

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

NRC LICENSE R-23  
June 1, 1979 - May 31, 1980

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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, 1979 to May 31, 1980. 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:

- ENGR 101 Engineering Analysis
- NE 405 Nuclear Engineering Experiments
- 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>
2/22/80	Fine Control Rod Reactivity Worth	0.35% $\frac{\Delta k}{k}$
2/18/80	Coarse Control Rod Reactivity Worth	1.18 $\frac{\Delta k}{k}$
1/18/80	Coarse Control Rod Drop Time	140 msec
2/18/80	Safety Rod #1 Reactivity Worth	1.16% $\frac{\Delta k}{k}$
1/17/80	Safety Rod #1 Rod Drop Time	140 msec
2/18/80	Safety Rod #2 Reactivity Worth	1.16% $\frac{\Delta k}{k}$
1/17/80	Safety Rod #2 Rod Drop Time	150 msec
4/21/80	Total Excess Reactivity @20°C	0.29% $\frac{\Delta k}{k}$

## 2. OPERATIONAL SUMMARY

### Utilization by Category:

(a) Support of Nuclear Engineering Courses	61.93 hrs.
(b) Operator Training	.77 hrs.
(c) Preventive Maintenance	8.69 Hrs.
Total Operating Hours	<u>71.39 Hrs.</u>

<u>Total Watt - Hours of Operation</u>	61.24 watt-hrs.
<u>Average Power Level of Operation</u>	.86 watts
<u>Number of Reactor Startups</u>	102

## 3. UNSCHEDULED SHUTDOWNS

<u>Date</u>	<u>Type</u>	<u>Cause</u>	<u>Corrective Action</u>
8/1/79	Chan. #3 High Level Scram	Operator Error in Switching Meter Scales	None
2/5/80	Chan. #2 High Level Scram	Drift of Trip Setpoint to Lower Setting	Readjust Trip Setpoint
2/7/80	Lost Magnet Current	Dirty Contacts on Shield Water Level Interlock	Cleaned Contacts
2/7/80	Chan. #3 High Level Scram	Operator Error in Switching Meter Scales	None
2/7/80	Chan. #3 Low Level Interlock	Operator Error in Switching Meter Scales	None
2/8/80	Lost Magnet Current	Dirty contacts on Shield Water Level Interlock	Cleaned Contacts
2/8/80	Chan. #3 High Level Scram	Operator Error in Switching Meter Scales	None
2/12/80	Period Scram	Instrument Noise	None
2/12/80	Period Scram	Instrument Noise	None
2/13/80	Chan. #3 High Level Scram	Instrument Noise when Switching Meter Scales	None
2/19/80	Period Scram	Instrument Noise	None

Summary

(a) Instrument Scrams	7
(b) Operator Error	<u>4</u>
Total Unscheduled Shutdowns	11

## 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) 7/2/79 - Channel #2, Log N Channel, vacuum tubes V-4(6CB6), V-5(6CB6), and V-11 (6C4) replaced.
- (b) 7/5/79 - Channel #1, High voltage power supply failed. High voltage power supply replaced with equivalent unit.
- (c) 7/26/79 - Replaced "Rod Down" microswitches on safety rods #1 and #2 and coarse control rod with equivalent items.
- (d) 8/6/79 - Channel #1, Log count rate channel, high voltage power supply failed. High voltage power supply replaced with equivalent unit.
- (e) 8/6/79 - Channel #1, Log count rate channel, Hamner NB-14 Preamp replaced with equivalent item.
- (f) 9/13/79 - Channel #1, Log count rate channel, high voltage power supply failed. High voltage power supply replaced with equivalent unit.
- (g) 12/17/79 - Channel #1, log count rate channel, high voltage power supply failed and was repaired.
- (h) 1/14/80 - Channel #2 - Log N channel, vacuum tube V-11(6C4) replaced.
- (i) 2/1/80 - Fine control drive motor armature found to have lower than normal resistance. Replaced fine control rod drive motor with equivalent item.
- (j) 2/7/80 - Channel #1, Log count rate channel, high voltage power supply failed. High voltage power supply replaced with equivalent unit.
- (k) 2/7/80 - Channel #1, Log count rate channel,  $\text{BF}_3$  detector replaced with equivalent item.
- (l) 2/12/80 - Channel #1, Log count rate channel, high voltage power supply replaced with newer model unit.
- (m) 2/12/80 - Channel #1, Log count rate channel linear amplifier replaced with equivalent item.

- (n) 2/12/80 - Reworked shield water level switch contacts.
- (o) 4/21/80 - Channel #2, Log N channel, vacuum tubes V4 (6CB6), V5(6CB6), V7(6AV6), V10(12AU7), V14(12AX7), and V17(12AX7) replaced.
- (p) 5/2/80 - Channel #2, log N channel, vacuum tube V12(6BW4) replaced.

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) 7/26/79 - "Rod Down" microswitch mechanisms were modified to activate from the side of the control rod flange rather than from the bottom of the flange. This modification was designed to prevent control rod scram force from damaging the microswitches. This modification was reviewed and approved by the Reactor Safety Board on 7/23/79.
- (2) 3/10/80 - Added "on - off" switch to channel #1 audio output speaker.
- (3) 5/22/80 - Added 5 amp fuse to channel #2 Log N channel 6.3V filament circuit. This modification was designed to prevent filament transformer overheating in the event of tube filament short.

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

(1) Revised Preventive Maintenance Procedures were approved by the Reactor Safety Board on 10/16/79. These revised procedures provide much more detailed instructions for performing preventive maintenance.

(2) Revised Emergency Procedures were approved by the Reactor Safety Board on 3/7/80. These revised procedures comply with ANS 15.6 and NRC Regulatory Guide 2.6 guidelines.

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

- (a) Reactor Safety Board members performed periodic audits of the AGN-201M Reactor Facility on 6/19/79, 9/20/79, 12/20/79, and 3/27/80. No items of non-compliance were identified.
- (b) 7/23/79 - Reactor Safety Board approved "Rod Down" microswitch modification.
- (c) 10/16/79 - Reactor Safety Board approved revised AGN-201M Preventive Maintenance Procedures.
- (d) 1/30/80 - Reactor Safety Board reviewed AGN-201M Reactor Facility Security Plan.
- (e) 3/7/80 - Reactor Safety Board approved revised AGN-201M Reactor Facility Emergency Procedures.

## 11. MISCELLANEOUS

- (a) 8/9 - 8/10/79 - Mr. M.B. Weinstein of American Nuclear Insurers inspected the Texas A&M University AGN-201M Reactor Facility. No items of safety violation were identified.
- (b) 10/2 - 10/3/79 - Mr. B. Brock, Mr. Y. Kobosi, and Mr. A. Wieder inspected the Texas A&M University AGN-201M Reactor Facility for compliance with 10 CFR 70. No items of non-compliance were identified.
- (c) 3/5 - 3/6/80 - Mr. G. L. Constable, Mr. S.R. Dean, and Mr. J.W. Craig of the NRC Inspection and Enforcement staff performed a general inspection of the Texas A&M University AGN-201M Reactor Facility. No items of non-compliance were identified.