

ANNUAL OPERATIONS REPORT
of the
TEXAS A&M UNIVERSITY AGN-201M TRAINING REACTOR

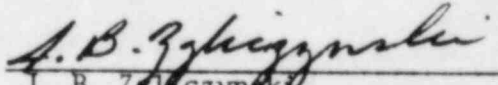
NRC LICENSE R-23
June 1, 1978 - May 31, 1979

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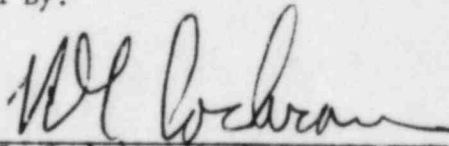
ANNUAL OPERATIONS REPORT
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TEXAS A&M UNIVERSITY AGN-201M TRAINING REACTOR

NRC LICENSE R-23
June 1, 1978 - May 31, 1979

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1. SUMMARY

This report details the pertinent activities related to the Texas A&M University AGN-201M training reactor facility operated by the Department of Nuclear Engineering during the period June 1, 1978 to May 31, 1979. Furthermore, it is intended that the contents of this report comply with the requirements of 10 CFR 50, Section 50.59 (b) and Appendix A, Technical Specifications, of NRC license R-23.

The utilization of this facility continues to be similar to that of previous years. The general categories of utilization for this past year were support of Nuclear Engineering courses, operator training, and preventive maintenance. Nuclear Engineering courses supported during the past year were:

- NE 402 Nuclear Detection and Isotope Technology Laboratory
- NE 405 Nuclear Engineering Experiments
- NE 485 Problems
- NE 679 Practical Applications of Radiological Safety I

Several modifications of facility hardware were made during this reporting period to improve system performance. These modifications are described in detail in Section 5.(a.). None of the modifications performed change the facility description or performance as described in the safety analysis report or technical specifications.

During normal preventive maintenance, malfunctioning components were replaced as detailed in Section 4. Facility modifications and component replacement performed during this reporting period do not involve unreviewed safety questions and are not expected to adversely affect the safe operation of this facility.

The results of all major surveillance tests and inspections performed during this reporting period were nominal. A summary of various reactor parameter surveillance measurements are shown in Table I.

TABLE I. REACTOR PARAMETER SURVEILLANCE MEASUREMENTS

<u>Date</u>	<u>Parameter</u>	<u>Value</u>
2/8/79	Fine Control Rod Reactivity Worth	0.38% $\frac{\Delta k}{k}$
2/7/79	Coarse Control Rod Reactivity Worth	1.20% $\frac{\Delta k}{k}$
1/18/79	Coarse Control Rod Drop Time	140 msec
2/7/79	Safety Rod #1 Reactivity Worth	1.18% $\frac{\Delta k}{k}$
1/18/79	Safety Rod #1 Rod Drop Time	150 msec
2/7/79	Safety Rod #2 Reactivity Worth	1.18% $\frac{\Delta k}{k}$
1/18/79	Safety Rod #2 Rod Drop Time	140 msec
4/30/79	Total Excess Reactivity @20°C	0.34% $\frac{\Delta k}{k}$

2. OPERATIONAL SUMMARY

Utilization by Category:

(a) Support of Nuclear Engineering Courses	77.20 hrs.
(b) Operator Training	.98 hrs.
(c) Preventive Maintenance	16.73 hrs.

Total Operating Hours	<u>94.91</u>
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<u>Total Watt - Hours of Operation</u>	97.44 watt-hrs.
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<u>Average Power Level of Operation</u>	1.03 watts
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<u>Number of Reactor Startups</u>	114
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3. UNSCHEDULED SHUTDOWNS

<u>Date</u>	<u>Type</u>	<u>Cause</u>	<u>Corrective Action</u>
6/16/78	Period Scram	Signal Noise	<u>None</u>
6/16/78	Lost Magnet Current	Dirty Contacts on Shield Water Level Interlock	Cleaned Contacts
1/12/79	Lost Magnet Current	Dirty Contacts on Shield Water Level Interlock	Cleaned Contacts
2/13/79	Chan. #3 High Level Scram	Operator Error in Switching Meter Scales	None
2/16/79	Chan. #3 High Level Scram	Operator Error in Switching Meter Scales	None
2/28/79	Period Scram	Source Driven in at Subcritical Source Level	None
3/21/79	Chan. #3 High Level Scram	Operator Error in Switching Meter Scales	None

Summary

(a) Instrument Scrams	<u>4</u>
(b) Operator Error	<u>3</u>

Total Unscheduled Shutdowns 7

4. CORRECTIVE MAINTENANCE AND COMPONENT REPLACEMENT

Corrective maintenance and component replacement performed as normal maintenance of the Texas A&M University AGN-201M reactor and instrumentation during this reporting period are summarized as follows:

(a) 7/11/78 - Safety Rod #2 "rod up" and "engaged" microswitches found defective and were replaced during normal control rod inspection.

(b) 7/13/78 - Coarse Control Rod "carriage down" microswitch found defective and was replaced during normal control rod inspection.

(c) 7/20/78 - Coarse Control Rod drive switch noise suppression capacitor failed and was replaced.

(d) 7/24/78 - Channel #2, Log N Channel, vacuum tubes V-5, V-6, and V-14 replaced.

(e) 9/11/78 - Safety Rod #1 "rod down" microswitch found defective and was replaced.

(f) 12/24/78 - Channel #2, Log N Channel, chassis power transformer burned out. Subsequent investigation showed that a cathode to filament short in vacuum tube V-12 (6BW4) probably caused a high current in the chassis power transformer filament windings leading to overheating and burn out of the transformer. On 1/5/79 - vacuum tube V-12 and the chassis power transformer were replaced.

(g) 1/5/79 - Channel #2, Log N Channel, vacuum tubes V-4, V-5, V-6, V-11, V-13, V-14, and V-17, replaced.

(h) 1/12/79 - Shield Water Level Interlock float switch contacts cleaned and contact tension readjusted.

(i) 2/5/79 - Coarse Control Rod drive switch noise suppression capacitor failed and was replaced.

(j) 2/5/79 - Coarse Control Rod drive switch contacts were found pitted. Drive switch was rewired to use previously unused contacts on the switch. All noise suppression capacitors on all control rod drive switches were removed. No increase in switching noise was detectable after capacitor removal.

(k) 5/24/79 - Channel #1, Log Count Rate Channel, EG & G NIM bin power supply - 12 VDC output failed. EG & G NIM bin replaced with equivalent Tennelec NIM bin power supply.

The corrective maintenance and component replacement performed during this reporting period have no impact on the safe operation of the reactor facility and do not change the description of the facility as submitted in the license application and amendments thereto.

5. (a) REACTOR MODIFICATIONS

Modifications of the Texas A&M University AGN-201M reactor and instrumentation performed during this reporting period are detailed as follows:

(1) 6/27/78 - The original AGN 110 VDC control rod motor and 28 VDC control rod magnet power supplies were modified by replacing the original selenium stack rectifiers by solid state silicon diode rectifiers. Also large filter capacitors were added to the 110 VDC and 28 VDC outputs. All component changes were detailed on AGN drawing 2-000 474 - A as revised.

This modification was made to decrease ripple in the D.C. outputs and to modernize the D.C. power chassis. Tests of the power supply after modification showed significant ripple reduction and much better stability under load.

This modification was presented to the Reactor Safety Board on 9/18/78 and has no safety impact.

(2) 7/13/78 - The "rod up" microswitch mechanisms on Safety Rod #1, Safety Rod #2, and the Coarse Control Rod were modified to be activated by the microswitch roller cam rather than by compressing the whole microswitch activating lever. This modification was made to avoid unnecessary wear to the microswitch and to allow the microswitch to be activated earlier, thereby preventing the rod drive carriage from jamming into the mechanical stop. Tests of this modification showed that the microswitch mechanisms operated smoothly and that the rod drive carriages coasted gently against the stops.

This modification was presented to the Reactor Safety Board on 9/18/79

and has no safety impact.

(3) 10/17/78 - Leeds & Northrup recorder capillary pens replaced with disposable marker pens. This modification has no safety impact.

Reactor modifications performed during this reporting period have no impact on the safe operation of the reactor facility and do not change the description of the facility as submitted in the license application and amendments thereto.

5. (b) CHANGES TO PROCEDURES

No changes to procedures were made during this reporting period.

5. (c) NEW EXPERIMENTS OR TESTS

No new experiments or tests were performed during this reporting period.

6. SUMMARY OF SAFETY EVALUATIONS

No changes, tests, or experiments were performed subsequent to 10 CFR 50 paragraph 50.59, during this reporting period; therefore, no safety evaluations were required.

7. SUMMARY OF RADIOACTIVE EFFLUENT RELEASE

No liquid or solid radioactive waste was released during this reporting period.

8. ENVIRONMENTAL RADIOLOGICAL SURVEYS

No environmental radiological surveys were performed outside the facility during this reporting period.

9. RADIATION EXPOSURE

No reactor facility personnel or visitors received radiation exposures greater than 100 mrem (50 mrem for persons under 18 years of age) during this reporting period.

10. REACTOR SAFETY BOARD ACTIONS

9/11/78 - Dr. F. Sicilio of the Reactor Safety Board audited the AGN-201M Reactor Facility with particular attention to physical and administrative security. No discrepancies were found.

9/18/78 - The Reactor Safety Board approved the revised Technical Specifications for submittal to the NRC.

11. MISCELLANEOUS

The NRC Region IV Office of Inspection and Enforcement inspected the AGN-201M Reactor Facility on 11/7/78 with regard to physical and administrative security. No items of noncompliance were found.

The NRC Region IV office of Inspection and Enforcement made a general inspection of the AGN-201M Reactor Facility on 1/9/79 and 1/10/79. No items of noncompliance were found.

The AGN-201M reactor license, R-23, with revised Technical Specifications, was renewed by the NRC on 4/25/79 for a period of 20 years.