UNITED STATES
NUCLEAR REGULATORY COMMISSION
REGION II
101 MARIETTA STREET, N.W.
ATLANTA, GEORGIA 30323

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Report Nos.: 50-259/91-35, 50-260/91-35, and 50-296/91-35

Licensee: Tennessee Valley Authority
6N 38A Lookout Place
1101 Market Street
Chattanooga, TN 37402-2801

Docket Nos.: 50-259, 50-260 and 50-296 License Nos.: DPR-33, DPR-52, and DPR-68

Facility Name: Browns Ferry 1, 2, and 3

Inspection Conducted: September 16-20, 1991

Inspector: Eldon L. Testa 10/2/91
E. D. Testa Date Signed

Approved by: John Potter 10/2/91
J. P. Potter, Chief Date Signed
Facilities Radiation Protection Section
Radiological Protection and Emergency
Preparedness Branch
Division of Radiation Safety and Safeguards

SUMMARY

Scope:

This routine, unannounced inspection of the radiation protection program was conducted in the areas of external exposure, internal exposure, dose reduction initiatives, training and qualifications for personnel, ALARA, program audits, and contamination control.

Results:

In the areas inspected, no violations or deviations were identified. The original 1991 fiscal year exposure goal was revised downward from 650 person-rem to 539 person-rem by the ALARA/Radwaste Committee to be more challenging. Personnel contamination reports and radiological incident reports for 1991 fiscal year were below established goals. The amount of contaminated square footage had been reduced to about 4.3 percent.

The computer based Radiation Exposure System had been placed in limited service in Unit 2 and was scheduled for implementation within the next month in Unit 3. Audits were found to be detailed and reflected an indepth review of the program. The technical qualification of auditors was noted as a strength.

REPORT DETAILS

1. Persons Contacted

Licensee Employees

*S. Bugg, Manager, Radwaste
*P. Carier, Manager, Site Licensing
*R. Coleman, Radiological Protection Supervisor
*J. Corey, Radiological Control Manager
*G. Hudson, Manager, NCO Radcon
*E. Mastick, Health Physics Field Operations Supervisor
*R. Miller, Quality Assurance Evaluator
*S. Rudge, Manager, Site Support
*J. Sabados, Manager, Chemistry and Environmental
*P. Salas, Manager, Compliance/Licensing
*J. Scalice, Plant Manager
*J. Wallace, Compliance Engineer, Site Licensing

Other licensee employees contacted during this inspection included craftsmen, engineers, operators, security force members, technicians, and administrative personnel.

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*W. Bearden, Resident Inspector
*E. Christnot, Resident Inspector
*P. Kellogg, Section Chief, BFNP
*J. Lenahan, Civil Engineer
*C. Patterson, Senior Resident Inspector

*Attended exit interview

2. Organization and Management Controls (83750)

The inspector reviewed the Radiological Control Organization staffing levels. At the time of inspection, the Radcon staff included 1 manager, 14 supervisors, 17 shift supervisors and 87 technicians. There were no vendor technicians on staff and the licensee indicated that none would be needed in the foreseeable future. At the time of the inspection Unit 1 was in layup, Unit 2 was at 100 percent power and Unit 3 was undergoing rehabilitation in preparation for startup. There appeared to be an adequate organization to support the plant.

No violations or deviations were identified.

3. Person-Rem, Personnel Contamination Events, Radiological Incident Reports, and Contaminated Square Footage (83750)

10 CFR 20.1(c) states that persons engaged in activities under licenses issued by the NRC should make every reasonable effort to maintain radiation exposures as low as reasonably achievable.

a. Person-Rem Status

The inspector reviewed site collective dose for fiscal year (FY) 1991, and discussed past and current trends, and future goals with plant personnel.

The original FY 1991 (October-September) goal was 650 person-rem. Based upon actual dose received the licensee management felt that the goal could be revised downward to 539 person-rem. A more challenging site goal was recommended by the ALARA/Radwaste Committee in their September 6, 1991 meeting. As of September 20, 1991 the last date of the inspection, approximately 97 percent of the FY, the accumulative person-rem was 489 which was approximately 91 percent of the revised FY goal. The breakdown of dose per unit:

Unit	% of Total Dose	Unit Status
Unit 1	12%	layup
Unit 2	67%	Operational
Unit 3	21%	preparation for restart

b. Personnel Contamination Reports (PCRs)

The reporting level trigger for PCRs is greater than 100 counts per minute surface contamination. The licensee's FY 1991 goal for PCRs was less than 85. With about 97 percent of the FY complete there were 74 PCRs reported. This is about 87 percent of the goal. The inspector reviewed selected PCRs for the period June through September and found them complete.

c. Radiological Incident Reports (RIRs)

The licensee's FY 1991 goal for RIRs was less than 70. With about 97 percent of the FY complete there were 37 RIRs reported. The inspector selectively reviewed RIRs for the period June through September. Radiological Control Instruction (RCI) 14 titled, "Radiological Awareness Reporting" describes the RIR system and provides guidance on preparation, use, tracking, and trending of RIRs. RIR 91-036 dated July 21, 1991, indicated that 13 contract employees terminated and left the site without first obtaining whole body counts (WBCs). This investigation was still in progress. The inspector reviewed historical termination letters and followup for similar situations. Employees who terminate and who do not obtain an exit WBC are contacted and requested to return to obtain an exit

count. Absenting this WBC, an analysis of MPC-hours and a review of Radiation Work Permit (RWP) sign-on/off is conducted. The licensee also places a statement on the person's termination letter stating that this person had exited without first obtaining a WBC.

d. Contaminated Square Footage

The amount of contaminated area in the plant continues to be reduced. The trend has continued downward and of approximately 927,000 ft.^{2} the licensee has slightly over 4 percent controlled as contaminated. This is below the FY 1991 goal of 5 percent or less. The licensee maintains an aggressive program to keep the contaminated area minimized. During the weekend of September 14, 1991, the licensee reclaimed about 8,000 ft.^{2} which had been temporarily lost due to maintenance and other activities.

No violations or deviations were identified.

4. As Low As Reasonably Achievable (ALARA) (83750)

10 CFR 20.1(c) states that persons engaged in activities under licenses issued by the NRC should make every reasonable effort to maintain radiation exposure as low as reasonably achievable.

a. Radiation Exposure System (REXS)

The REXS system has been placed in limited service in Unit 2 and is scheduled for Unit 3 implementation within the next month. The computer based system is designed to record and track workers, RWPS and maintain easily accessible records. The inspector attended and received the necessary training prior to using the system for the first time. The training consisted of viewing a 15 minute video and verbal and hands on training for REXS. The system appeared to be easy to use and observation of workers logging in and logging out of the system resulted in few problems. The several problems observed were quickly resolved by HP technicians located in the vicinity of the computer terminals. Interviewed workers expressed an enthusiastic acceptance of the system.

b. Surrogate Tour System

The inspector was informed by the licensee that a contract for the preparation of a surrogate tour for Unit 2 had been awarded. This was expected to enhance the capabilities for work planning, emergency response and job training, resulting in better ALARA. This item will be revisited during a later inspection.

c. ALARA/Radwaste Committee

The inspector reviewed RCI 15.3, Revision 3, titled, "ALARA/Radwaste Committee" and the meeting minutes from the following dates:

ARC 91-01	January 25, 1991
ARC 91-02	March 7, 1991
ARC 91-03	April 16, 1991
ARC 91-04	July 19, 1991
ARC 91-05	September 6, 1991

The committee appears to be aggressive and functioning effectively in pursuing ALARA.

d. Hot Spot Tracking Program

The inspector reviewed RCI-23, Revision 0, dated January 15, 1991, titled, "Hot Spot Tracking Program." The RCI provides instructions for the implementation of a hot spot tracking, trending and eliminations program. A hot spot is defined as an area where the contact dose rate at the posting is greater than or equal to 100 mr/hr and four times the surrounding area contact dose rate. There are 67 hot spots currently identified and tracked. Thus far 9 hot spots have been eliminated and an action plan has targeted 6 more for flushes. Operations are currently writing flush procedures for each of the hot spots. There are 6 target areas due for flushes between September 21, 1991 and October 5, 1991. The program appears to be working effectively.

e. Instruments

The inspector toured Units 1, 2, and 3 Reactor Building and Units 1, 2, and 3 Turbine Building and Common Radwaste area. Selective examination of instrument calibration dates found them all to be current. The inspector observed several work orders on the newly installed continuous air monitors (CAMs). Further investigation of these instruments found that 52 of the 81 work orders have been written since April 1991 on the CAMs. The work orders are characterized as follows:

Problem	Number of Work Orders Written
Wiring/Setpoint	18
Broken/Inoperative Detectors	6
Dirty Filters	3
Personnel Error	4
Wiring/Installations	11
Field Components	10

The licensee has recognized the significance of the CAM problem and in a September 19, 1991 memorandum has proposed corrective actions

for each category. Because of the identified problems, the new CAMs have been out of service for significant periods of time. This item will be tracked as Inspector Followup Item (IFI) (IFI 50-259, 260, 296/91-35-01).

f. Unit 3 Steam Separator Lift

The inspector witnessed the Unit 3 Steam Separator Lift on September 19, 1991, carried out under RWP 91-3-500281100. Effective use of distance and shielding afforded by previously removed shield plugs enabled workers to reduce job dose when not actively assisting in the lift operation. Adequate pre-job surveys and lift monitoring ensured minimization of worker dose.

No violations or deviations were identified.

5. Audits (83750)

Technical Specification (TS) 6.5.1.6 requires audits of facility activities to be performed under cognizance of the Plant Operations Review Committee (PORC) encompassing conformance of facility operations to all provisions contained in the TSs and applicable License Conditions at least once per 12 months, and the Process Control Program (PCP) and implementing procedures at least once per 24 months.

The inspector reviewed the Nuclear Quality and Evaluations (NQA&E) Audit Report No. BFA 91103, "Internal Exposure Control and Radcon Instrumentation," dated March 1991. The inspector also reviewed the audit checklist prepared for this audit. The audit identified no conditions adverse to quality. The audit provided recommendations for program enhancements.

During the week of the inspection another audit BFA 91111, "Radiological Control (RADCON)" was being performed. This audit was being conducted to assess the performance and effectiveness of the Site Radcon organization (including Unit 3 restart Radcon). The audit was being conducted using personnel interviews, in plant observations, and documentation reviews of organizations involved with BFN Radcon program implementations. The inspector reviewed the audit plan and the technical qualifications of the audit team. As a result of this review, the inspector considered the present audit program a strength. Audit recommendations contributed to Radcon Program improvements. The inspector noted the experience and depth of the Radcon technical expertise on the audit team.

No violations or deviations were identified.

6. Low-Level Radioactive Waste Storage Facilities (65051)

The Low-Level Radioactive Waste Policy Amendments Act provides for the closing of the Barnwell Waste Management Facility on December 31, 1992. In anticipation of this closing, the licensee's plans for dealing with the closure were reviewed. The licensee's final action plan for disposal of low-level radwaste was reviewed. An update meeting was scheduled for September 20, 1991, to review the action plan. A tour of the BFN low-level waste storage modules indicated that some upgrade and equipment purchases would be necessary prior to their use; however, a number of concrete structures are already in place and could be made ready for use if needed.

No violations or deviations were identified.

7. Solid Radwaste Waste Management and Transportation of Radioactive Materials (86750)

10 CFR 20.311(b) requires each shipment of radioactive waste to a land disposal facility to be accompanied by a shipment manifest that indicates as completely as practicable: a physical description of the waste; the volume; and the radionuclide identity and quantity; the total radioactivity; and the principal chemical form.

10 CFR 71.5 requires that a licensee who transports licensed material outside the confines of its plant or other place of use, or who delivers licensed material to a carrier for transport, to comply with the applicable requirements of the regulations appropriate to the mode of transport of the Department of Transportation (DOT) on 49 CFR Parts 170 through 189.

49 CFR 172.203(d)(i) requires the description for a shipment of radioactive material to include the name of each radionuclide in the radioactive material and the activity contained in each package of the shipment in terms of curies, millicuries, or microcuries.

49 CFR 172.604(a)(1)(3) requires that a person who offers a hazardous material for transportation must provide a 24-hour emergency response telephone number (including the area code or international access code) for use in the event of an emergency involving the hazardous material. The telephone number must be monitored at all times and entered on the shipping paper.

During the inspection, the inspector observed licensee shipping activity and reviewed the records of radioactive waste shipment RD No. 176084. The shipment consisted of Irradiated Components comprised of LPRM strings with fission chambers, antimony source pins and miscellaneous hardware. The shipment contained approximately 8550 Ci(s) of activity and was shipped as a Waste Form Class C shipment. The shipping manifest examined was consistent with applicable 49 CFR Parts 170 through 189 requirements. The

radiation and contamination survey results were within the limits specified for this mode of transport and shipment classification, and the shipping documents were completed and maintained as required.

The inspector telephoned the 24-hour emergency response telephone number listed on the shipping manifest as required by 49 CFR 172.602 for use in the event of an emergency. The call was placed at about 8:15 p.m. CDT on September 19, 1991. The phone was answered by the Operations Duty Specialist. He talked through the actions that he would take if this were a "real" notification. He used the emergency procedure written to respond to a transportation accident CECC-EPIP-22, Revision 5, dated April 30, 1991, titled, "Operations Duty Specialist Transportation Accident Involving a Shipment of Radioactive Material." The responses were complete and correct by procedure.

No violations or deviations were identified.

8. Exit Interview

The inspection scope and results were summarized on September 20, 1991, with those persons indicated in Paragraph 1 above. The inspector described the areas inspected and discussed in detail the inspection results listed below. Although proprietary information was reviewed during the inspection none is included in this report. Dissenting comments were not received from the licensee.

Item Number	Description and Reference
50-259, 260, 296/91-35-01	IFI - Ensure reliable operation of the newly installed Continuous Air Monitors (Paragraph 4.e).