

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

NRC LICENSE R-23
JUNE 1, 1985 - MAY 31, 1986

DEPARTMENT OF NUCLEAR ENGINEERING
TEXAS A&M UNIVERSITY
College Station, Texas 77843

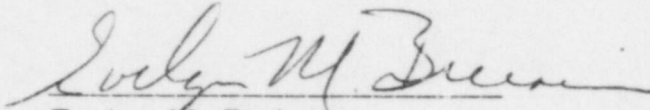
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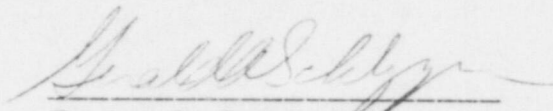
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Prepared by:



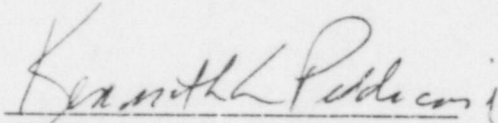
Evelyn M. Breiner
Reactor Operator

Reviewed by:



Gerald A. Schlapper
Acting Reactor Supervisor

Approved by:



Kenneth L. Peddicord, Head
Nuclear Engineering Dept.

DEPARTMENT OF NUCLEAR ENGINEERING

TEXAS A&M UNIVERSITY

College Station, Texas 77843

1. SUMMARY

This report details the pertinent activities related to the Texas A&M University AGN-201M training facility operated by the Department of Nuclear Engineering during the period of 1 June 1985 to 31 May 1986. 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 licence 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:

NUEN 405	Nuclear Engineering Reactor Experiments
NUEN 606	Nuclear Engineering Reactor Experiments

Components replaced as part of preventive and corrective maintenance are detailed in Section 4. Components replaced during this period do not involve unreviewed safety questions and are not expected to

adversely affect the safe operation of this facility.

A facility modification was performed this year. It involved removing the original float water level detector and replacing it with a new float and magnetic reed switch assembly. The change was reviewed and approved by the Reactor Safety Board. This modification is not expected to adversely affect the safe operation of this facility.

The results of all major parameter surveillance tests are shown in Table 1.

TABLE 1 REACTOR PARAMETERS SURVEILLANCE MEASUREMENTS

<u>DATE</u>	<u>REACTIVITY WORTH</u>	<u>VALUE</u>
16 JAN 86	SAFETY ROD #1	1.171% $\Delta k/k$
16 JAN 86	SAFETY ROD #2	1.155% $\Delta k/k$
16 JAN 86	COARSE CONTROL ROD	1.123% $\Delta k/k$
16 JAN 86	FINE CONTROL ROD	0.351% $\Delta k/k$
<u>ROD DROP TIMES</u>		
24 FEB 86	SAFETY ROD #1	108 msec
24 FEB 86	SAFETY ROD #2	143 msec
24 FEB 86	COARSE CONTROL ROD	125 msec
<u>REACTIVITY INSERTION RATES</u>		
13 JAN 86	SAFETY ROD #1	0.044% $\Delta k/k/sec$
13 JAN 86	SAFETY ROD #2	0.045% $\Delta k/k/sec$
13 JAN 86	COARSE CONTROL ROD	0.037% $\Delta k/k/sec$
13 JAN 86	FINE CONTROL ROD	0.011% $\Delta k/k/sec$
<u>TOTAL EXCESS REACTIVITY</u>		
16 JAN 86	TOTAL EXCESS REACTIVITY	0.275% $\Delta k/k$
	CORRECTED TO 20 C	

2. OPERATIONAL SUMMARY

UTILIZATION BY CATEGORY: HOURS

(a) Support of Nuclear Engineering Courses	34.05
(b) Operator Training	10.02
(c) Preventive/Corrective Maintenance	03.37

Total Operating Hours: 47.43

Total Hours Critical: 33.62

Total Watt-hours of Operation: 25.51

Average Power Level of Operation (Watts): 00.73

Number of Reactor Startups: 85

3. UNSCHEDULED SHUTDOWNS

<u>DATE</u>	<u>TYPE</u>	<u>CAUSE</u>	<u>CORRECTIVE ACTION</u>
17 JUN 85	Scram Hi Level Channel 3	Operator Trainee Error in Switching Ranges	Reinstruct Student Operator
24 OCT 85	Low Level Shield Water Interlock	Failure of Water Level Detector Integrated Circuit	Added Filtering to Circuit
29 OCT 85	Low Level Shield Water Interlock	Failure of Water Level Detector Integrated Circuit	Changed Power Source to Independant Supply

19 NOV 85	Low Level Shield Water Interlock	Failure of Water Level Detector Integrated Circuit	Changed Detector Design to Magnetic Reed Switch/Float
06 Feb 86	Scram Hi Level Channel 3	Operator Trainee Error in Switching Ranges	Reinstruct Student Operator
11 FEB 86	Low Level Channel 3 Interlock	Operator Trainee Error in Switching Ranges	Reinstruct Student Operator
27 FEB 86	Scram Hi Level Channel 3	Operator Trainee Error in Switching Ranges	Reinstruct Student Operator
03 APR 86	Scram Hi Level Channel 3	Operator Error in Switching Ranges	Operator Counseled
10 APR 86	Rod Drop Safety Rod 2	Frobable Cause is Vibration from Motor on Oscil- lator (Occurred at about 2000 rpm)	Restricted rpm to Prevent Reoccurrence

4. MAJOR SAFETY RELATED CORRECTIVE MAINTENANCE

- (a) 17 OCT 85 The existing water level detector float assembly was removed.
- (b) 01 NOV 85 During testing of the new water level detector, Safety rod #2 jammed at its upper limit while on the test stand, and binding of the rod caused the motor to fail. The rod and the carriage were mechanically unjammed, and the motor was replaced. The failure was attributed to the rod top limit switch (replaced 11/14/85.)
- (c) 08 NOV 85 While operating all of the rods on the test stand, it was noted that Safety Rod # 2 started inserting itself automatically as soon as Safety Rod #1's top limit switch made contact. Found that Safety Rod #2's

in-hold-out switch contacts were failed in the "in" direction. Replaced the switch with another of the same type.

- (d) 14 NOV 85 Replaced the rod top limit switch on Safety Rod #2 , and replaced Safety Rod #2's in-hold-out switch with a new double pole - double throw momentary on - off - momentary on toggle switch. These switches satisfy the requirements of 10 CFR 50.59.
- (e) 26 NOV 85 Replaced control rod switches for Safety Rod #1, the Coarse Control Rod, and the Fine Control Rod with switches of the same type as on Safety Rod #2 (11/14/85.)
- (f) 13 DEC 85 Disconnected existing ground wire from the 120 VAC console power outlet. Then, the ground was reconnected to a 6 AWG solid copper wire running to an earth ground.
- (g) 06 JAN 86 Replaced the rod top limit switches for Safety Rod #1, the Coarse Control Rod, and the Fine Control Rod with switches of identical manufacture.
- (h) 09 JAN 86 Installed new float/magnetic reed switch water level assembly. Previous replacement had proven to be incompatible with the system due to the noise voltage level on the ground bus.
- (i) 05 FEB 86 Installed an evacuation horn bypass beeper circuit in the upstairs graduate/lab area. Reviewed by the Reactor Safety Board during a quarterly audit on 6/12/86. Approved during Reactor Safety Board meeting of 7/31/86.
- (j) 05 FEB 86 Channel 2 failed low during the prestartup checkout. Performed inspection of the Channel 2 drawer and cleaned and resoldered several connections.
- (k) 06 FEB 86 Cleaned and resoldered more connections on the Channel 2 drawer. Replaced the Mercury battery with a 1.4 V Mercury battery and recalibrated all set points.
- (l) 11 FEB 86 Installed an evacuation horn bypass beeper

circuit downstairs. Replaced a blown 15 A fuse on the line input to the console. (The reactor was in a shutdown configuration when the fuse failed.)

- (m) 12 FEB 86 When the Manual Scram button was depressed, all rod position indicator lights were lost. Found and replaced a blown 28 V, 1 A fuse. (The fuse subsequently failed again on 13 FEB 86.)
- (n) 13 FEB 86 Attempted a reactor startup but could not insert Safety Rod #1. Found that fuses F 10, F 11, F 12, and F 13 had failed. The fuses were replaced and the rods were tested. These fuses failed due to the 28 V, 1 A fuse failing on 12 FEB 86 and the subsequent attempts to drive the carriages out.
- (o) 18 FEB 86 Found that a wire leading from the Fine Control Rod upper limit switch was shorted to ground. The wire was replaced and secured. It was determined that this was the cause of the failure of the 28 V, 1 A fuse.
- (p) 21 FEB 86 Replaced the 28 V, 1 A fuse. When the console was energized, the 5 A fuse for the Channel 2 filament supply failed. The fuse was replaced.
- (q) 12 MAR 86 Radiation survey was performed at several power levels. Indications show that operator exposure at the console during full power (5W) operations remains within safe levels.
- (r) 17 MAR 86 Replaced Channel 2 period meter with an identical meter from a spare drawer.
- (s) 28 APR 86 Replaced the low adjust potentiometer for Channel 1 with a new 5 k Ω potentiometer.

5. (a) FACILITY CHANGES

Facility changes this year included replacing the shield tank water level detector. The new water level detector consists of a proximity sensing magnetic reed switch with a magnet activator attached to a float assembly. When the magnet on the float drops more than about one inch below the reed switch, the switch opens, and a relay in the console

deenergizes causing the LOW LEVEL SHIELD WATER alarm and an interlock scram. The float assembly is attached to the inside wall of the shield tank and is constructed from plexiglass for corrosion resistance.

(b) CHANGES TO PLANS AND PROCEDURES

The maintenance procedure for testing the shield water level interlock was modified to reflect the design changes. These changes do not decrease the effectiveness of the procedure.

(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 during this reporting period which meet the criteria of 10 CFR 50 paragraph 50.59 requiring a safety evaluation.

7. SUMMARY OF RADIOACTIVE EFFLUENTS RELEASED

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

Three individuals received radiation exposures between 0.100 and 0.250 Rems for the calendar year 1985.

10. MISCELLANEOUS

The following personnel participated satisfactorily in the AGN

requalification program.

Donald Anderson	SOP-43203
Gerald Schlapper	SOP-4210
Randall White	SOP-43026
Evelyn Breiner	OP-42139

Mr. Randall White resigned as Reactor Supervisor effective 15 May 1986. Dr. Gerald Schlapper was named the Acting Reactor Supervisor for the AGN-201M facility effective 16 May 1986.

TEXAS A&M UNIVERSITY

COLLEGE OF ENGINEERING

COLLEGE STATION TEXAS 77843-3133

DEPARTMENT OF NUCLEAR L
(409) 845-4161

ENGINEERING

19 August 1986

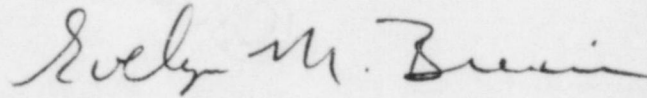
Cecil O. Thomas, Chief
Standardization and Special Proj. Branch
Division of Licensing
U. S. Nuclear Regulatory Commission
Washington, DC 20555

Dear Mr. Thomas:

Please find enclosed five copies of the most recently completed annual operating report dated 1 June 1985 to 31 May 1986 for the AGN-201M, docket no. 50-59.

If you have any questions concerning the report please call me or Dr. Gerald Schlapper, Acting Reactor Supervisor, at (409) 845-4988 or (409) 845-4161.

Sincerely,



Evelyn M. Breiner
Reactor Operator, AGN-201M
Nuclear Engineering Department

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