



UNITED STATES
NUCLEAR REGULATORY COMMISSION
REGION II
101 MARIETTA ST., N.W., SUITE 3100
ATLANTA, GEORGIA 30303

Report Nos. 50-62/79-03 and 50-396/79-02

Licensee: University of Virginia
School of Engineering and Applied Science
Department of Nuclear Engineering
Charlottesville, Virginia 22901

Facility Name: UVAR and The Cavalier

Docket Nos. 50-62 and 50-396

License Nos. R-66 and R-123

Inspection at the UVAR and Cavalier facility, Charlottesville, Virginia

Inspector: *E. H. Webster* 1/17/80
E. H. Webster Date Signed

Approved by: *P. J. Kellogg* 1/17/80
P. J. Kellogg, Section Chief, RONS Branch Date Signed

SUMMARY

Inspection on December 13-14, 1979

Areas Inspected

This routine unannounced inspection involved 14 inspector-hours onsite in the areas of requalification training, experiments, followup of previous inspection findings, and Class H Reactor operation and maintenance.

Results

Of the four areas inspected, no apparent items of noncompliance or deviations were identified in three areas; one apparent item of noncompliance was found in one area (Infraction-failure to conduct safety system channel calibrations as required by Technical Specifications-paragraph 7a).

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DETAILS

1. Persons Contacted

Licensee Employees

- Dr. T. G. Williamson, Director, Department of Nuclear Engineering
- *Dr. B. L. Shriver, Director, Reactor Facility
- *J. P. Farrar, Reactor Supervisor
- *P. E. Benneche, Reactor Engineer
- *T. L. Porter, Senior Reactor Operator
- *B. Hosticka, Reactor Operator

*Attended exit interview

2. Exit Interview

The inspection scope and findings were summarized on December 14, 1979 with those persons indicated in Paragraph 1 above. The item of noncompliance was thoroughly discussed at that time.

3. Licensee Action on Previous Inspection Findings

- a. (Closed) Deficiency (62/79-01-04) Heat balance surveillance conducted without procedure change. A temporary change to Standard Operating Procedure (SOP) 7.1.5 dated August 29, 1979, gives the operators greater latitude in the reactor power level at which the heat balance is conducted and specifies the allowable band between calculated and measured power level. This area is further discussed in paragraph 7a.
- b. (Closed) Unresolved item (62/79-01-07) Modification to core loading without Reactor Safety Committee (RSC) approval. This item resulted from review of licensee event reports which indicated fuel element changeout and relocation without RSC approval. Since IE Report 50-62/79-01, the RSC has further defined Core Alterations requiring their approval. The inspector also reviewed calculations of the reactivity changes expected on both core modifications involved, and the resultant reactivity change seen on subsequent startups. The reactivity changes involved were not significant enough to require approval, and the new RSC guidance on those changes requiring approval are adequate.

4. Unresolved Items

Unresolved items were not identified during this inspection.

5. Experiments (UVAR)

The inspector reviewed irradiation records, operations logs and RSC minutes to insure that experiments conducted in the UVAR were properly reviewed, approved, and conducted. Logs for the period April, 1979 through December 12, 1979 were reviewed and found to be adequate. RSC minutes for the period June, 1979 through December, 1979 documented adequate RSC approval of procedures and controls for the untried EPRI irradiations which are still in progress. The inspector had no further questions in this area.

6. Operator Requalification Training (UVAR)

The inspector reviewed licensee requalification training files and program documents to insure that a continuing operator requalification program is being pursued which meets the requirements of 10 CFR 55 Appendix A as implemented by the accepted UVAR program of June 20, 1974. The inspector reviewed the following items with comments as noted.

- a. The requalification program as detailed to NRC in the University of Virginia letter dated June 20, 1974.
- b. The requalification program procedure letter of December 21, 1978. This details specifically how the program will be run and documented to meet the requirements of 10 CFR 55 Appendix A and the June 20, 1974 letter to NRC. This letter was approved by the RSC early in 1979.
- c. Written examination, answers, and tabulated results for a comprehensive examination given in June, 1979 to all operators. The average grade for this exam was 93%, which upon review by the inspector, was fairly graded and adequately covered all areas of the reactor program.
- d. Operator reading file. This file was implemented to keep operators informed of procedure changes, system modifications, changes to policy, regulations, Technical Specifications, and other pertinent information. The file contained the desired reading material, but was not organized or indexed so operators could refer to new material. After some discussion with licensee staff, they agreed to place more emphasis on use of this file and streamline it for easier reference.
- e. Four operators were interviewed by the inspector to ascertain the adequacy of the requalification program. Two of the operators had just received their NRC licenses in October and had not experienced any formal requalification training.

They were also not aware of the reading file (see d. above). The other two operators demonstrated adequate plant knowledge and confirmed that satisfactory requalification training was occurring. Several small points on planning and conduct of formal training sessions were discussed with plant staff which will be further evaluated by the licensee.

- f. RSC minutes. During the period June to December, 1979, one emergency evacuation drill was run on August 16. The inspector discussed the consideration for performing drills which included support groups outside the facility, and was informed that plans for such a drill were underway. The inspector requested that NRC be informed beforehand of any drill of this magnitude so that emergency preparedness of the affected agencies in the area could be assessed.

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

7. Previously Identified Concerns (UVAR)

- a. (Open) item (62/79-01-01) Verification of accuracy bands allowed in nuclear instrumentation calibration procedures. The inspector was not able to verify the accuracy bands used by the licensee to calibrate nuclear instrumentation from the vendor, Delta Controls. However, a comparison of the procedures to those used by similar research reactors and an analysis by Region II personnel found the accuracies allowed to be reasonable. The inspector investigated the accuracy of the heat balance determination to conclude the concern, since the heat balance is the only correlation of actual core power developed to nuclear channel readout. In so doing, the inspector verified adequate calibration is conducted for the primary flow indication channel, but found inadequacies in the temperature monitoring system calibration. The core inlet and outlet temperature channels are calibrated per SOP 7.6.2, by decade resistance box every 6 months, but no checks are performed on the Resistance Temperature Detectors (RTDs) to assure calibration and linearity. The Technical Specifications do not define these temperature readouts as a reactor safety system, however, these channels are used operationally as core power indication (along with primary flow) and therefore should receive the same channel calibration as required for safety channels.

The only temperature indication readout required by Technical Specification 3.3 as a Reactor Safety System channel is pool water temperature. This calibration procedure, SOP 7.6.1 also does not require the RTD to be calibrated. The maintenance records for this instrument indicated that no checks had been conducted on the pool water temperature RTD.

Technical Specification 4.2 requires a channel calibration of reactor safety channels be performed every eight months. Specification 1.11 defines channel calibration as an adjustment such that the output of the channel responds with acceptable accuracy to known values of the parameter which the channel measures.

Licensee management was informed that failure to routinely calibrate the pool water temperature RTD as a part of the channel calibration is in noncompliance with Technical Specification 4.2 (Infraction-62/79-03-01) and that open item 79-01-01 remains open pending complete channel calibration of the core delta T temperature monitors.

- b. (Closed) item (62/79-01-03) Inaccuracies allowed in heat balance test, SOP 7.1.5. The procedure change identified in paragraph 3a. specified allowable inaccuracies between calculated reactor power and power range indication as +15% -5%. The large band is allowed to account for axial flux movement and temperature variations.
- c. (Closed) item (62/79-01-04) Designation of new RSC membership. As of July 1, 1980 the RSC membership changed and J. L. Meem became chairman of the committee. The new membership is delineated in a memo to the RSC dated July 2, 1979 and is appropriately filed.
- d. (Closed) item (62/79-01-06) Updating copies of Technical Specifications at the facility. It had been noted by the inspector in IE Report 62/79-01 paragraph 8 that none of the copies of Technical Specifications at the facility had been updated with the revisions of Amendments 12 or 13, issued in December 1978. At the onset of this inspection, the inspector observed two copies of the Specifications, including the control room copy, still did not have these revisions. Licensee staff corrected this omission prior to the inspector leaving the facility.

8. The Cavalier

The inspector reviewed facility documents, interviewed personnel, and toured the Cavalier facility, as indicated below, to ascertain whether license conditions pertaining to requalification training, staffing, experiments, and surveillance have been met.

- a. Requalification training and staffing. Paragraph 6 discussed review of this area for personnel with licenses to operate the UVAR. Since these same people with the same level licenses constitute the staff for the Cavalier, and due to the similarity between facilities, the review documented in paragraph 6 constituted a review of the Cavalier program as well. The facility staffing met the requirements of Technical Specification 6.1 and SOP 2.2.
- b. Experiments. Review of the operations log and interviews with personnel confirmed there have been no experiments run in the Cavalier this year.
- c. Surveillance and maintenance. The inspector reviewed the maintenance files for the Cavalier systems as listed below and confirmed that surveillance testing was conducted and documented as required, that maintenance was performed properly and documented, and that appropriate functional testing was satisfactorily performed following maintenance:
 - (1) Alternative Reactivity Insertion System
 - (2) Tank level indication and scram
 - (3) Radiation monitors

- (4) Gamma channel
- (5) Source range nuclear instrumentation
- (6) Log N nuclear instrumentation
- (7) Control rods

No items of noncompliance or deviations were identified.