



UNITED STATES
 NUCLEAR REGULATORY COMMISSION
 REGION II
 101 MARIETTA STREET, N.W.
 ATLANTA, GEORGIA 30303

Report No. 50-124/79-02

Licensee: Virginia Polytechnic Institute and State University
 Blacksburg, Virginia 24060

Docket No. 50-124

License No. R-62

Inspectors:	<u>C. A. Julian</u>	<u>3/22/79</u>
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	<u>R. C. Sauer</u>	<u>3/23/79</u>
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	R. D. Martin, Section Chief, RONS	Date Signed

SUMMARY

Inspection on January 30 through February 2, 1979

Areas Inspected

This routine, unannounced inspection involved 50 inspector-hours on-site in the areas of plant operations, previous inspection findings, operator re-qualification program, operating procedures, surveillance requirements, reactor logs and other records.

Results

Of the six areas inspected, no apparent items of noncompliance or deviations were identified in three areas; three apparent items of noncompliance were found in three areas (deficiency-failure to document licensed reactor operator re-qualification records-Paragraph 10; infraction-failure to provide and maintain procedures in conducting operations, testing and maintenance-Paragraph 7; infraction-failure to comply with required radiation monitor settings-Paragraph 8).

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DETAILS

1. Persons Contacted

Licensee Employees

- *Dr. T. F. Parkinson, Director, Nuclear Reactor Laboratory
- *Dr. A. K. Furr, Director, Health and Safety Office
- Dr. T. Teekell, Chairman, Radiation Safety Committee
- *Mr. R. T. Stone, Reactor Supervisor
- Mr. R. D. Mogle, Radiation Safety Officer
- *Mr. S. L. Meyers, Campus Radiation Safety Officer
- *Mr. A. P. Curtner, Senior Reactor Operator
- Mr. H. G. Knight, Laboratory Supervisor and Reactor Operator

*Attended exit interview.

2. Exit Interview

The inspection scope and findings were summarized on February 2, 1979, with those persons indicated in Paragraph 1 above. All subjects presented in these details were discussed. The licensee representative acknowledged the three identified items of noncompliance (paragraphs 7, 8, and 10) and the open and unresolved items discussed below.

3. Licensee Action on Previous Inspection Findings

(Open) Unresolved item (50-124/77-02-01): The inspectors reviewed this item concerning minimum detail in procedure content. The licensee has implemented a program to update procedures to include initial conditions, precautions and limitations and procedural step sections. The licensee committed at the exit interview to complete procedural review and upgrade by June 30, 1979 (Paragraph 9).

(Closed) Noncompliance (50-124/77-04-01): The inspectors reviewed this item concerning the failure to administer annual re-qualification examinations to two reactor operators. The licensee, in response letter dated January 4, 1978, stated the operators were re-qualified and that the first working day of each month would be designated for training, re-qualification and review. The inspectors have verified implementation of this action. This item is considered closed.

4. Unresolved Items

Unresolved items are matters about which more information is required to determine whether they are acceptable or may involve noncompliance or deviations. New unresolved items identified during this inspection are discussed in Paragraphs 7 and 8,

5. Reactor Operations and Plant Tour

- a. The inspectors observed completion of portions of three reactor prestart checkouts with subsequent startups and two reactor shut-downs by two reactor operators within the time interval January 30 through February 2, 1979. During a reactor startup, the inspectors noted the following:
- (1) The source range nuclear instrumentation operated nosily and erratically. The licensee stated that the problem was infrequent and caused by radio frequency electrical noise generated by operation of a welding machine in the building and that investigation to resolve the problem is continuing. The inspectors left this as an open item for review in future inspections (79-02-01).
 - (2) The backup means of regulating rod position indication was sticking, resulting in a momentary non-indication response. The meter movement stopped at approximately two inches until enough torque was generated through rod movement on the indicator that a step jump in indication occurred to approximately six inches. The primary means of rod position indication is by means of a digital voltmeter readout (0 to 100 percent of withdrawal). The primary means of indication functioned properly. The licensee stated he would have the backup position indicating meter replaced by March 1, 1979 (79-02-10).
- b. A plant tour of the facility was conducted on January 30, 1979, while the reactor was being operated at maximum rated power (100 Kwt). Housekeeping in the reactor room and the control room was considered satisfactory. The inspectors noted several items which were pointed out to the reactor supervisor during this tour and subsequently resolved.
- (1) Additional concrete shields had been constructed to replace stacked concrete blocks around the reactor. In general, radiation levels have been reduced by this improvement. Documentation related to this change, including safety analysis, Radiation Safety Committee review and approval and post installation shielding surveys were reviewed and appeared adequate.
 - (2) A radiation survey sheet required to be posted on the reactor room door by the reactor room access instructions was found missing. The survey sheet had been removed in order to re-draw the reactor room layout as a result of adding the additional concrete shields described in 5.b.(1) above. The inspectors confirmed that posting requirements for all radiation areas within the reactor room had been met.

The licensee representative stated that henceforth a survey sheet would be posted and that he will maintain an interim sheet should future modification of the sheet be required.

- (3) The inspectors noted a change in the security features of the reactor room. The inspectors considered the change not to have decreased the effectiveness of the security plan and noted at the exit interview that the item was unresolved pending further review. This matter was brought to the attention of regional security personnel upon return to the MRC regional office (for details, see Inspection Report 50-124/79-03).

On February 8, 1979 the inspector telephoned a licensee representative and informed him of the need to furnish a report to The Office of Nuclear Reactor Regulation describing each change made to the security plan as required by Section 50.54(P) of 10 CFR 50. The report is to be written within two months after the changes were made.

- c. The licensee stated that under the provisions of 10 CFR 50.59, nuclear instrumentation detectors for power range channel 2 and the source range channel have been moved from just above the core to the bulk shield tank and the thermal column, respectively. The inspectors reviewed the documentation and implementation of this change and found no problems.

No items of noncompliance or deviations were identified in this area.

6. Review of Reactor Experiments

The inspectors reviewed a representative sample of the records of experiments carried out during the year 1978. The experiment program was discussed with the licensee. No new experiments of a previously unreviewed nature were conducted during 1978.

No items of noncompliance or deviations were identified in this area.

7. Procedures

- a. The inspectors reviewed the licensee's operating, maintenance and emergency procedures to verify compliance with Technical Specification 8.3. Approximately forty procedures were inspected for adequacy. The inspectors found two procedures in which maintenance required at six month intervals was not being conducted at the required frequency due to equipment upgrade (see discussion, Paragraph 8), and three evolutions which were being conducted

without approved written procedures (reactor heat balance, reactor rod speed checks and the rod cocking portion of rod drop time determinations). The inspectors also noted that the approval dates on several of the reactor procedures appeared to be inconsistent with the dates approved by the Radiation Safety Committee (RSC) denoted in the RSC minutes (see discussion, Paragraph 9.c).

This is contrary to Technical Specifications Sections 8.3.1 and 8.3.4 which require RSC approval of written procedures for testing and calibration of reactor operating instrumentation and controls, control rod drives and for preventive or corrective maintenance operations which could have an effect on the safety of the reactor.

This constitutes an apparent noncompliance with NRC requirements (79-02-02). A licensee representative stated at the exit interview the facility's intention to preclude recurrence of this item of noncompliance as follows:

- (1) Investigate establishing a RSC subcommittee which will perform a review of facility procedural needs and see to their development.
 - (2) Commit one-half (1/2) man-day per day, with an overall completion date of June 30, 1979, for the preparation of procedures required and to upgrade the format and content of current facility procedures carried as an unresolved item (URI 50-124/77-02-01) since May 1977 (Paragraph 3).
- b. The inspector review of procedures also identified three other items of concern.
- (1) The Technical Specifications maintained at the reactor console and on file did not have Change Number 1 (dated October 1, 1970) incorporated. This change authorizes the relocation of the reactor control console to one floor above its previous location and specifies the new operating ranges for Nuclear Instrumentation channels after conversion to transistorized components. The inspectors furnished a copy of the change to the Reactor Supervisor.

Unresolved Item: This matter concerning the non-incorporation of Change Number 1 to the facility's Technical Specifications is considered unresolved pending further examination during a subsequent inspection (79-02-03).

- (2) A need was seen for a method of insuring jumper installation/removal or wire disconnect/connecting evolutions are conducted such that system status is restored and no abnormalities

exist. The concern stemmed from a review of the power controller procedure involving the lifting of a negative feedback lead to an output transformer in the regulating rod servo, without specific instructions in the procedure to re-install the lead.

The licensee representative indicated that a jumper/wire control system would be investigated or incorporated into the applicable procedures. This is considered an open item (79-02-04).

- (3) The rod drop time test procedure as indicated in Paragraph 7.a above was being performed without adequate procedural control. A further concern developed when the inspectors questioned the licensee representatives as to the method of cocking control rods since no procedure was available. The representatives indicated manual withdrawal of the rods was the motive force rather than reactor console manipulation. This is done when no moderator is present in the core. The manual withdrawal technique was employed as an aid in determining if control rods were being restricted in any way. This action was approved by the Radiation Safety Committee; however, documentation of RSC review could not be located during the inspection period.

In a telephone conversation between the licensee and the inspector on February 8, 1979, the representative stated RSC approval for manual withdrawal of control rods during performance of rod drop time measurements was obtained and documented in the July 9, 1969 minutes. The licensee representative further stated he would have the rod drop time determination procedure prepared in total prior to its next scheduled performance (that of April 9, 1979). After additional discussion, he committed to include the concept, along with the basis for manual rod withdrawal, in the facilities proposed Technical Specification submitted to Nuclear Reactor Regulation as part of its license renewal application. The facility's license expires November 16, 1979.

Unresolved Item: This item concerning the RSC review of manual withdrawal of control rods prior to drop time testing is considered unresolved pending further examination of the July 9, 1969 minutes during a subsequent inspection (79-02-05).

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8. Surveillance

- a. The licensee's program for routine surveillance of setpoints and conditions described in Section 11.0 of the Technical Specifications and administrative requirements were inspected for adequacy. Two maintenance procedures were found apparently not being performed at their required frequency of six months, but annually. The first procedure, that of performing a tube check of the Westronic recorder amplifier was not being performed due to converting the recorder to a transistorized unit. The second procedure, that of performing maintenance on the dump valve (safety-related) rack and gear, rack guide and motor bearings, was extended after installation of a dust cap. No documentation could be found for relaxation of these requirements.

This is contrary to Technical Specification Section 8.2.5 which requires the Radiation Safety Committee to review and approve changes in the facility or procedure to determine if they constitute an unreviewed safety question, a change in Technical Specifications or are reportable under 10 CFR 50.59. Further, Technical Specification Section 11.2 requires routine maintenance on all control and process system components to be performed in accordance with written schedules and written procedures. The inspectors stated at the exit interview that this appears to be an item of noncompliance.

Subsequent to the inspection and exit interview, on February 8, 1979, the licensee telephoned the inspector and stated the Radiation Safety Committee had approved relaxation of the maintenance requirements to the recorder and dump valve as documented in RSC minutes dated March 25, 1974 and March 15, 1969, respectively.

Unresolved Item: This matter of apparent nonperformance of routine recorder amplifier and dump valve maintenance is considered an unresolved item pending the inspection of Radiation Safety Committee meeting minutes during a subsequent inspection (79-02-06).

- b. Review of Technical Specification Table 1 titled Safety System Functions indicates the setpoint for high radiation levels at the fission product monitor to annunciate at greater than ten times normal. The setpoint observed by the inspector on 1/30/79 on the radiation monitor was 1000 mr/hr. with the monitor indicating 80 mr/hr.

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Since the setpoint is not recorded on the reactor startup sheet, previous noncompliance could not be ascertained even though the licensee indicated the setpoint is held at 1000 mr/hr. due to cases where radiation levels approach 100 mr/hr. Previous records indicate a variance of between 70 mr/hr. to 100 mr/hr. with an average reading of 80 mr/hr. at 100 Kwt.

The failure to maintain this setpoint at less than or equal to ten times the normal reading constitutes an apparent noncompliance with NRC requirements (79-02-07). The licensee stated at the exit interview that he would investigate and take the required corrective action.

9. Reactor Logs and Other Records

a. Reactor Operations and Maintenance Logs

The reactor operations logs were reviewed for the period February 1978 to January 1979 and the maintenance log reviewed for the period January 1978 to January 1979. The inspector's review of these logs identified no items of noncompliance or deviations. The inspector discussed a concern with the licensee representative on the desirability of establishing a journal to correlate log content with activities occurring or which are being performed by the licensee and traceability of data in several cases is an involved process. However, even though log inconsistencies exist, all data traced by the inspector could be accounted for.

This concern was re-emphasized at the exit interview in which the licensee representative indicated he would investigate the use of a journal for documentation purposes. This matter is considered an open item for review in future inspections (79-02-08).

b. Unscheduled Shutdown Records

The inspectors reviewed the records of unscheduled reactor shutdowns since the last inspection. No areas of concern were identified.

c. Review of Minutes of Radiation Safety Committee

The minutes of the six meetings of the Radiation Safety Committee conducted between December 5, 1977 and December 4, 1978 were reviewed. The required quorums were present and meetings were conducted within the frequency specified by the technical specifications. The committee reviewed reactor operations, proposed procedures and design changes.

The meeting of May 26, 1978 reviewed an occurrence of May 15, 1978 in which an abnormal ventilation situation in the reactor room revealed an Argon-41 gaseous radioactivity concentration in the process pit higher than previously recognized. The occurrence was reported to NRC Region II for information only. The committee approved the installation of a vent duct direct from the process pit providing enhanced exhaust flow to the facility stack. The inspector identified no problems with this item.

During the review, certain apparent inadequacies were detected in the incorporation of procedures in the approved procedure book at the reactor console after review and approval by the committee. Examples are as follows:

- Procedure IV.21 (Argon 41) was approved as revised during the committee meeting of September 15, 1978. The console procedure manual still contained a procedure approved June 20, 1977 on the same subject.
- Procedure V.21 (Re-Entering the Building After an Evacuation Alarm) was approved as revised during the committee meeting of September 15, 1978. The console procedure manual contained an interim procedure dated January 30, 1978 and another on the same subject approved December 6, 1978.
- Procedure III.2 (Fuel Transfer) was approved as revised on June 5, 1978. The console manual contained the version dated March 16, 1978.

These findings are further examples of the item of noncompliance discussed in Paragraph 7.a above (79-02-02).

10. Review of Reactor Operator Re-Qualification Records

Previously identified item of noncompliance 50-124/77-04-01 as transmitted in our letter of 12/21/77 stated that two licensed operator written examinations were delinquent during 1977. The inspectors found that written examinations were taken by these operators during December 1977. This item is considered closed.

Records of the reactor operator re-qualification program for 1978 were reviewed. Certain items appear to be in noncompliance with the approved re-qualification plan and 10 CFR 50.54(i-1) in that recordkeeping was found to be inadequate.

The licensee committed by letter dated January 4, 1978 to NRC Region II to conduct monthly meetings of licensed personnel for training, re-qualification and review of procedure changes. Although the licensee states that the meetings were held, meeting minutes could not be found for the months of January, April, May, June, November and December of 1978. After discussion in the exit interview, the licensee stated that in the future complete minutes will be maintained.

Also, the plan says emergency procedures will be reviewed every three months at required meetings. The period of April through June 1978 is a quarter in which no documentation of such meetings was found. An Emergency Procedure Sign-Off Sheet was reviewed and there were incomplete entries during 1978 for four licensed personnel.

The plan commits that a list of qualified reactor operators and senior reactor operators will be maintained at the reactor console. No such list was found.

Additionally, the plan requires licensed personnel to enter in the console log hours operating the reactor. Although an approximation of operating times can be obtained from initial entries on hourly readings, no clearly identifiable record was found.

The plan calls for oral examinations to be conducted each quarter, reviewing at least twelve items each quarter from a list of identified topics. Although it appears that oral examinations were performed, as evidenced by a sufficient number of initialled items on oral examination record sheets, the entries were not dated in many instances. Additionally, entries were made for several operators on multiple record sheets and records were not in a traceable format. The licensee agreed to investigate and correct these problems.

These instances of failure to properly document re-qualification efforts appear to be in noncompliance with the approved plan and 10 CFR 50.54 (i-1). (79-02-09).

11. Follow-Up on Open Items

The following documents on NRC identified potential problems were reviewed with the licensee. It was confirmed that the licensee was aware of the items and had made responses as required.

- Circular 77-14, Separation of Contaminated Water Systems from Non-Contaminated Plant Systems

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- Circular 78-03, Packaging Greater than Type A Quantities of Low Specific Activity Radioactive Material for Transport
- Bulletin 78-08, Radiation Levels from Fuel Element Transfer Tubes

These items are closed.

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