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

Report Nos. 50-259/81-15, 50-260/81-5 and 50-296/81-5

Licensee: Tennessee Valley Authority
500A Chestnut Street
Chattanooga, TN 37401

Facility Name: Browns Ferry

Docket Nos. 50-259, 50-260 and 50-296

License Nos. DPR-33, DPR-52 and DPR-68

Inspection at Browns Ferry Nuclear Plant near Athens, Alabama

Inspector: G. L. Troup — Date Signed: 3/6/81

Approved by: C. M. Hosey, Acting Chief, Facilities Radiation Protection Section, Technical Inspection Branch, Division of Engineering and Technical Inspection — Date Signed: 3/6/81

SUMMARY

Inspection on February 9-13, 1981

Areas Inspected

This special, unannounced inspection involved 33 inspector-hours on site in the areas of radiation protection including evaluation of personnel doses, authorized doses, dosimetry and reports relating to an apparent overexposure of a worker.

Results

Of the four areas inspected, no violations of NRC requirements or deviations were identified in three areas; one violation was found in one area (failure to retain exposure data in accordance with 10 CFR 20.102.).

DETAILS

1. Pesons Contacted

Licensee Employees

Browns Ferry Nuclear Plant

*J. L. Harness, Assistant Plant Superintendent
*D. C. Cummins, Assistant Health Physics Supervisor
*R. T. Smith, Quality Assurance Supervisor
*T. L. Chinn, Compliance Supervisor
*E. M. Cargill, Assistant Radiation Control Supervisor (Outage)
*W. Simpkins, Health Physics Engineer

Radiological Hygiene Branch, Division of Occupational Health and Safety

S. G. Bugg, Supervisor, Radiation Exposure Management Group

Nuclear Power Division, Office of Power

J. W. Hufham, Assistant to the Director

Other licensee employees contacted included 2 construction craftsmen, 5 technicians, 2 security force members and 3 office personnel.

NRC Resident Inspector

*R. F. Sullivan
J. W. Chase

*Attended exit interview

2. Exit Interview

The inspection scope and findings were summarized on February 13, 1981 with those persons indicated in paragraph 1 above. The inspector reviewed the results of his investigation of the apparent overexposure and stated that his investigation indicated that the individual had not received a dose to his body of the magnitude indicated by the TLD. This was the same conclusion which the licensee had reached. Regarding the violation concerning retention of exposure forms (paragraph 6), the inspector stated that the principal concern dealt with the large numbers of records which are processed during outages and the need to implement controls to assure that they are handled and filed properly, not just the specifics of one particular record. These comments were acknowledged by Mr. Harness.

3. Licensee Action on Previous Inspection Findings

Not inspected.

4. Unresolved Items

Unresolved items were not identified during this inspection.

5. Description of Event

a. On January 6, 1981, the TVA Radiation Exposure Management Group reported that the thermoluminescent dosimeter badge (TLD) issued to an outage worker (individual A) for the month of December, 1980 indicated a dose of 2.818 rems. When this dose was added to the dose previously received by the individual during the fourth calendar quarter, the total dose for the quarter was 3.429 Rems; 10 CFR 20.101 (b) specifies a maximum dose during a calendar quarter of 3 Rems.

b. On January 7, 1981 the Radiation Exposure Management Group reported that the TLD issued to another outage worker (individual B) indicated a dose of 2.21 Rems. The fourth quarter dose for this individual was 2.793 Rems, which is below the regulatory limit.

c. Both individuals were outage workers working in the same work crew. No other workers on the crew received a dose for the month of December greater than 600 millirems as measured by TLD. The doses for the two individuals as measured by self-reading dosimeters were 804 millirems and 786 millirems, respectively.

6. Evaluation of Doses

a. Following the identification of the apparent overexposure to individual A, the licensee initiated an investigation to establish the validity of the dose and to identify the cause(s) of the overexposure. Included in this investigation were:

(1) Review of dosimeter logs (rezero logs), radiological incident reports, and special work permits (SWP's);

(2) Review of radiation surveys of work areas and conduct of special radiation surveys to identify any hot spots or streamers which might have previously not been identified;

(3) Calculation of doses based on radiation levels and stay times for each SWP;

(4) Interview with both individuals and the crew foreman;

(5) Comparison of doses for both individuals with the doses of other workmen who performed the same work at the same time; and

(6) Testing of TLD's for adequate response.

Based on this investigation, nothing was identified which indicated that the doses received by the two individuals were of the magnitude measured by the TLD's.

b. The inspector reviewed the results of the licensee's investigation, independently calculated doses based on the SWP information and compared the doses received by other members of the work crew with the doses for the two individuals for both self reading dosimeters and TLD's. The inspector also inspected the TLD storage area for possible sources which might have affected the measured doses, and reviewed the records of when radiography was performed in the areas where the individuals worked. The inspector did not identify any probable cause for the high dose for the two individuals.

c. The inspector also interviewed the general foreman and individual A by telephone. Neither individual was able to provide any information not previously provided to the licensee. Neither individual was able to provide any information which would explain the disparity in doses between the workers on the crew and individuals A and B.

7. Authorized Doses

a. 10 CFR 20.101(b)(1) permits an individual to receive a whole body dose of 3 rems provided that a Form NRC-4 has been completed in accordance with section 20.102, and the accumulated lifetime dose does not exceed 5 (N-18) rems. If these actions have not been completed, then the permissible dose is 1¼ rems per calender quarter.

b. The inspector reviewed the records for individual A and verified that a current Form NRC-4 had been completed by him in September 1980. The inspector also reviewed the Personnel Exposure Computer Printout (issued twice daily) and verified that the cumulative lifetime dose and allowable lifetime dose had been determined. Neither an authorized dose of 3 rems nor the assigned dose of 3.429 rems would have resulted in the individual exceeding his allowable lifetime dose. The inspector had no further questions on the authorized dose for individual A.

c. The inspector also reviewed the dose records for individual B. However, the licensee could not locate the current Form NRC-4 either in the plant files or in the dosimetry files. Discussions with individuals involved with these records at the plant revealed that the individual had filled out the Form NRC-4 in November 1980. The individuals involved stated that the individual and his foreman had come to the office together and discussed the need for a current form before it was signed. The inspector reviewed the Personnel Exposure Computer Printouts for November 26. The first printout at 8:14 a.m. showed that the individual did not have a current form and his allowable quarterly dose was 1,250 mrems; the second printout at 7:19 p.m. showed that the individual had a current form and his allowable quarterly dose was

3,000 mrems. The individual who does the computer input told the inspector that the data are taken directly off the form so if the computer base was changed, then the completed form was available. Based on the computer records and discussions with the personnel, the inspector concluded that a Form NRC-4 had been completed for individual B but had been lost or misplaced. Despite an extensive search of the files, the form could not be located.

d. 10 CFR 20.102(c)(2) requires that the licensee shall retain and preserve records used in preparing Form NRC-4. In that the form could not be located after an extensive search the inspector concluded that it had not been retained. This is a violation. (259/81-15-01, 260/296/81-05-01). The inspector emphasized to licensee management that care must be exercised to assure that personnel records such as these are properly handled and filed, expecially when during outages when copious amounts of records are being generated. This comment was acknowledged by licensee representatives.

8. Dosimetry

a. During work in the radiation control areas, individuals wore both self-reading dosimeters and thermoluminescent dosimeters (TLD's). Doses recorded on work permits were based on self-reading dosimeters. The inspector asked if the dosimeters used by the two individuals had been checked for accuracy, malfunction, etc. A licensee representative stated that for much of the work, high range dosimeters had been issued when entering the area and returned when exiting. The same dosimeter was not used each time so any discrepancies which might be identified with a particular dosimeter could not be related to the dose any particular individual may or may not have received.

b. The TLD's used by TVA contain two chips. To evaluate the dose, each chip is read seperately. The inspector reviewed the strip chart printout for the energy output ("glow curves") for the two chips in the TLD worn by individual A., glow curves for other chips and the light response curves for checking the instrument performance. The relative size of the peaks for the two chips were comparable and were markedly larger than the peaks for other chips. The shapes of both curves were consistent with the curves for other chips and indicated no anomalies or breaks and the light response curves appeared normal. Based on these records the inspector did not identify any irregularities which would invalidate the dose of 2.818 Rems which was reported for the TLD of individual A.

c. A licensee representative discussed the checks performed on the TLD chips, which included checking for a retained dose due to improper preparation and response to a known dose. The licensee representative stated that the checks did not indicate the presence of a retained dose and the chip responded properly to the known dose. The inspector

reviewed the data from the exposure of several chips, including the two chips from the TLD issued to individual A, and concluded that the response to a known dose was consistent for the chips and did not indicate any anomaly in the performance of the chips. A licensee representative stated that based on the checks of the chips, the dose of 2.818 Rems was measured by the chip as a true dose but nothing can be concluded concerning the dose which the individual might have received because there was no way of determining when or how the dose was received.

9. Reports

a. 10 CFR 20.405 (a) requires that each licensee shall make a report in writing within 30 days of each exposure of an individual to radiation in excess of the applicable limits in section 20.101. On February 4, 1981 the licensee submitted a written report of the exposure which exceeded the quarterly limit for whole body exposure of 10 CFR 20.101-(b). After reviewing the report the inspector had several questions concerning the actions taken during the investigation by the licensee and the conclusions drawn. These were discussed with a licensee representative during the inspection. The inspector requested that a supplemental report be submitted to clarify these questions; this was acknowledged by the licensee representative. A supplemental report was submitted on February 13, 1981. The inspector had no further questions concerning the report.

b. 10 CFR 19.13(d) requires that when a licensee is required pursuant to 10 CFR 20.405 to report to the Commission any exposure of an individual in excess of regulatory limits, the licensee shall also furnish the individual a report on his exposure data. The inspector reviewed the report which was sent to individual A on February 4, 1981 in accordance with 10 CFR 19.13(d); the inspector had no further questions.

10. Conclusion

a. In the report of the event, the licensee stated "based on work records and pocket dosimeter data, there is no indication of an exposure of the magnitude indicated by the TLD badges". This position was substantiated by the licensee's investigation and by the inspector's review. The inspector concluded that the individual did not receive a dose to his person of the magnitude on the TLD and that an overexposure had not occurred.

b. The licensee's report further stated "since this discrepancy cannot be accounted for, the TLD data will be entered into the radiation exposure history for these employees." The inspector noted that this was a conservative approach and concluded that this was an acceptable resolution of the discrepancy.