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

Report Nos.: 50-259/84-03, 50-260/84-03, and 50-296/84-03

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

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

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

Facility Name: Browns Ferry

Inspection at Browns Ferry site near Decatur, Alabama

Inspector: Ray E. Weddington 3/2/84
R. E. Weddington Date Signed

Approved by: K. P. Barr 3/2/84
K. P. Barr, Section Chief Date Signed
Operational Program Branch
Division of Engineering and Operational Programs

SUMMARY

Inspection on January 10 - 13, 1984

Areas Inspected

This routine, unannounced inspection involved 31 inspector-hours on site in the areas of transportation, 10 CFR Part 61 implementation, posting and labeling, procedure compliance, TLD/pocket chamber mismatch evaluation, whole body count reports and administration of multibadging TLDs.

Results

Of the sever areas inspected, no violations or deviations were identified in two areas; four apparent violations were found in five areas.

REPORT DETAILS

1. Persons Contacted

Licensee Employees

*A. W. Sorrell, Health Physics Supervisor
*M. D. Kelley, TVA Radwaste Management Engineer
*G. T. Jones, Plant Superintendent
*C. J. Rozear, Plant Compliance
*E. D. Nave, Plant Engineering
*E. M. Cargill, Jr., Assistant Health Physics Supervisor
*L. L. Krause, Plant Engineering
*J. Owen, Plant Power Stores
*D. C. Minsy, Plant Engineering
*J. R. Clark, Plant Chemistry
*W. C. Thomison, Plant Nuclear Engineering Supervisor
*B. T. Williams, Plant Nuclear Engineer
*H. M. Crowson, Assistant Health Physics Supervisor
*J. E. Swindell, Assistant Power Plant Superintendent

Other licensee employees contacted included five technicians and three office personnel.

NRC Resident Inspectors

*G. L. Paulk, Senior Resident Inspector
*C. Patterson, Resident Inspector

*Attended exit interview

2. Exit Interview

The inspection scope and findings were summarized on January 13, 1984, with those persons indicated in paragraph 1 above. The violations of 10 CFR 71.5(a), 10 CFR 30.41(c), 10 CFR 19.13(d), 10 CFR 20.203.e.1 and Technical Specification 6.3.A.7 were discussed with licensee management who acknowledged the violations.

3. Licensee Action on Previous Enforcement Matters

Not inspected.

4. Unresolved Items

Unresolved items are matters about which more information is required to determine whether they are acceptable or may involve violations or deviations. New unresolved items identified during this inspection are discussed in paragraph 5.

5. Transportation of Licensed Material

Browns Ferry has made ten radioactive material waste shipments to a licensed land disposal facility in calendar year 1984. The inspector reviewed the Plant Power Stores files of the records of these shipments. The inspector noted that the shipping papers for shipment number 0184-166-S on January 3, 1984, a loaded resin cask shipment to the Chem-Nuclear Systems, Inc. Waste Management Facility near Barnwell, South Carolina, indicated that a metal box containing radioactive tools was also included in the shipment. The inspector noted that the manifest for the box of radioactive tools, TVA Form 17111, appeared to be improperly prepared in that not all of the descriptive information required to be on a shipping manifest for radioactive material was annotated for this item. Specifically 49 CFR 172.202(a)(1) and (3) requires that the manifest contain the proper shipping name and identification number for the material. 49 CFR 172.101 gives the proper shipping name and identification number for a low specific activity material as "Radioactive material, low specific activity or LSA, N.O.S., UN2912." The box of radioactive tools represented a low specific activity quantity of material. 49 CFR 172.202.d.1 further requires that the description for a shipment of radioactive material include the name of each radionuclide in the radioactive material. The licensee shipping paper described the radioactive material as "Radioactive Tools." Licensee representative reviewed the shipping manifest and acknowledged that the proper shipping name, identification number and description of radionuclides in the radioactive material was not properly annotated on the shipping record. The inspector informed the licensee that failure to properly prepare the shipping manifest constituted a violation of 10 CFR 71.5.(a), which requires that each licensee who transports licensed material outside of the confines of its plant or other place of use, or who delivers licensed material to a carrier for transport, shall comply with the applicable requirements of the regulations appropriate to the mode of transport of DOT in 49 CFR Parts 170 through 189 (VIO 259/260/296/84-03-02).

The inspector then questioned the licensee concerning for what purpose this metal box containing radioactive tools was included on the resin cask shipment to the Barnwell, S.C. facility. The licensee stated that the tools were not accessories or components of the shipping cask, were not intended for disposal and were of no apparent need to the recipient. Rather, the box of radioactive tools on the shipping cask transport was indeed to remain with the empty shipping cask transport for the return trip from the Barnwell, S.C. site to the licensee's site. The licensee was concerned that the State of Georgia might impose restrictions on times and/or days that an empty radioactive materials cask transport may use its public highways. The licensee reasoned that including the box of radioactive tools on the cask transport would permit them to legally display the "Radioactive" placard on the return trip and thus preclude any delays due to State of Georgia laws concerning movement of empty radioactive material cask carriers. The inspector stated his concern as to the propriety of using the regulations of the Commission and the Department of Transportation to circumvent a state law. The Region II State Liasion Office contacted the State of Georgia Department of Transportation on this matter. The State of Georgia indicated

concern about needlessly transporting radioactive material through their state and indicated they would further consider the matter.The licensee should clarify this matter with the State of Georgia so that they are not needlessly transporting radioactive material on the public highways. The licensee then showed the inspector the manifest which Chem-Nuclear Systems, Inc. used to transfer the box of radioactive tools back to the licensee on January 4, 1984. The inspector noted that preparation of the return manifest and documentation of radiological surveys evidenced receipt by Chem-Nuclear of the box of radioactive tools. The inspector reviewed the license issued to Chem-Nuclear for its Barnwell site by the State of South Carolina. Condition 8 of license number 097, effective December 27, 1983, states that only radioactive material consigned for burial shall be received at the Barnwell site, unless otherwise authorized by the license or by the State of South Carolina. The remainder of the text of the license does not address radioactive materials other than waste and the licensee did not have the state's approval to transfer the material to the Barnwell site. The licensee was informed that since Chem-Nuclear's license did not permit them to receive radioactive materials other than waste, that also transferring the box containing radioactive tools with the loaded resin cask was a violation of 10 CFR 30.41(c) which requires that before transferring byproduct material to a specific licensee of an Agreement State, the licensee transferring the material shall verify that the transferee's license authorizes the receipt of the type, form, and quantity of byproduct material to be transferred (VIO 259/260/296/84-03-02).

The inspector then inquired of the licensee how weighing of loaded radioactive materials transport vehicles is accomplished. The licensee stated that after the shipment is delivered to the carrier, there is a commercial weight scale along the route at the intersection of the site road and Alabama State Highway 72. If the shipment is overweight, then the carrier returns to the licensee site and the load is offloaded or rearranged as necessary to correct the overweight condition. The inspector then asked if the licensee performs new radiological surveys or makes any annotations to the shipping documents to document any changes that may be caused by reloading the vehicles. The licensee stated that if anything changes, the shipping papers would be adjusted accordingly. The licensee recalls of two occasions in calendar year 1983 where a carrier had to return to the licensee's site with a cargo of radioactive material because of being overweight. The inspector asked to be provided the shipping papers for those two radioactive material shipments that had to return to the licensee's site to have their cargo adjusted. The licensee indicated that it might be difficult to identify the shipping papers that these two events correspond to. The inspector requested that the records be provided in a reasonable period of time and that this matter would be carried as an Unresolved Item (URI 259/260/296/84-03-05) until such time as the records can be provided and evaluated for compliance with applicable regulations concerning the transportation of radioactive material. The inspector further noted that the licensee's radioactive material shipping procedures do not address what actions are required of the licensee to control the preparation and release of radioactive material shipments that have to return to the licensee's

site. The inspector observed that for initial shipments, a system of procedural controls, use of checklists and verification signatures is required to ensure the performance of radiological surveys, proper loading and bracing of the cargo, application of seals, proper classification, labeling and placarding and various other actions to demonstrate compliance with applicable regulations governing the transportation of radioactive materials. Depending on what actions are required to correct the overweight condition, many if not all of the initial determinations and verifications would be invalidated and a procedure to ensure a similar degree of control as was provided for the initial shipment is considered necessary for the corrected shipment. The inspector informed the licensee that lack of such procedural controls in this area was a violation of Technical Specifications 6.3.A.7, which requires that radiation control procedures be prepared and approved (VIO 259/260/296/84-03-01).

6. Implementation of 10 CFR Part 61 and 10 CFR 20.311

The inspector reviewed the licensee's actions to implement the new regulations governing the preparation and shipment of radioactive waste to land disposal facilities with personnel from the licensee's Nuclear Engineering Section and a representative of the TVA Waste management Group. 10 CFR Part 61 and 10 CFR 20.311 were effective for licensee implementation on December 27, 1983, and the licensee had made ten radioactive material shipments to which the provisions of the regulations apply at the time of the inspection. TVA had an outside contractor devise their implementation program. The contractor had provided a computer software package, that was in use at the time of the inspection, which performed the waste classification determination based on licensee input of radiochemistry analysis of samples taken from the specific waste being shipped or a waste stream representative of the material being prepared for shipment. The licensee has identified six streams from which radioactive waste may be generated at the licensee's site. Those six streams are each of the three units' Reactor Water Cleanup Systems, the Condensate System, Reactor Building Trash and Turbine Building Trash. Seven samples were taken of these waste streams and forwarded to an offsite laboratory for analysis and identification of radionuclides and concentrations of nuclides that cannot be determined by on-site analysis. Six of the samples were forwarded for analysis on November 6, 1983, and the seventh was shipped on December 13, 1983. Pending analysis results of the off-site samples, the contractor software includes a set of generic scaling factors that enable the licensee to determine concentrations of nuclides that cannot be measured by licensee radiochemistry based on concentrations of those nuclides that can be measured on-site. The contractor has also prepared a set of draft procedures which describe the sample and analysis data which the licensee should input into the contractor computer program in order for the program to produce a valid waste classification. The draft procedures also describe a manual method of determining waste classification. A TVA letter dated December 30, 1983, from the TVA Nuclear Production Manager to the licensee's Plant Superintendent forwarded the contractor prepared draft procedures for review and comment. The letter stated that the procedures would have to be incorporated into plant instructions and that any technical changes would

require the contractors' review. The inspector noted that the contractor procedure titled "Sampling Procedures for Waste Classification" stated in paragraph 10.3.1 that, for classification of Dry Active Waste (trash) shipments, a recent sludge sample from the Reactor Water Clean-up phase separator was necessary in order to determine isotopic abundance of reportable radionuclides. The total curie activity is to be determined per step 10.3.2 of the procedure by performing a dose-to-curie calculation on the Dry Active Waste container. This data is then input into the licensee's computer and the contractor's program produces a waste classification. The inspector asked the licensee to demonstrate how sampling and analysis had been performed for Dry Active Waste shipments made since 10 CFR Part 61 became effective. The licensee stated percent of radionuclide abundance is based on a Condensate System sample and total activity is based on a dose-to-curie calculation. The inspector then asked why the licensee was basing waste classification on a waste stream sample other than the one specified in the contractor procedure. The licensee and the TVA Waste Management Group representative reviewed the contractor procedure and stated that they had not previously noticed that a Reactor Water Clean-Up System sample was specified instead of a Condensate System sample. Since they were not aware of this deviation from the contractor's specifications until it was pointed out by the inspector, they had not sought or obtained the contractor's review of this technical change. The inspector expressed the concern that they had no reasonable assurance that they were classifying waste properly.

The licensee stated that the radionuclide abundance for the Condensate and Reactor Water Clean-Up System should be similar. The inspector noted, as mentioned previously, that the licensee had identified these two systems as separate waste streams for classification purposes. The licensee stated that three shipments of Dry Active Waste had been made using the classification method that was other than as specified by the contractor. The inspector was not able to determine that a shipment had been improperly classified since no samples were taken of those particular wastes. The inspector then expressed a concern that no licensee procedures are in place to ensure proper waste classification and other applicable requirements of 10 CFR Part 61 and 10 CFR 20.311 and there is nothing in writing to indicate that the contractor draft procedures and computer program had been reviewed and approved for use as an interim method for performing radioactive waste shipments until local procedures could be developed. The inspector informed the licensee that failure to incorporate the applicable provisions of 10 CFR 61 and 10 CFR 20.311 into local radioactive material shipping procedures constituted a violation of licensee Technical Specifications 6.3.A.7, which requires that radiation control procedures be prepared and approved (VIO 259/260/296/84-03-01).

7. Whole Body count Reports

The inspector requested and obtained from the licensee a computer printout listing personnel who had terminated employment at the licensee's site. The names of three individuals were selected from the printout who had terminated in September and October, 1983. The licensee then provided a printout showing the individuals on-site whole body count results and the

corresponding report to the individual that had been prepared and sent out by the TVA Dosimetery Group at Muscle Shoals, Alabama. It was noted by the inspector that the whole body count results for one of the individuals indicated a positive result, specifically detectable radionuclides were listed as Ru-103, 9.88E-3 microcuries, 0.34% maximum permissible organ burden and Zn-65, 6.25E-3 microcuries, 0.12% maximum permissible organ burden. The written report to the individual from the Muscle Shoals Dosimetery Group, in the section of the report titled Whole Body Findings, was the statement of the result of the whole body count: "No Detectable Activity." The inspector contacted the Muscle Shoals Dosimetry Group to inquire into the discrepancy between the whole body count result and the report to the individual. The inspector was informed that TVA does not report to the individual measurements that represent less than two percent (2%) of a maximum permissible organ burden since there is less statistical confidence in those values close to the Lower Limit of Detection (LLD) of the counting equipment. The inspector expressed the concern that to report to the individual that no activity was detected was misleading. The Dosimetry Group representative acknowledged the concern and indicated that he thought the reports stated there was no significant activity detected or words to that effect. He agreed to investigate this matter and change the computer program to a more accurate description of whole body count findings for low levels of activity. The inspector informed the licensee that not furnishing the individual an accurate report of his whole body count findings was a violation of 10 CFR 19.13(d) which requires reporting to the individual any exposure information forwarded to the Commission pursuant to 10 CFR 20.408.(b) and 10 CFR 19.13(a) which requires that the results of any measurements of radioactive material deposited or retained in the body of an individual, shall be reported to the individual. (VIO 259/260/296/84-03-03)

8. Posting and Labeling

The inspector toured the licensee's Service Building, Radwaste Building, Turbine Building, Reactor Building and Refueling Floor to observe for proper posting and labeling of Radioactive Material Areas, Radiation Areas and High Radiation Areas. The inspector noted on the 562-Elevation of the Service Building, that racks placed along the walls of each side of the main passageway are used to store laundered anticontamination clothing. The inspector surveyed the racks of anticontamination clothing for radiation using an NRC Beta/gamma portable survey instrument, serial number 11347 calibrated on August 15, 1983, and discovered radiation levels of 0.8 to 1.2 millirem per hour along the vertical planes of the racks and 0.4 to 0.5 millirem per hour in the center of the main passageway. The inspector then obtained a licensee calibrated beta/gamma survey meter, an RO-2, and obtained similar results. The inspector noted that there were no postings on the racks or in the vicinity or entrances to this area to warn personnel of the radiological hazard present. The inspector was particularly concerned since this storage area is in a heavily trafficed area and outside of the licensee's frisker boundaries. The inspector informed the licensee that since the racks of anticontamination clothing apparently contained well in excess of ten times 10 CFR 20, Appendix C quantities of licensed material due to the radiation levels observed and was not posted with a radiological

warning sign, that this event would be considered a violation of 10 CFR 20.203.e.1 which requires that each area or room in which licensed material is used or stored and which contains any radioactive material in an amount exceeding ten times the quantity of such material specified in Appendix C of this part shall be posted "Caution, Radioactive Materials" (VIO 259/260/296/84-03-04).

9. Procedure Compliance

During the tour of the licensee facility, the inspector observed activities in progress for compliance with applicable plant procedures and posted Special Work Permit (SWP) requirements. The inspector observed work at the Unit 3 Drywell personnel access being performed under SWP 01-3-35353, Disassemble and Repair Inboard MSIV and Associated Work. The inspector also observed work being performed on the Refueling Floor under SWP 01-3-34097, Remove and Repair Mapping Boom From Cavity. No procedural problems were noted. The inspector observed sorting of contaminated trash being performed on the 565' elevation of the Unit 3 Turbine Building under SWP 13-00139, Sort Trash and Frisk. The inspector noted that the SWP specified that personnel must tape their anticontamination gloves closed around their coveralls. Three of the five personnel working at the area were not complying with this requirement of the SWP. The inspector also noted that a licensee Health physics Technician was providing continual coverage for the work and had apparently not ensured that all of the Health Physics requirements of the SWP were being complied with by the workers. The inspector then observed, in the company of the station Health Physics Supervisor, a worker on the 578' elevation of the Radwaste Building exit the contamination zone barrier and then begin to dress in his personal clothing without performing a whole body frisk. The station Health Physics Supervisor determined from the individual that he did not intend to remove his personal clothing and perform a whole body frisk and had also not performed a personal frisk for contamination upon exiting contamination zones in the past. The licensee then took action to deal with this matter as an internal disciplinary action. The inspector informed the licensee that the two events noted of noncompliance with licensee procedures, noncompliance with the SWP requirements in the trash sorting area and failure of the individual to perform a whole body frisk after exiting a contamination zone contrary to RCI-1, Section III, paragraph IV, constituted a violation of Technical Specifications 6.3.A.7 which requires that radiation control procedures be adhered to. The matter of the individual not performing a whole body frisk is not considered licensee identified since the licensee's routine surveillance did not discover this event (VIO 259/260/296/84-03-01).

10. TLD/Pocket Chamber Dosimeter Mismatch Evaluation

The inspector evaluated corrective action taken as a result of Notice of Violation 259/260/296/83-03-02 concerning the licensee's lack of a program to investigate discrepancies between TLD and Pocket Chamber readings. In a TVA letter dated September 7, 1983 to Region II, the licensee stated that mismatch evaluations and investigation, documentation and corrective action

is now being performed for individual exposures exceeding 500 millirem per month with a difference between TLD and Pocket Chamber readings greater than 25 percent. The inspector reviewed the records of mismatch evaluations performed through December, 1983 and noted that eighty (80) discrepancies were noted in September, 1983, six (6) in October, 1983, two (2) in November, 1983 and six (6) in December, 1983. The inspector inquired as to why fewer discrepancies were identified in the last three months of the year compared with those identified in September, 1983. The licensee stated that they became more sensitive to exposure control and enforcement of administrative exposure control limits within that time frame and had begun reading TLDs more frequently. This practice was formalized in a change to station RCI-2, Personnel Monitoring, on November 30, 1983 which now states that TLD badges should be processed when the cumulative Pocket Chamber reading is in the neighborhood of 500 millirem. The effect of this change is that a significant percentage of the TLD and Pocket Chambers are not now evaluated for discrepancies since they do not meet the minimum criteria for evaluation of being greater than 500 millirem. The inspector also expressed a concern that the investigations that are being conducted are not as meaningful as they might be. Currently a questionnaire is mailed to the individual that was assigned the discrepant TLD and pocket chamber, sometimes up to four to six weeks later, asking him if he can explain why the discrepancy occurred. The licensee did not show the inspector any meaningful response they ever received from this questionnaire and in many cases had received no response at all since the subject individual was a contractor that had terminated. The inspector expressed his concern that the investigation should be more timely and aimed at obtaining more substantive information. The inspector informed the licensee that this matter was being designated as an Inspector Followup Item and that the inspector will evaluate this area again on the next routine inspection. The concerns relevant to this issue were subsequently discussed by the Chief, Operating Programs Branch and Mr. J. E. Swindell, Assistant Power Plant Superintendent on January 18, 1984, at the Atlanta Regional Office. (IFI 259/260/296/84-03-06).

11. Administration of Multiplebadging TLDs

The licensee for the Unit 3 outage has required multiple TLD badging for certain work activities inside the Unit 3 drywell. As a change from the method of accomplishing multiplebadging for the Unit 1 outage, the routine individual Harshaw TLD is no longer worn when the Panasonic multiple TLDs are issued. The inspector evaluated the controls in place to accomplish this switching of monitoring devices. The inspector visited the multiple TLD issue area at the Outage Health Physics Office and licensee Health Physics Technicians explained the records they maintain. The records indicated that the responsible Health Physics Technicians have been apparently very diligent to properly document what TLD a worker is issued and to maintain accurate records of the readings on the workers various Pocket Chambers. The inspector then followed typical records delivered to the licensee dosimetry section and observed them being entered into the worker's exposure file. No violations or deviations were noted.