

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

NRC LICENSE R-23
June 1, 1983 - May 31, 1984

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

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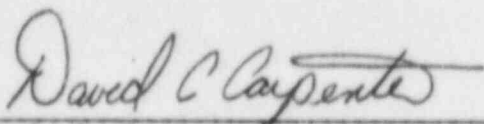
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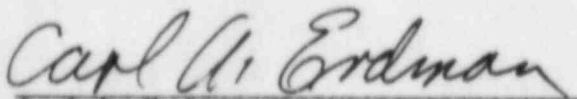
June 1, 1983 - May 31, 1984

Prepared by:



David C. Carpenter
Reactor Supervisor

Approved by:



Carl A. Erdman, Head
Nuclear Engineering Department

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 reactor facility operated at the Department of Nuclear Engineering during the period June 1, 1983 to May 31, 1984. 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 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, RSO radiation safety course, preventive maintenance, and research for a masters thesis. Nuclear Engineering courses supported during the past year were:

ENGR 101G	Engineering Analysis
NE 402	Nuclear Detection and Isotope Technology Laboratory
NE 405	Nuclear Engineering Experiments
NE 485	Problems

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 parameter surveillance tests are shown in Table I.

TABLE I. REACTOR PARAMETER SURVEILLANCE MEASUREMENTS

<u>Date</u>	<u>Reactivity Worth</u>	<u>Value</u>
10 May 1984	Safety Rod #1	1.159 % δ k/k
10 May 1984	Safety Rod #2	1.168 % δ k/k
14 May 1984	Course Control Rod	1.166 % δ k/k
14 May 1984	Fine Control Rod	0.353 % δ k/k

Rod Drop Times

14 May 1984	Safety Rod #1	115 msec
14 May 1984	Safety Rod #2	140 msec
14 May 1984	Course Control Rod	125 msec

Average Reactivity
Insertion Rates

10 May 1984	Safety Rod #1	0.0484 % δ k/k/sec
10 May 1984	Safety Rod #2	0.0498 % δ k/k/sec
10 May 1984	Course Control Rod	0.0457 % δ k/k/sec
10 May 1984	Fine Control Rod	0.0114 % δ k/k/sec

Total Excess Reactivity

16 May 1984	Total Excess Reactivity Corrected to 20°C	0.297 % δ k/k
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2. OPERATIONAL SUMMARY

Utilization by Category:

(a) Support of Nuclear Lab Engineering Courses	33.8 hours
(b) Reactor Operator/Senior Reactor Operating Training	6.1 hours
(c) Preventive/Corrective Maintenance	5.8 hours
(d) Support of Research	3.7 hours

<u>Total Operating Hours</u>	49.4 hours
<u>Total Operating Hours at Power</u>	26.6 hours
<u>Total Watt-hours of Operation</u>	54.4
<u>Average Power Level of Operation</u>	2.05 watts
<u>Number of Reactor Startups</u>	123

3. UNSCHEDULED SHUTDOWNS

<u>DATE</u>	<u>TYPE</u>	<u>CAUSE</u>	<u>CORRECTIVE ACTION</u>
7/19/83	Hi Level Ch #2 Trip	Suspect Noise Spike	None - no reoccurrence of this problem.
9/2/83	Interlock Open	Suspect Noise Spike	Required Readjustment of reactor shield tank level switch for condition to clear. Did not receive low level alarm - no reoccurrence.
9/15/83	Ch #2 Period	Movement of source while at low power	None - caution operators about potential problem when verifying criticality at low powers
9/22/83	Low Level Ch #3	Movement of source while at low power	Counsel Operator

1/31/84	Hi Level Ch #3	Possible Noise Spike while changing scale on Ch #3 range sw	None
2/1/84	Hi Level Ch #3	Student Operator error in switching range sw	Reinstruct Student Operator
2/1/84	Lo Level Ch #3	Student Operator error in switching range sw	Reinstruct Student Operator
2/2/84	Hi Level Ch #3	Student Operator error in switching range sw	Reinstruct Student Operator
2/2/84	Hi Level Ch #3	Student Operator error in switching range sw	Reinstruct Student Operator
2/2/84	Hi Level Ch #3	Student Operator error in switching range sw	Reinstruct Student Operator
2/2/84	Hi Level Ch #3	Possible noise spike while changing scale on Ch #3 range sw	None-no reoccurrence of this problem
2/2/84	Hi Level Ch #3	Student Operator error in switching range sw	Reinstruct Student Operator
2/3/84	Hi Level Ch #3	Student Operator error in switching range sw	Reinstruct Student Operator
2/4/84	Lo Level CH #3	Student Operator error in switching range sw	Reinstruct Student Operator
2/21/84	Hi Level CH #3	Student Operator not monitoring Ch #3 properly	Reinstruct Student about need for proper eye contact of all instrumentation

Summary

(a) Scrams due to Instrument Failure or Malfunction	6
(b) Scrams due to Operator Error	
1. Due to improper selection of CH 3 range sw	7
2. Other	<u>2</u>

TOTAL UNSCHEDULED SHUTDOWNS	15
4. CORRECTIVE MAINTENANCE AND COMPONENT REPLACEMENT	

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

- (a) 7/11/83 - Soldered "Borderline" connections on rod drive mechanisms as part of normal preventative maintenance.
- (b) 7/27/83 - In preparation for inspection of shield water tank (SWTI-12), movement of manhole cover jarred level controller. Movement caused actuator arm which appeared corroded to fall into tank. Level controller activator repaired and tested satisfactorily by standard procedure on 7/28/83.
- (c) 9/29/83 - Performed evacuation exercise under supervision of RSB member Dr. Hart. Satisfactory evaluation. Details of test on file.
- (d) 11/7/83 - After repeated low level trips on CH #2 and subsequent period trips, performed check of channel 2 electronics by approved procedure C2TC-6. Replaced tubes V4, V5, V6, V10, V11, V12, V14, V17. Also replaced V15(0A2) and V16(0G3).
- (e) 1/24/84 - Reoccurring spikes on CH #2 level and period instruments. Again performed C2TC-6. Replaced V10 and V4.
- (f) 2/4/84 - Sight glass on thermal column broke loose. All water that was above the lower sight glass connection was drained to reactor room floor. Visual inspection verified no equipment damage and that approximately 3 feet of water still existed in thermal column.
- (g) 3/7/84 - Replaced tall thermal column with smaller one. Placed concrete discs above reactor to seal off access port above reactor.

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

No modifications were made to the Texas A&M University AGN-201M reactor during this reporting period.

(b) CHANGES TO PLANS AND PROCEDURES

Revised C3LT-3 and C3HT-3 to reflect a more satisfactory compliance check. It was possible to set CH #3 high trip or low trip at a setting that would be offscale on the meter. Procedure changed so that high trip could be no greater than 95% full scale on the meter. The low trip was set so that it would be no less than 5% full scale.

Upon verification of how thermal column interlock interacts with rod control system, it was found to be in possible violation of amendment #5 to

license R-23. By this amendment, if the thermal column were removed, the scram magnets were to be deenergized. In actuality, removal of the thermal column opens the +110 VDC line to the rod drive motors thus inducing a rod hold situation as the annunciator states. Mr. Hal Bernard of USNRC was informed of situation by Dr. Erdman. NE Department internal memo prohibits criticality experiment RXEP-10 to be performed until matter reviewed by USNRC.

Revision of facility operating procedures that included several minor text changes and a complete rewrite of section 3.2 (Operational Information) and 3.3 (Checkout Procedure). First page of operations log was completely revised to reflect a better order of performance. Additional steps added which deal with the testing of all alarms in the facility. Skirt monitor checks and a test of the rod interlock sytem were added to better document performance based on results of facility inspection of June 25, 1982.

Corrections to and changes in performance frequency of preventative maintenance procedures. To reflect technical specifications, most of the PM procedures were performed on a quarterly or semiannual basis although by technical specifications they only needed to be performed annually.

(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 RELEASES

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 MEETINGS

(a) 25 July 83 - Review of RSB audit. Audits to be added to quarterly maintenance.

(b) 28 October 83 - Review RSB audits conducted 8 March, 12 July and 29 September 83. Approval of changes in facility operating procedures. Approval of change in performance frequency of preventive maintenance. Notified of discrepancy in operation of thermal column interlock.

(c) 30 January 83 - Annual review of security plan.

(d) 20 April 84 - Approval of modifications to Reactor Facility subject to restrictions stated in memo dated 20 April 84. Modifications consist of building new walls in Room 61 and rewiring of reactor console to upgrade existing cabling that has deteriorated.

11. MISCELLANEOUS

The following personnel participated satisfactorily in the AGN operator requalification program.

Carl Erdman	SOP-4136
Gerald Schlapper	SOP-4210
David Carpenter	SOP-4471

The following were trained for licensing and received senior reactor operator licenses based on satisfactory performance on the USNRC administered SRO exam.

Art Flores	SOP-43027 effective 3 November 1983
Randy White	SOP-43026 effective 3 November 1983

Upon receiving his BS degree in Nuclear Engineering, Mr. Carpenter was named the Reactor Supervisor for the AGN-20iM facility. He replaced Dr. Gerald Schlapper, who had served in that capacity until a replacement could be found for Mr. Barry Willits.

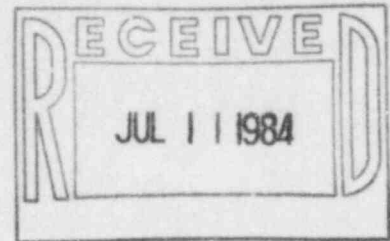
Full implementation of Emergency Plan was completed within 120 day limit of USNRC after its review and evaluation dated 24 June 1983.

TEXAS A&M UNIVERSITY

COLLEGE OF ENGINEERING

COLLEGE STATION TEXAS 77843-3133

DEPARTMENT OF NUCLEAR ENGINEERING
(409) 845-4161



July 6, 1984

John Collins
Regional Administrator
611 Ryan Plaza Drive
Suite 1000
Arlington, Texas 76012

Reference: License No. R-23, Docket No. 50-59

Dear Sir:

Enclosed are the signed original and twelve (12) copies of the annual operating report for the period June 1, 1983 to May 31, 1984 for the AGN-201M Reactor Facility. Any questions concerning this report may be directed to myself at (409) 845-4988.

Respectfully,

A handwritten signature in cursive script that reads "David C. Carpenter".

David C. Carpenter
AGN-201M Reactor Supervisor
Texas A&M University

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