



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

JUN 20 1988

Report Nos.: 50-259/88-14, 50-260/88-14 and 50-296/88-14

Licensee: Tennessee Valley Authority
6N38 A Lookout
1101 Market Street
Chattanooga, TN 37402-2801

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

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

Facility Name: Browns Ferry 1, 2, and 3

Inspection Conducted: May 9-13, 1988

Inspector:

C. M. Hosey
R. E. Weddington

6/3/88

Date Signed

Accompanying Personnel: W. B. Gloersen

Approved by:

C. M. Hosey

C. M. Hosey, Section Chief
Division of Radiation Safety and Safeguards

6/3/88

Date Signed

SUMMARY

Scope: This was a routine, announced, onsite health physics inspection in the areas of followup on previous enforcement issues, organization and management controls, training and qualifications, external exposure control, internal exposure control, control of radioactive material, licensee's program to maintain exposures as low as reasonably achievable, solid waste, transportation, followup on TMI action items, followup on inspector identified items and followup on NRC Information Notices.

Results: No violations or deviations were identified.

REPORT DETAILS

1. Persons Contacted

Licensee Employees

- R. Albright, Radcon Supervisor
- *A. Clement, Project Operations Engineer
- W. Cooper, ALARA Engineer
- *J. Corey, Radiological Protection Supervisor
- *H. Crowson, Radcon Field Operations Supervisor
- *D. Davis, Radcon Supervisor
- *D. Hixon, Radwaste Coordinator
- *C. Hsieh, Compliance Engineer
- E. Mastich, Radcon Supervisor
- *R. McKeon, Operations Superintendent
- *J. Savage, Compliance Supervisor
- *R. Simpkins, Radcon Supervisor
- F. Tsakeres, Rad Health Supervisor
- *J. Walker, Plant Manager
- *R. Weedon, Supervisor, Water and Waste Group

Other licensee employees contacted included technicians, security force members and office personnel.

Nuclear Regulatory Commission

- *C. Paulk, Senior Resident Inspector
- *C. Brooks, Resident Inspector
- *E. Christnot, Resident Inspector

*Attended exit interview

2. Exit Interview

The inspection scope and findings were summarized on May 13, 1988, with those persons indicated in Paragraph 1. Dissenting comments were not received from the licensee. The licensee did not identify as proprietary any of the materials provided to or reviewed by the inspector during this inspection.

3. Licensee Action On Previous Enforcement Matters (92702)

(Closed) Violation (50-259, 260, 296/84-12-03) Failure to report an overexposure to the individual and failure to send termination exposure reports to contractor personnel. The inspector reviewed the licensee's responses of September 28, 1987 and March 16, 1988, and verified that the corrective actions specified in the responses had been taken.

(Closed) Violation (50-259, 260, 296/87-34-02) Failure to comply with a low level radioactive waste disposal site prohibition from receiving free liquid within packages. The inspector reviewed the licensee's response of November 25, 1987 and verified that the corrective actions specified by the response had been taken.

4. Organization and Management Controls (83722)

Technical Specification (TS) 6.1.f describes the licensee's radiation protection organization. The inspector reviewed the organization and staffing of the licensee's radiological control (Radcon) and radioactive waste groups.

The Radcon group was authorized a total staffing of 229 technicians, engineers and supervisory personnel of which 224 were currently on hand. This total included a full complement of 95 ANSI qualified health physics technicians.

The licensee had recently reorganized the radioactive waste group to place all waste processing, packaging and shipping functions under a single supervisor reporting directly to the Operations Superintendent. The new group also performed decontamination duties. A new section was formed to implement the licensee's program to minimize the volume of radioactive waste.

No violations or deviations were identified.

5. Training And Qualifications (83723)

TS 6.1.E requires that the qualifications of the Browns Ferry Nuclear Plant management and operating staff meet the minimum acceptable levels as described in ANSI-N18.1. The inspector reviewed with licensee representatives the qualifications and experience of the newly appointed Supervisor, Water and Waste Process Group and determined that the qualifications were consistent with technical specification requirements.

The inspector discussed with licensee representatives proposals to transfer personnel from other TVA facilities to fill senior positions within the licensee's Radcon Group. At the time of the inspection, specific transfers had not been finalized so individual qualifications could not be reviewed. However, the inspector learned that some of the prospective transferees may lack the four years of experience in the craft or discipline that they may supervise and may replace individuals currently in the position that are fully qualified. The inspector stated that this issue will be reviewed when and if transfers are made. Licensee representatives acknowledged the inspector's comments.

No violations or deviations were identified.

6. External Exposure Control (83724)

a. Surveys

10 CFR 20.201(b) requires that each licensee shall make or cause to be made such surveys as may be necessary for the licensee to comply with the regulations in 10 CFR 20 and are reasonable under the circumstances to evaluate the extent of radiation hazards that may be present.

During several tours of the facility, the inspector reviewed Radiation Work Permits (RWPs) posted at work areas. Current radiological survey information was annotated on the RWP form. Current survey information was also indicated on information boards at the controlled area access. During several tours of the facility, the inspector performed independent radiation surveys and noted no inconsistencies with licensee survey results.

The inspector observed personnel removing material across a contaminated area barrier in the turbine building. The work was being performed under RWP 88-6565, Condenser Tube Replacement. The material was being wiped with a cloth and the cloth was checked by a health physics technician using a frisker prior to being released from the contaminated area. The material was then taken to a clean equipment storage area in the turbine building. The equipment was checked with a wide area cloth wipe a second time before it was placed in storage. The inspector did not observe any quantitative smearable contamination or direct radiation surveys being performed. The health physics personnel on the scene had stated that only a large area wipe survey was being performed on the released material.

Licensee procedure TSIL-2, Contamination Surveys Revision 13, January 23, 1987, required that equipment being removed from a contaminated area must have both a smear survey and a direct survey with an appropriate instrument. The inspector discussed this matter with licensee representatives. The inspector was shown a survey record completed by another health physics technician which indicated that the material had been checked for direct radiation while still in the contaminated area. Another technician stated that smears over 100 square centimeters were periodically obtained on the material before it was transferred to the storage area. The inspector observed that the licensee's procedures did not give sufficient guidance on the types of surveys required to release material from a controlled area, when the surveys were to be performed and the limits for release of the material to ensure that surveys were being performed in a consistent manner. Licensee representatives stated that they would revise their procedures to clarify the survey requirements for releasing material from a contaminated area. This procedural change was identified as an inspector followup item (50-254,-260,-296/88-14-01).

No violations or deviations were identified.

b. High Radiation Area Control

TS 6.3.D requires that any individual or group of individuals permitted to enter such areas shall be provided with or accompanied by one or more of the following: (1) a radiation monitoring device which continuously indicates the radiation dose rate in the area, (2) a radiation monitoring device which continuously integrates the radiation dose rate in the area and alarms when a preset integrated dose is received or (3) an individual qualified in radiation protection procedures who is equipped with a radiation dose rate monitoring device.

The licensee typically provided personnel entering high radiation areas with a Xetex digital alarming dosimeter, a radiation monitoring device which continuously integrates the radiation dose in the area. Prior to being issued, the instruments were set to alarm at an integrated dose of either 90, 140 or 300 millirem. The inspector toured the instrument issue area in the turbine building and discussed the calibration and issuance of the instruments with licensee representatives. After being alarm-checked by exposure to a radioactive source and battery checked, the instruments were placed in sealed plastic bags and sent to the issue stations. Instruments were not allowed to be on the shelf available for issue for longer than 24 hours without being rechecked.

No violations or deviations were identified.

c. Irradiation Facility

The licensee had established in a building outside of the plant's protective area an irradiation facility which used a 1.2 curie Cesium-137 source to calibrate thermoluminescent dosimeters (TLDs) and pocket ion chambers and to response check portable instruments. The outer door to the building was protected by an interlock such that the radioactive source was automatically stowed inside the shielded cask when the outer door was opened. Inside the work area was a flashing red light which was activated when the source was exposed and a read-out for a remote radiation monitor which showed the dose rates inside the irradiation area next to the labyrinth exit. The entrance to the labyrinth was also protected by a wire mesh gate that was also interlocked with the source. A read-out for a second remote radiation monitor was adjacent to the labyrinth exit which showed the dose rates in the vicinity of the source.

The facility was operated by Radcon dosimetry or instrumentation technicians that were either fully qualified or had completed the portion of the technician training program applicable to operation of the irradiation facility. The operation of the facility was described in licensee procedure HPISIL 14. The source exposure could be controlled to produce radiation levels of 50 to 4000 millirem.

Exposure times ranged from 3 to 252 minutes depending on the source check or calibration operation being performed.

During discussions with licensee representatives, the inspector was informed of an event in September 1987 in which a technician had bypassed the interlock on the outer door of the facility by placing a penny in the mechanism so that the door could be propped open to allow fresh air into the work area. The event had been discovered by a Radcon supervisor passing by the area. Licensee representatives stated that disciplinary action had been taken against the individual. The inspector also reviewed a memorandum from the Rad Health Supervisor to his group informing them that any tampering with the interlocks was unauthorized and could result in disciplinary action.

No violations or deviations were identified.

d. Skin Dose Assessment From Hot Particles

The inspector reviewed licensee procedure HP DSIL-30, Skin Dose Assessments and Calculations, Revision 0, May 9, 1988. The procedure required a dose assessment for any skin contamination greater than 100 counts per minute as measured by a frisker. Generic dose factors of 4130 millirem - square centimeter/microcurie-hour ($\text{mr-cm}^2/\text{uCi-hr}$) for beta radiation were used for initial assessment of the exposure. These dose factors were those given in the NRC's computer code VARSKIN for Cobalt-60. If the exposure was greater than ten percent of the NRC quarterly exposure limit, then the contaminant was retained for isotopic analysis. DSIL 30 contained a list of 27 isotope-specific dose factors that were then used to perform a more refined dose assessment calculation. These dose factors were also from VARSKIN.

During review of the licensee's procedure, the inspector discussed the following observations with licensee representatives:

- ° Only about one third of the VARSKIN dose factors were given in the licensee's procedure. The procedure did not contain any guidance concerning how to perform the dose assessment for isotopes not listed in the procedure.
- ° The procedure did not contain any provisions to assess the effect of self absorption on the calculated dose.
- ° The procedure contained a provision that allowed suspension of dose assessments after 26 days if the individual could not be decontaminated and was not available for followup evaluation (e.g. termination of employment). This provision was based on ICRP 23, Standard Man, skin cell replacement times. The inspector observed that this approach may not always be appropriate since contaminants that are not readily removable

may be embedded in the skin, as is the case with puncture wounds, and may continue to cause exposure for a much longer period of time than that given in the licensee's procedure.

Licensee representatives stated that they would consider revisions to their procedure to clarify these areas. The revision to this procedure was identified as an inspector followup item (50-259, -260, -296/88-14-02)

No violations or deviations were identified.

e. TLD/Pocket Ion Chamber Discrepancy Reports

During inspection 50-259/260/296/87-34, September 21-25, 1987, it was noted that the licensee was performing few if any TLD/Pocket Ion Chamber discrepancy investigations. The reason for this appeared to be that the licensee's criteria for performing the evaluation effectively excluded most of the readings from review in that the licensee processed TLDs when the cumulative pocket ion chamber reading approached 500 millirem and one of the criteria for performing the evaluation was that the exposure must exceed 500 millirem. Since that inspection, the licensee had changed their TLD minimum dose criteria from 500 to 250 millirem. It was also noted that performing the evaluation quarterly based on cumulative data had the effect of potentially masking discrepant data when combined with other readings.

The inspector discussed these observations with licensee representatives who stated they would submit a request for a revision to the computer software which performed the comparisons to the following criteria:

If the pocket ion chamber or TLD is greater than or equal to 250 mrem and there is greater than or equal to a 50% difference in the values, then an investigation will be required. The investigation will occur for the corresponding TLD wear period. A special pull of a TLD will occur whenever the pocket ion chamber (cumulative or individual) reading is greater than or equal to 300 mrem.

The revision to the computer software which performed the comparisons to the TLDs and pocket ion chambers was identified as an inspector followup item (50259, -260, -296/88-14-03)

No violations or deviations were identified.

7. Internal Exposure Control (83725)

During tours of the facility, the inspector examined the licensee's mask repair area. The facility was used to dispatch and receive respirators from an offsite contractor laundry. The inspector observed respirators

being inspected and tested in the facility. After testing and necessary repairs, the masks were heat sealed in plastic bags and taken to the issue areas. The inspector visited the mask issue area and observed the use of the licensee's computerized issue equipment. The issue program was such that a transaction for an individual was not permitted if all the pre-requisites for mask issue were not satisfied (i.e. current training, medical examination and fit testing).

Licensee representatives stated they had purchased and would install four American Bristol SAC-7 stationary air compressors to provide breathing air to supplied air respirators. Plant service air is currently used for this purpose. The licensee plans to have this equipment in service by September 1988.

No violations or deviations were identified.

8. Control Of Radioactive Material (83726)

The inspector discussed with licensee representatives their hot particle control program as described in licensee procedure TSIL-28, Revision 0, April 20, 1988. The procedure described the control measures that would be taken to control exposures to hot particles. In reviewing the program with licensee representatives, the inspector discussed the following observations:

- ° Hot particle control areas were not identified as such by an insert on the warning sign or other means, but were posted in the same manner as other plant contaminated areas.
- ° The procedure required that personnel in hot particle areas be surveyed every hour, but did not state any actions to take if contamination was detected.
- ° The procedure did not specify that every person in the area be surveyed hourly or just a representative sampling of workers.
- ° The procedure did not specify that personnel surveys should be performed prior to removing any protective clothing, thus presenting the possibility that exposure producing contamination on outer protective clothing would go undetected.
- ° The procedure required that all material, clothing, etc. be surveyed prior to release from the hot particle area. Some material, such as waste, might be more appropriately handled to prevent the spread of particles by promptly containing and dispositioning the waste through the normal plant processes.

Licensee representatives stated that they would consider revisions to their procedure to clarify these areas. Revisions to procedure TS/L-28, Revision 0 was identified as an inspector followup item (50-259, -260, -296/88-14-04)

No violations or deviations were identified.

9. Licensee's Program To Maintain Exposures As Low As Reasonably Achievable (ALARA) (83728)

The inspector discussed with licensee representatives their recent initiatives to promote their ALARA program. An ALARA information board was placed at the Turbine building entrance to the controlled area. The board contained color-coded radiological information on plant diagrams and other ALARA and exposure control information. Licensee representatives also showed the inspector a series of informational pamphlets that TVA had prepared to keep workers informed on various subjects. Pamphlets had been prepared concerning radon, noble gas, whole body counting, prenatal exposure, solar radiation, uses of radiation sources, radiation health effects, and in vitro bioassay.

The inspector discussed ALARA preplanning of radiological work with licensee representatives. The inspector reviewed the following ALARA preplans:

- ° Prejob ALARA Planning Report 88-012, Condenser Retubing, Main Steam Condensing Units 2A, 2B and 2C, February 20, 1988, estimated 82.711 man-rem.
- ° Prejob ALARA Planning Report 88-021, Unit 2 Spent Fuel Storage Pool, Visual Inspection of Approximately 250 Bundles, Cleaning and Reconstitution, April 8, 1988, estimated 5.99 man-rem.
- ° Prejob ALARA Planning Report 88-023, Remove 81 Control Rod Drives and Install 81 New Ones in Unit 2, April 21, 1988, estimated 73.791 man-rem.

The inspector discussed the controls specified in the preplans and determined that appropriate lessons learned had been incorporated into the reviews.

The inspector discussed with licensee representatives how exposure experience on outage work compared with industry data reported in NUREG/CR-4254, Occupational Dose Reduction and ALARA at Nuclear Power Plants: Study on High-Dose Jobs, Radwaste Handling, and ALARA Incentives, Brookhaven National Laboratory, May 1985. The following table compares industry and licensee data:

| <u>Job Title</u> | Licensee (LIC) or Industry (IND) | Collective Dose (Man-Rem) | | |
|----------------------------------|--|---------------------------|----------------|----------------|
| | | <u>Minimum</u> | <u>Maximum</u> | <u>Average</u> |
| Snubber Inspection and Repair | LIC | 0.078 | 16.941 | 5.516 |
| | IND | 2.6 | 1400 | 290 |

| | | | | |
|--|------------|--------------|---------------|---------------|
| Torus Repair, Inspection, and Modification | LIC IND | 0.213 100 | 52.562 600 | 23.506 280 |
| In-Service Inspection | LIC IND | 0.901 32 | 118.60 380 | 34.119 150 |
| CRD Removal/Rebuild and Replacement | LIC IND | 2.003 6.3 | 66.30 230 | 20.267 60 |
| Scaffold Installation/ Removal | LIC IND | 0.446 24 | 11.394 120 | 2.822 57 |
| Primary Valve Maintenance and Repair | LIC IND | 0.015 7.0 | 16.648 150 | 2.559 57 |
| Insulation Removal/ Replacement | LIC IND | 5.2 0.60 | 40.80 170 | 17.0 44 |
| Safety Valve Repair and Inspection | LIC IND | 0.792 9.3 | 20.60 80 | 9.6 39 |
| Plant Decontamination | LIC IND | 1.699 9.4 | 58.228 65 | 22.54 37 |
| RHR System Repair and Maintenance | LIC IND | 1.097 11 | 110.891 48 | 19.157 34 |
| Operations-Surveillance, Routine, and Valve Lineups | LIC IND | 6.095 11 | 57.760 53 | 19.980 24 |
| Reactor Disassembly/ Assembly | LIC IND | 2.553 7.8 | 6.2 51 | 4.663 24 |
| MSIV Repair and Inspection | LIC IND | 0.478 2.7 | 28.0 67 | 13.786 20 |
| Fuel Shuffle/Sipping and Inspection | LIC IND | 0.113 3.8 | 22.8 58 | 8.275 19 |
| Radwaste System Repair, Operator, and Maintenance | LIC IND | 1.634 7.7 | 49.5 28 | 10.222 16 |
| Instrumentation Repair and Calibration | LIC IND | 0.005 3.2 | 21.5 41 | 5.969 15 |
| TIP/IRM/SRM or PRM Calibration, Repair and Maintenance | LIC IND | 0.3 3.5 | 4.1 4.1 | 1.874 11 |

| | | | | |
|--------------------|-----|-----|-------|-------|
| Recirculation Pump | LIC | 1.3 | 4.104 | 3.125 |
| Seal Replacement | IND | 1.5 | 23 | 7.8 |

The licensee's data were taken from 179 separate jobs based on ALARA preplans on file since 1983 and the licensee's computerized database that was implemented in 1985. The industry data were based on 212 separate jobs which were worked at three General Electric Boiling Water Reactors during the period 1974-1984. The inspector determined that the licensee's exposure performance compared favorably with the industry averages reported in NUREG/CR-4254.

No violations or deviations were identified.

10. Solid Wastes (84722)

The inspector discussed with licensee representatives their waste stream sampling program for developing 10 CFR Part 61 scaling factors. Licensee representatives stated that they planned to sample all plant waste streams prior to Unit 2 restart and the Unit 2 waste streams would be resampled after startup and the systems had stabilized.

The inspector discussed with licensee representatives the disposition of wastes from current and recent outages. The licensee had in storage approximately 200 cubic feet of alpha contaminated trash from Unit 2 safe end replacement project. The licensee had sampled this waste and the analysis results indicated that the isotopic distribution within the waste agreed with the Reactor Water Clean-Up (RWCU) System analysis within a factor of five. The licensee therefore planned to scale the safe end waste to the RWCU. 10 CFR 61.55(a)(8) permits use of scaling factors to estimate concentrations of radionuclides in wastes if there is reasonable assurance that the indirect methods can be correlated with actual measurements. The NRC considers agreement by within a factor of ten to be acceptable.

The inspector discussed with licensee representatives the disposition of condenser tubes removed from the Unit 2 Main Steam Condensing Units outage. The licensee had contracted with a licensed waste reprocessor to receive the condenser tubes. The waste reprocessor reportedly intended to decontaminate and attempt to recover the copper from the condenser tubes. The inspector reviewed selected documents indicating the transfer of the material to the contractor.

No violations or deviations were identified.

11. Transportation (86721)

The inspector discussed with licensee representatives radioactive material shipments performed in 1988 and reviewed the shipment log. The inspector reviewed the completed document files for the two following shipments:

Shipment No. 880505, RW 88-127, Condensor Tubes in a strong, tight package, Low Specific Activity, 26.29 millicuries.

Shipment No. 880339, RW 88-078, GE Shroud Head Bolt in a strong, tight package, Low Specific Activity, 8.5E-3 curies.

The inspector determined that the shipments had been prepared consistent with NRC and Department of Transportation requirements.

No violations or deviations were identified.

12. Followup On TMI Action Items NUREG-0737 II.F.1, Attachment 3, Containment High Range Monitor (25401B)

(Open) IFI (50-259/260/296/87-FRP-01), Containment High Range Radiation Monitor. NUREG-0737, Item II.F.1, Attachment 3, required the licensee to have the capability to detect and measure the radiation level within the reactor containment during and following an accident. Table II.F.1-3 of NUREG-0737 specified the following requirements:

- ° Range - 1 rad/hr to 1E+08 rads/hr (beta and gamma) or alternatively 1 R/hr to 1 E+07 R/hr (gamma only)
- ° Response - 60 keV to 3 MeV photons, with linear energy response ($\pm 20\%$) for photons of 100 KeV to 3 MeV. Instruments must be accurate enough to provide usable information.
- ° Redundant - A minimum of two physically separated monitors (that is, monitoring widely separated spaces within containment).
- ° Special Calibration - In situ calibration by electronic signal substitution is acceptable for all range decades above 10 R/hr. In situ calibration for at least one decade below 10 R/hr shall be by means of a calibrated radiation source. The original laboratory calibration is not an acceptable position due to the possible differences after in situ installation.
- ° Special Environmental Qualification - Calibrate and type-test representative specimens of detectors at sufficient points to demonstrate linearity through all scales up to 1E+06 R/hr. Prior to initial use, certify calibration of each detector for at least one point per decade of range between 1 R/hr to 1 E+03 R/hr.

The inspectors interviewed cognizant licensee representatives and reviewed various workplans including the manufacturer's instrumentation manuals pertaining to the containment high range radiation monitoring system (CHRRMS). Specifically, the following workplans were reviewed and discussed with licensee representatives: Workplan Numbers 2241-84,

2007-85, 2008-85, 2009-85, 2160-86, and 2085-87. The workplans detailed the installation of recorders, radiation detectors, terminal blocks, signal cables, conduit, and junction boxes. 10 CFR 50.59 safety evaluations of the CHRRMS were also reviewed. The inspectors ascertained that two Victoreen High Range Containment Detectors (Model 877-1) had been installed inside the Unit 2 drywell shield wall at the 569 foot elevation. The detectors were positioned such that they were diametrically opposite from one another. The inspectors observed, however, that the CHRRMS had not been declared operational. As of this inspection, the licensee had not developed approved calibration procedures, surveillance and testing procedures, nor emergency procedures instructing operators on the use of the containment high range monitor. Also during post modification testing of the equipment, defective cables were identified and were being replaced.

The Victoreen Detector Model 877-1 was an ionization chamber and, according to the licensee, had been designed and tested to function in an environment of up to 357 degrees Fahrenheit (F). The maximum drywell temperature near the detectors after a design base loss of coolant accident had been calculated to be approximately 325 degrees F (Bechtel calculation). Additionally, the detectors had a range from 1 R/hr to $1E+07$ R/hr (gamma only). The manufacturer had tested the detectors up to $1.4 E+08$ R/hr. The test results indicated a linear response (R/hr versus detector voltage output) up to approximately $1.8E+07$ R/hr. Additionally, it appeared that the detector could respond to photons with an energy range of 60 keV to 3 MeV with an essentially linear energy response for photons of 100 keV to 3 MeV. The containment high range monitoring system will have both a meter readout and strip chart recorder located in the control room.

The inspector and licensee representatives discussed the schedule for completion of procedures, equipment checks, environmental qualification, and the calibration of the containment high range monitoring system. The licensee had made a commitment to have the CHRRMS operational before Unit 2 startup. This item will be reviewed further during a subsequent inspection.

No violations or deviations were identified.

13. Followup On Inspector Identified Items (92701)

(Closed) IFI (50-259/260/296/87-34-01), Review technical training given to new supervisor in the Radcon group. This item was opened following the appointment of a supervisor in the radcon group who had little operating reactor plant experience. The inspector discussed the technical training given to the new supervisor and determined through interviews and review of records that the new supervisor had received the following training:

- ° For a three week period, October 19 to November 9, 1987, the individual was reassigned to special projects as directed by the Radcon Superintendent

- Completed B.I.R Systems course
- Completed radiological emergency preparedness training
- Scheduled to attend outside training courses on respiratory protection and health physics certification preparation training
- Completed onsite training courses on (1) Panasonic TLD system, (2) general employee training, (3) orientation to Nuclear Supervisor
- Completed procedure training

Additionally, the supervisors work activities were being reviewed weekly by the Radcon Superintendent. The inspector determined that the licensee's actions on this item were satisfactory.

(Closed) IFI (50-259/260/296/87-34-03), Review licensee's corrective actions for alpha contamination control problems noted during the safe end replacement outage. During the Unit 2 safe end replacement project, December 1986 to April 1987, the licensee encountered levels of alpha contamination on air samples that were more restrictive than the corresponding beta-gamma Maximum Permissible Concentration (MPC) multiples on the samples. One sample indicated an alpha air concentration of 2500 times MPC, which was seven times the beta-gamma MPC multiple. This problem was further complicated by inadequate alpha spectroscopy equipment, which necessitated the licensee decaying the sample for several days to reduce the naturally occurring alpha radioactivity.

The licensee implemented a number of corrective actions in response to this event. The inspector reviewed licensee procedure TSIL-2, Contamination Survey, Revision 13, January 23, 1987. The procedure required control of areas with greater than 20 dpm/100cm² alpha as contaminated. The procedure required alpha surveys upon initial breach of all primary systems and whenever work was to be performed in units with leaking fuel. The procedure establish a beta to gamma ratio of less than 50:1 as indicating that alpha surveys should be performed for release from the contaminated area.

The inspector reviewed TSIL-3, Airborne Radioactivity Surveys, Revision 20, March 13, 1988. The procedure described the use of annular kinetic impactors to perform airborne alpha contamination surveys. The impactors were required to be used in areas where alpha contamination was known or suspected to be present. Since the impactor had a collection efficiency of approximately one hundredth that of a particulate air sample for radon and thoron daughters, initial assessments of airborne alpha concentrations were possible within five hours of sample collection.

The licensee also purchased 30 Bicron Surveyor M alpha scintillation portable survey instruments and placed them at various control points in the controlled area to allow technicians to field check airborne and contamination survey samples for alpha contamination.

The inspector determined that the licensee had implemented acceptable corrective actions.

14. NRC Information Notice (IN)(92717)

The inspector determined that the following information notice had been received by the licensee, reviewed for applicability, distributed to appropriate personnel and that action, as appropriate, was taken or scheduled:

IN88-08: Chemical Reactions with Radioactive Waste Solidification Agents