift of high-level trip point. Restart and operate at lower power level.

12/30/02 - 15:08: Channel No.1 low-level trip due to low neutron flux. Reinsert neutron source and restart.

12/30/02 - 15:17: Channel No.3 high-level trip due to switching error by operator. Restart.

12/30/02 - 15:27: Channel No.3 low-level trip due to switching error by operator. Restart.

4. Safety-Related Corrective Maintenance

1/22/02: The Channel No. 2 amplifier was found to have blown a fuse. The fuse and the GY6GA(V13) and 6BW4 (V12) vacuum tubes were replaced. The amplifier was returned to service.

2/1/02: Replaced the Channel No. 1 rate meter with a spare unit because of loss of displayed signal during power ascension. The rate meter was taken to Royce Martin, an electronics technician, for trouble-shooting and repair.

2/15/02: Replaced the 1.5-V N reference cell in the Channel No. 2 amplifier.

3/27/02: The Channel No. 2 recorder was removed and taken to Royce Martin, for trouble-shooting and repair.

6/17/02: The Channel No. 2 amplifier was found to have blown a fuse. The fuse and the 6BW4 (V12) vacuum tube were replaced. The amplifier was returned to service.

7/5/02: A routine inspection of the safety and control rods was performed to closely examine the control elements and pneumatic dashpots for any signs of deterioration. All control elements were found to be in good condition with no indication of degradation since the previous inspection. The dashpots were also found in excellent condition.

7/8/02: A 10.6-Ω resistor was replaced in the Channel No. 2 recorder.

11/26/02: The Channel No. 2 amplifier was found to have blown a fuse. The fuse and the 6BW4 (V12) vacuum tube were replaced. The amplifier was returned to service.

12/27/02: The rubber pads attached to the strike plate on all dashpots were removed, cleaned, and then reattached using epoxy cement and returned to service after the cement had cured.

12/27/02: The Channel No. 2 amplifier was found to have blown a fuse. Trouble-shooting revealed a failed 100 μF power supply capacitor (C201) and diode (D105) in the Keithley amplifier. These components were replaced and the amplifier was returned to service.

5. Modifications.

A. Changes in Facility Design.

There were no changes to the facility design to the extent that changed a description of the facility in the application for license and amendments thereto during 2002.

B. Changes to Procedures.

None.

C. Experiments.

No new or untried experiments or tests were performed during 2002.

D. Reactor Safety Committee.

As of the end of the reporting period, membership of the Reactor Safety Committee (RSC) consisted of the following individuals:

Frank H. Just - Chair
Jay F. Kunze - Dean, College of Engineering and Reactor Administrator
John S. Bennion - Reactor Manager/Supervisor
Thomas F. Gesell - Radiation Safety Officer
Robert Boston
Richard R. Brey
Todd Gansauge
Chad Pope
Michael E. Vaughan

6. Summary of Changes Reportable under 10 CFR 50.59.

None.

7. Radioactive Effluents.

A. Liquid Waste - Total Activity Released: None.

B. Gaseous Waste - Total Estimated Activity Released: 0.29 μCi (Ar-41).

The AGN-201 Reactor was operated for 39.6 hours at power levels up to approximately 4.0 watts. At this power level Ar-41 production is negligible and substantially below the effluent concentration limit given in 10 CFR 20 Appendix B, Table 2. The total activity of Ar-41 released to the environment was conservatively estimated at 0.29 μCi. This activity corresponds to the total activity of all gaseous radioactive effluent from the facility. A monthly summary of gaseous releases is given in Table II.

C. Solid Waste - Total Activity: None.

Table II. Summary of Monthly Gaseous Radioactive Effluent Releases
(1 January 2002 through 31 December 2002)

Month	Ar-41 (μCi)
January	0.000
February	0.031
March	0.001
April	0.203
May	0.000
June	0.000
July	0.000
August	0.000
September	0.000
October	0.000
November	0.000
December	0.051
Total activity:	0.286 μCi

9. Radiation Exposures.

Personnel radiation exposures are reviewed quarterly by the Radiation Safety Officer. Annual reports of ionizing radiation doses are provided by the Radiation Safety Officer to all monitored personnel as required under the provisions of 10 CFR 19.

Personnel with duties in the reactor laboratory on either a regular or occasional basis have been issued radiation dosimeters by the Idaho State University Technical Safety Office. The duty category and monitoring period of personnel are summarized in Table III:

Table III. Personnel Monitored for Exposure to Ionizing Radiation

Name	Monitoring Period	Duty Category
John S. Bennion	1/1/02 - 12/31/02	Regular
Carl Friesen	1/1/02 - 6/30/02	Occasional
Todd Gansauge	1/1/02 - 12/31/02	Regular
Jay F. Kunze	1/1/02 - 12/31/02	Occasional
Scott O'Connor	1/1/02 - 9/30/02	Occasional
Charles Taylor	1/1/02 - 6/30/02	Occasional
Jason Wharton	1/1/02 - 6/30/02	Occasional

Dose Equivalent summary for Reporting Period:

Measured Doses

1/1/02 - 12/31/02 Whole-Body Dose Equivalent: <100 mrem for all personnel.
Minimum Detectable Dose Equivalent per Quarterly Badge = 10 mrem.

None of the 222 visitors to the facility during calendar year 2002 received a measurable dose. Therefore, the average and maximum doses are all well within NRC guidelines. A summary of whole-body dose equivalent for facility personnel is presented in Table IV.

Table IV. Summary of Whole-Body Dose Equivalent
(1 January 2002 through 31 December 2002)

Estimated whole-body dose equivalent range (rem):	Number of individuals in each range:
No Measurable Dose	5
Less than 0.10	2
0.10 to 0.25	0
0.25 to 0.50	0
0.50 to 0.75	0
0.75 to 1.00	0
1.00 to 2.00	0
2.00 to 3.00	0
3.00 to 4.00	0
4.00 to 5.00	0
Greater than 5 rem	0
Total number of individuals reported:	7

Report prepared by: John S. Bennion, Reactor Manager/Supervisor