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~~Mail Stop 848~~
Washington, D.C. 20555

Docket # 50-284-

Dear Mr. ^{*Weiss*}~~Thomas~~

Attached is the Annual Operating Report for the Idaho State University AGN-201 Nuclear Reactor, License R-110, Docket No. 50-284, for the calendar year 1989.

Respectfully submitted,

David Levinskas
Reactor Supervisor

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cc: V. Charyulu, Dean, College of Engineering
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c/o Document Management Branch
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ANNUAL OPERATING REPORT
FOR 1989

1. Brief Narrative of Changes

- a. There were no changes to the facility design, performance characteristics or operating procedures relating to reactor safety during this reporting period.
- b. Results of major surveillance tests and inspections.
 - 1) Channel tests on all safety channels were performed and all scram interlocks were tested and found to be satisfactory and within specification.
 - 2) Power and period calibrations were performed with satisfactory results.
 - 3) The shield tank was inspected and no leaks or excessive corrosion were noted.
 - 4)
 - a) The control rod drive mechanisms were inspected and tested with satisfactory results.
 - b) Scram times were measured and found to be less than 130 milliseconds.
 - c) Control and safety rod worths and run up times were measured; from these values the reactivity insertion rate was determined to be less than 0.045% per second for any rod.
 - d) The shutdown margin was determined to be greater than 2.1% with the most reactive rod fully inserted.

2. The total operating time for the reactor during 1989 was nearly 102 hours with a total thermal energy output of approximately 110 watt-hours. The monthly breakdown of operation time follows:

<u>Month</u>	<u>Hours</u>	<u>Month</u>	<u>Hours</u>
January	13.7	July	0.8
February	14.9	August	5.0
March	11.9	September	11.8
April	11.4	October	12.9
May	5.3	November	11.8
June	0.5	December	1.6

3. Unscheduled shutdowns

Planned startups were delayed on three occasions (3/1, 4/12 & 6/27) due to weak and/or burned out tubes in channel 2.

4. Safety related maintenance included the following:

- a. Replacement of various tubes in channel 2

5. Changes to the Facility

- a. There have been no changes to the facility as described in the application for license.
- b. A movable graphite plug was installed in an access port replacing an existing stationary graphite plug. Three small fuel disks were added to the top polyethylene disk in the core. The total amount of fuel material added was 59.62 gm. The fuel addition changed the amount of U-235 in the core from 670.24 gm to 672.93 gm.

The reactivity change associated with the graphite plug installation was measured and found to be $-0.09\% \Delta k/k$. The reactivity change associated with the fuel addition was measured and found to be $+0.10\% \Delta k/k$. The net change in the excess reactivity of the reactor was $+0.01\% \Delta k/k$.

- c. No new or untried experiments or tests were performed during the reporting period.

6. Summary of Safety Evaluations

The addition of 3 small fuel disks to the core was calculated to produce a reactivity change of not greater than $+0.12\% \Delta k/k$. Thus, the expected excess reactivity of the reactor after the fuel addition was estimated to be less than $0.45\% \Delta k/k$, which would not exceed the technical specification of $+0.65\% \Delta k/k$.

The installation of the movable graphite plug was expected to result in a reactivity change of $-0.13\% \Delta k/k$. The Reactor Safety Committee found that no unresolved safety issues existed for either change and authorized procedures to install the graphite plug first and then perform the fuel addition.

- 7. No radioactive effluents were released or discharged to the environment during 1989.
- 8. No person using the facility received a whole body exposure of greater than 50 millirem during 1989.
- 9. Neutron and beta/gamma radiation surveys performed on the exterior walls of the facility indicated that maximum combined contact radiation levels were less than 2 mrem/hr.