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

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Report No.: 70-1201/91-01

Licensee: B&W Fuel Company
Commercial Nuclear Fuel Plant
Lynchburg, VA 24505

Docket No.: 70-1201 License No.: SNM-1168

Facility Name: Commercial Nuclear Fuel Plant

Inspection Conducted: January 7-11, 1991

Inspectors: M. P. Elliott — Date Signed: 2/4/91

G. B. Kuzo — Date Signed: 4 February 1991

Approved by: J. P. Potter, Chief — Date Signed: 2/4/91
Facilities Radiation Protection Section
Radiological Protection and Emergency
Preparedness Branch
Division of Radiation Safety and Safeguards

SUMMARY

Scope:

This routine, unannounced inspection involved review of licensee radiation protection (RP) program activities including program staffing and organization, training, radioactive contamination control, audits, internal and external exposure controls and evaluations; transportation of radioactive materials; and review of previously identified inspector followup items, violations, and Information Notices.

Results:

Organizational and staffing changes to the Safety and Licensing group met License Application requirements. Training and medical qualifications for personnel were conducted in accordance with established RP program schedules. Air sampling and bioassay monitoring program results were below applicable license and 10 CFR limits. Routine reports required by 10 CFR Parts 19 and 20, and audits required by the licensee were completed as required. Transportation activities were managed effectively and associated procedures were technically adequate. Within the areas inspected, violations were identified for nonadherence to procedures, and improper evaluation and subsequent assignment of extremity doses for selected workers, as outlined below:

- Failure to have or to follow written personnel radiation procedures for (1) evaluating extremity monitoring requirements for personnel routinely handling unclad uranium material (Paragraph 2.a); (2) conducting in vivo monitoring of SERF workers (Paragraph 3.b); and (3) wearing personnel dosimetry (Paragraph 9.a). Multiple examples of a violation of License Condition No. 9.

- Failure to maintain adequate records of current radiation exposure for personnel monitored under 10 CFR 20.202 in accordance with instructions provided in Form NRC-5 (Paragraph 2.b). Violation of 10 CFR 20.401(a) requirements.

- Failure to follow personnel radiation protection training procedures for (1) SERF access training (Paragraph 6); (2) training documentation (Paragraph 6); and (3) annual retraining (Paragraph 6). Multiple examples of a violation of License Condition No. 9.

- Failure to follow written radiation protection instrument calibration procedures for (1) determining instrument counting efficiency (Paragraph 4.b); and (2) calibrating survey instruments to within ten percent of known values (Paragraph 4.b). Multiple examples of a violation of License Condition No. 9.

REPORT DETAILS

1. Persons Contacted

Licensee Employees

*W. Engelke, Quality Assurance Manager
*D. Ferree, Fuel Operations Manager
*K. Lester, Safety and Licensing Manager
*G. Lindsey, Health-Safety Foreman
C. Speight, Facilities and Services Manager

Other licensee employees contacted included engineers, analysts, technicians, operators, and office personnel.

*Attended exit interview conducted January 11, 1991.

2. External Exposure (83822)

10 CFR 20.101(a) requires that no licensee possess, use or transfer licensed material in such a manner as to cause any individual in a restricted area to receive in any period of one calendar quarter a total occupational dose in excess of 1.25 rems to the whole body, head and trunk, active blood forming organs, lens of the eyes, or gonads; and 18.75 rem to the hands and forearms, feet and ankles.

10 CFR 20.202(a) requires each licensee to supply appropriate personnel monitoring equipment and require the use of such equipment by each individual entering a restricted area under such circumstances that he receives or is likely to receive, a dose in any calendar quarter in excess of 25 percent of the applicable value specified in 10 CFR 20.101(a).

10 CFR 20.202(b) defines personnel monitoring equipment as devices designed to be worn or carried by an individual for the purpose of measuring the dose received.

License Condition Number (No.) 9 of Special Nuclear Material License No. 1168 (SNM-1168) requires that licensed material be used in accordance with statements, representations, and conditions of Part 1 of the licensee's application dated June 22, 1990.

a. Extremity Monitoring

Part 1, Section 3.1.4 of the licensee's Application for License No. SNM-1168 (License Application) requires that activities related to radiation protection functions be conducted in accordance with approved written procedures.

The licensee's extremity (hand) dose monitoring program for individuals involved with handling unclad uranium material was reviewed in detail during the onsite inspection. The inspector discussed and reviewed with licensee representatives evaluations of extremity exposure for persons handling unshielded uranium materials. The current extremity monitoring program involved approximately 10 individuals assigned to pellet weighing, fuel rod loading, quality assurance activities, and construction of fuel assemblies. Licensee representatives stated that the requirement to provide extremity monitoring was evaluated on a quarterly basis. The evaluations involved placement of a single chip thermoluminescent dosimeter (TLD) at the distal end of workers' index fingertip during one work week, for approximately 40 hours. These measured exposures were then extrapolated to estimate the expected quarterly extremity exposure.

Recent changes to the extremity monitoring program, following telephone conversations with a NRC Region II representative in September of 1990, regarding extremity monitoring issues identified at other fuel fabrication facilities, were discussed with licensee representatives. The identified concerns included proper extremity TLD placement and correction for differences in TLD responses between the uranium and calibration source energies. Changes included placement of the extremity TLDs at the tip of the index finger and the development of a correction factor for the dose measurements from the uranium. Prior to the fourth quarter of 1990, the extremity TLD used for the evaluation was placed on the index finger adjacent to the palm of the hand and no correction factor for measuring the 2.39 MeV energy beta from protactinium-234 (Pa-234) daughter radionuclide (the major contributor to extremity dose) was utilized.

The inspector asked to review guidance utilized to conduct the current extremity monitoring evaluation. Licensee representatives stated that no procedural guidance existed for conducting the evaluation. The inspector informed licensee representatives that the failure to have approved written procedures for evaluating the extremity monitoring requirements for employees handling unclad uranium materials was an apparent violation of Licensee Condition No. 9 (70-1201/91-01-01).

The inspector reviewed and discussed with licensee representatives, the January 1, through December 31, 1990 quarterly extremity doses assigned to personnel handling unclad uranium materials in selected facility process areas. Measurable extremity doses were routinely noted and evaluated for approximately three to six individuals involved with the manipulation of unclad uranium material. The inspector noted that minimal direct worker contact with unclad uranium material was maintained by the use of appropriate process controls. Without correcting for the differences between the uranium and calibration source beta energies, the maximum quarterly dose was calculated as approximately 2270 millirems (mrem). At the

time of the onsite inspection a correction factor had not been determined by the vendor. However, a letter to the licensee from the vendor, dated January 10, 1990, indicated that preliminary studies of the extremity TLD badge used by the licensee was expected to have a 80 percent response to the uranium beta energy. Using a correction factor of approximately 1.25 (80 percent response), the inspector calculated a maximum extremity dose of 2836 mrem for the second quarter of 1990.

The inspector noted that based on the vendor's preliminary correction factor, the calculated quarterly extremity dose was less than the 10 CFR 20.202(a) specified limit of approximately 4680 mrem requiring the use of continuous extremity monitoring equipment. However, the inspector noted that a final verification of the vendor's correction factor was not complete and that the correction factor and final extremity exposure data needed to be reviewed. The inspector informed licensee representatives that this issue would be tracked by the NRC and reviewed during a subsequent inspection (70-1201/91-01-02). Furthermore, during discussion regarding vendor measurement accuracy the licensee indicated that additional quality assurance activities, including submittal of extremity TLDs irradiated to a calibrated uranium source, may be conducted.

One violation for failure to have approved procedures for conducting the extremity monitoring program and one followup issue to review final extremity exposure results were identified.

b. Whole Body Exposure

10 CFR 20.401(a) requires each licensee to maintain records in accordance with the instructions contained in Form NRC-5, showing the radiation exposures of all individuals for whom personnel monitoring is required under 10 CFR 20.202(a).

The inspector reviewed records of January 1, through December 31, 1990, cumulative quarterly whole body exposures for individuals involved in fuel manufacturing operations, and of the April through November 1991 monthly exposures for individuals working in the SERF area. The maximum quarterly exposure was approximately 234 millirem (mrem) for an individual involved in pellet loading operations. For SERF area workers, the maximum monthly exposure of 474 mrem was reported. All quarterly exposures were below the 10 CFR Part 20 limits.

The licensee's current official radiation exposure records used to demonstrate compliance with 10 CFR 20.401(a) were reviewed for completeness. During the review, the inspector compared the licensee's January 1, through December 31, 1990 official dosimetry records with data sheets provided by the licensee's TLD vendor. The inspector noted that for three of eight records reviewed, exposure periods and associated whole body doses listed on the vendor's data sheets were not transferred to the employees official record. The

inspector informed licensee representatives that the failure to maintain complete, current employee radiation exposure records was a violation of 10 CFR 20.401 requirements (70-1201/91-01-03).

One violation for failure to maintain current exposure records was identified.

3. Internal Exposure (83822)

10 CFR 20.103(a)(1) states that no licensee shall possess, use, or transfer licensed material in such a manner as to permit any individual in a restricted area to inhale a quantity of radioactive material in any period of one calendar quarter greater than the quantity which would result from inhalation for 40 hours per week for 13 weeks at uniform concentrations of radioactive material in air specified in Appendix B, Table 1, Column 1.

10 CFR 20.103(a)(3) requires that for purposes of determining compliance with the requirements of this section, the licensee shall use suitable measurements of concentrations of radioactive materials in air for detecting and evaluating airborne radioactivity and in addition, as appropriate, shall use measurements of radioactivity in the body, or excreted from the body, or any combination thereof, as may be necessary for the timely detection and assessment of individual intakes of radioactivity by exposed individuals.

10 CFR 20.103(b)(2) states that whenever the intake of radioactive material within any period of seven consecutive days by any individual exceeds that which would result from inhalation for 40 hours at the uniform concentrations specified in Appendix B, Table 1, Column 1, the licensee shall make evaluations and take such actions as are necessary to assure against recurrence. The licensee shall maintain records of such occurrences, evaluations, and actions taken in a clear and readily identifiable form suitable for summary review and evaluation.

a. Air Sampling

Licensee procedure AS-1103, "Airborne Radioactive Materials Control", Rev. 14, dated September 30, 1990 provides instructions for control and evaluation of airborne radioactive materials to insure personnel exposure is maintained ALARA during routine operations.

Documented guidance included action limits regarding Maximum Permissible Concentration-hours for airborne radioactive materials (MPCa-hrs) for insoluble uranium and mixed fission products. To assess worker intake, lapel samplers are utilized by workers at all times for Service Equipment Refurbishment Facility (SERF) area operations and routinely on a part-time basis, to compare breathing zone (BZ) to stationary air sampling (SAS) results in the uranium pellet weighing and loading operations. For the uranium process

area worker, airborne radioactive material intake is determined by correcting the stationary air sampler (SAS) results by a correction factor determined from a ratio of lapel to stationary air sampler (BZ/SAS) results, on a quarterly basis. The inspector noted that the procedure did not provide limits for the evaluation of BZ/SAS results. Licensee representatives stated that for all comparisons, the ratio was positive and all intakes were adjusted accordingly. The inspector noted that the licensee's program guidance for monitoring and assessing exposure to airborne radioactive materials was adequate and utilized conservative assumptions.

The licensee's air sampling program data including determination of BZ/SAS correction factors, selected area airborne radioactive material concentrations, and assigned MPCa-hrs. For January through September 1990, quarterly BZ/SAS comparisons were conducted as required, and all SAS data were adjusted and uranium process area worker MPCa-hrs assigned accordingly. In addition, the April through June 1990 SERF area MPCa results for workers conducting uranium pellet weighing and loading, and special fuel down-loading operations were reviewed. The maximum average airborne concentration, 3.45 E-11 microcuries per cubic centimeter (uCi/cc), was less than the MPCa, 1.0 E-10 uCi/cc, listed for insoluble compounds of uranium listed in 10 CFR Part 20, Appendix B, Table 1, Column 1. Review of licensee internal assessments indicated that a maximum of 9.26 MPCa-hrs was assigned for a worker involved in pellet loading area operations.

No violations or deviations were identified.

b. Lung Burden Analysis

License procedure AS-1121, "Bioassay Program", Rev. 9, dated June 14, 1990, defines the licensee program for monitoring internal deposition of radionuclides in personnel. The procedure requires in vivo analyses to be conducted for personnel assigned airborne radioactive material intakes exceeding 1 MPCa-hr per calendar quarter and annual analyses to be conducted for all SERF area workers. In addition, the procedure defines action limits and subsequent guidance for both uranium and fission product in vivo analysis results. No inadequacies with the the current in vivo procedure were identified.

The inspector reviewed the January 1, through December 31, 1991 in vivo (lung-burden) data for individuals working in the uranium process areas. All analyses were conducted as required and the maximum reported results, 175 micrograms total uranium (ug U) were below the licensee's action limit of 175 ug U. In addition the inspector reviewed selected 1989 and 1990 in vivo analysis conducted for personnel working in the SERF area. From review of in vivo analysis results for maintenance personnel involved in activities in the SERF area, the inspector identified one employee who had not received the required in vivo analysis. License representatives stated that additional time subsequent to the onsite inspection was

needed to review records regarding this issue. The inspector informed licensee representatives that the issue would be considered an unresolved item pending their review. During a January 18, 1991 teleconference, the licensee informed the inspector that the in vivo analysis was not conducted as required. The inspector informed the licensee that the failure to follow personnel monitoring procedures for in vivo analyses was an additional example of a violation of License Condition No. 9 (70-1201/91-01-01). The inspector noted that for other maintenance personnel involved in SERF activities all body burden analyses were negative.

An additional example of the failure to follow personnel radiation monitoring procedures for in vivo analyses was identified.

4. Radiation Controls (83822)

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

a. Radiation and Contamination Surveys

10 CFR 20.201(b) requires each licensee to make or cause to be made such surveys as (1) may be necessary for the licensee to comply with the regulations in 10 CFR 20 and (2) are reasonable under the circumstances to evaluate the extent of radiation hazards that may be present.

10 CFR 20.201(a) defines a survey to mean an evaluation of the radiation protection hazards incident to the production, use, release, disposal or presence of radioactive materials or other sources of radiation under a specific set of conditions. When appropriate, such evaluation includes a physical survey of the location of materials and equipment, and measurements of levels of radiation or concentrations of radioactive materials present.

Procedure AS-1105, "Contamination Control," Rev. 15, dated November 28, 1989 details the requirements and frequencies for performing radioactive contamination surveys in all areas of the plant except the Service Equipment Refurbishment Facility (SERF) area.

Procedure AS-1132, "Service Equipment Refurbishment Facilities Radiological Control," Rev. 5, dated January 5, 1990, details the requirements for performing radiation and contamination surveys in the SERF area.

The inspector reviewed selected survey records of surveys performed from January 1990 through December 1990 and verified that surveys were conducted daily in the pellet change room (clean side); weekly in the pellet change room (hot side), pellet loading room, and pellet

vault; and monthly in the uncontrolled areas of the plant. The surveys of the SERF were performed daily when work was in progress and weekly when no work was being performed.

No violations or deviations were identified.

b. Radiation and Contamination Survey Instrumentation

Procedure AS-1129 "Calibration and Maintenance of Radiation Survey Instruments," Rev. 4, dated September 13, 1989, details the requirements and methods for calibration and maintenance of radiation survey instruments.

Section 7.4 of procedure AS-1129 "Calibration and Maintenance of Radiation Survey Instruments," Rev. 4, dated September 13, 1989, requires counter efficiency to be determined by dividing the average counts per minute of twenty three-minute counts by the 4 Pi value stated on the calibration standard certificate.

The inspector reviewed calibration records for the gas proportional counters used to determine contamination survey results. The inspector noted that on November 12, 1990, the licensee failed to properly determine counter efficiency for the Tennelec LB-5100 gas proportional counter. The inspector informed the licensee that failure to properly determine instrument efficiency was a violation of License Condition No. 9 (70-1201/90-01-04).

Section 11.0 of procedure AS-1129 "Calibration and Maintenance of Radiation Survey Instruments," Rev. 4, dated September 13, 1989, requires instrument readings to be within ten percent of known calibration source values for the instrument to be considered properly calibrated.

The inspector reviewed calibration records for portable contamination survey instruments. The inspector noted that on June 30, 1990, the licensee failed to calibrate the 500-5000 scale on a PAC 4G S/N 4274 to within ten percent of known values but nevertheless determined the instrument to be properly calibrated. The inspector informed the licensee that failure to properly calibrate portable contamination survey instruments was an additional violation of License Condition No. 9 (70-1201/90-01-04).

Section 12.0 of procedure AS-1129 "Calibration and Maintenance of Radiation Survey Instruments," Rev. 4, dated September 13, 1989, requires that portable beta gamma survey instruments be calibrated at intervals not to exceed six months.

The inspector also reviewed calibration records for portable radiation survey instruments and verified that all had been properly calibrated at intervals not to exceed six months .

Two examples of failure to follow procedures for instrument calibration were identified.

5. Administrative Controls (83822)

a. Safety Review Board (SRB)

Chapter 2, Section 2.3 of the License Application details the purpose and functions of the Safety Review Board. The Safety Review Board is required to meet and review applicable items on a quarterly basis. The SRB shall also review the annual ALARA report which is prepared and submitted by the Manager of Safety and Licensing.

The inspector reviewed SRB meeting minutes from March 17, 1987 to December 6, 1989 and verified that the SRB conducted meetings at least quarterly as required. The SRB meeting topics included: new or revised facilities, analysis of hazardous materials equipment and processes, fire safety, effectiveness of established controls and safeguards, ALARA, safety-related audit and inspection findings, and other items as appropriate. Board membership included production managers, health and safety personnel and the plant manager.

No violations or deviations were identified.

b. Audits and Inspections (83822)

Chapter 2, Section 2.7 of the License Application details guidance for performing nuclear safety inspections and radiation safety audits by selected site and outside groups.

The License Application requires Health-Safety personnel to conduct the following:

- Daily inspections of plant activities as part of their routine duties.
- Monthly safety inspections of plant status relative to safety related functions and license requirements.
- Annual inspections of ventilation, containment, and air cleaning equipment.

The License Application also requires the licensee to have independent auditors conduct health physics inspections at the Commercial Nuclear Fuel Plant (CNFP) at least semi-annually. These audits shall be conducted in accordance with written instructions or procedures. Qualifications of the independent auditors shall include

competence in the area of health physics or nuclear physics as appropriate at a level at least equivalent to Paragraph 2.2.3 or 2.2.6 respectively. Paragraphs 2.2.3 and 2.2.6 require a B.S. in science or engineering and two years of applicable experience.

Based on interviews with the Health-Safety Foreman and a review of selected records, the inspector verified that daily, monthly and annual safety inspections were performed in accordance with License Application requirements. Independent health physics inspections are performed by qualified auditors and in accordance with the License Application requirements.

Based on interviews with the Health-Safety Foreman, a review of daily log books, and tours of the facility, the inspectors determined that daily informal plant safety inspections were usually performed by the Foreman and that air systems and filter heads were inspected as required by the license application.

No violations or deviations were identified.

c. Preoperational Survey Evaluations (83822)

Licensee procedure AS-1120, "CNFP Safety Review Board", Rev. 3, dated June 6, 1989, provides guidance for evaluating proposed changes in plant operations regarding nuclear, radiological, and industrial safety. The procedure requires the Nuclear Safety Review Board (NSR) to review additions or changes. Preoperational checks involve health physics audits.

The inspector reviewed selected evaluations conducted for the SERF area containment designed for fuel down-loading conducted in 1990. The licensee's review package included Nuclear Criticality Safety Group and NSRB review and subsequent audits of nuclear safety, health physics and industrial safety issues. The HP audit reviewed health physics controls including approved procedures, use of lapel air samplers, selected protective clothing, catch trays, and use of process controls (air flow hoods).

Cognizant licensee representatives stated that the radiological controls were implemented to maintain the SERF area as a clean area. Furthermore, licensee representatives stated that no significant personal contamination or significantly elevated concentrations of airborne radioactive materials were detected. The inspector noted that selected bioassay and/or BZ air sample results for personnel conducting fuel down-loading operations indicated that the licensee controls were effective (Paragraph 3).

No violations or deviations were identified.

6. Training (83822)

10 CFR 19.12 requires the licensee to instruct all individuals working or frequenting any portions of the restricted areas in the health protection aspects associated with exposure to radioactive material or radiation, in precautions or procedures to minimize exposure, and in the purpose and function of protection devices employed, applicable provisions of Commission Regulations, individual's responsibilities and the availability of radiation exposure data.

Chapter 2, Section 2.5 of the License Application requires all employees to complete initial indoctrination training prior to start of work. The initial indoctrination training shall be reinforced as appropriate to the individuals job assignment by the employee's immediate supervisor. After initial radiation worker training a continuing safety training program shall conducted for all radiation workers at least annually. All employees requiring unescorted access to the Service Equipment Refurbishment Facility (SERF) shall first complete SERF access training. All training shall be documented on the "Computer Training File."

During the current audit, the inspector verified that training was provided to all new employees hired from March 1990 to December 1990; however, only two of the fourteen reviewed had the training documented on the "Computer Training File." The inspector informed the licensee that failure to document initial indoctrination training on the "Computer Training File" was a violation of License Condition No. 9 (70-1201/90-01-05).

For the selected records reviewed, the inspector noted that one radiation worker did not receive continuing training during the period from December 15, 1987 to December 5, 1989. The inspector notified the licensee that failure to retrain radiation workers at least annually was an additional violation of License Condition No. 9 (70-1201/90-01-05).

From a review of the "Computer Training File" and the SERF access list, the inspector determined that several employees had been added to the SERF access list (the SERF access list includes those who have been granted unescorted access to the SERF area) prior to completion of SERF access training. The inspector informed the licensee that failure to properly train employees who had been granted unescorted access to the SERF was an additional violation of License Condition No. 9 (70-1201/90-01-05).

Three examples of failure to follow procedures pertaining to training were identified.

7. Respiratory Protection Program (83822)

10 CFR 20.103( )(2) permits the licensee to maintain and to implement a respiratory protective program that includes, at a minimum: air sampling to identify the hazard; surveys and bioassays to evaluate the actual exposures; written procedures to select, fit and maintain respirators;

written procedures regarding supervision and training of personnel and issuance of records; and determination by a physician prior to use of respirators, that the individual user is physically able to use respiratory protective equipment.

Licensee procedure AS-1109, "Respiratory Protection Program", Rev. 13, dated October 10, 1990 provides instruction for controlling intake of airborne radioactive or toxic materials by use of approved respiratory protective devices. The procedure requires retraining and annual medical qualifications to be established for personnel potentially using respirators.

The inspector reviewed the medical qualifications and training records for selected workers frequenting the SERF area. Records indicated that all personnel were trained and medically qualified as required by the procedure.

No violations or deviations were identified.

8. Transportation of Radioactive Materials (86740)

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

Procedure AS-1111, "Shipment of Radioactive Materials," Rev. 20 dated October 16, 1989 defines the controls established to ensure compliance with regulations governing radioactive material shipments made from CNFP.

The inspector reviewed selected records from radioactive material shipments made during 1990 that included UF6 cylinders, empty UF6 cylinders, field services equipment, and waste. The Radioactive Material Packaging and Shipping Records of each shipment were reviewed for adequacy and completeness as applicable. The items covered by the shipping records included:

- Radioactive materials packing lists
- Bills of lading
- Packaging requirements and classification
- Carrier certification
- Prior notification of shipment
- Vehicle inspection and survey for Exclusive Use Designated shipments
- Instructions to the driver for maintaining Exclusive use controls

- Waste Manifest Forms including such information as chemical form, physical form, container volume, radiation levels, and contamination levels
- Radiation Safety survey records
- Waste shipment checklists
- Empty container verifications
- USDOT 7A package specification test records

All official shipment records reviewed were complete and the supplied information appeared to be appropriate.

No violations or deviations were identified

9. Facility Tours (83822)

License Condition 9 of SNM-1168 requires that licensed material be used in accordance with statements, representations, and conditions of Part 1 of the License Application.

Part 1, Section 3.1.4 License Application that radiation protection function activities be conducted in accordance with written procedures.

During the onsite audit, the inspector selectively toured the licensee's facility and storage areas, observed facility operations, and observed work being performed in various locations to evaluate the implementation and effectiveness of the licensee's radiation protection program. The following specific radiation protection conditions, practices, and items were noted and/or discussed with licensee representatives.

a. Personal TLD Use

Procedure AS-1108, "Personnel Monitoring," Rev. 12, dated September 13, 1989, establishes guidance for initiation and maintenance of effective monitoring programs for non-emergency activities. The procedure requires the licensee to instruct employees to wear dosimetry between the neck and belt line on the front of the body.

During tours of licensee process area and fabrication facilities conducted on January 7, 1991, the inspector observed six of approximately fifteen employees in the pellet loading and rod welding areas improperly wearing their personnel TLDs below the waist or on lateral or dorsal torso areas. The inspector informed licensee individuals that the failure to follow radiation protection procedures for personnel monitoring was an additional example of a violation of License Condition No. 9 (70-1201/91-01-01). The inspector informed licensee representatives that the failure to wear personnel monitoring devices as required could result in inaccurate monitoring of personnel exposure. Discussions with selected employees indicated that radiation protection training provided

guidance and workers were knowledgeable regarding proper dosimeter placement. In addition, the inspector reviewed both shallow and deep doses for selected personnel and noted that based on the routinely low dose rates in the uranium process areas all doses received during the quarter were expected to be below 10 CFR Part 20 limits.

An additional example of a violation of License Condition No. 9 for failure to follow personnel monitoring procedures was identified.

b. Posting and Labeling

10 CFR 20.203(e) requires the licensee to post each area or room in which licensed material is stored if the radioactive material (other than natural uranium or thorium) exceeds 10 times the quantity of such material specified in Appendix C of this part or if natural uranium or thorium exceeds one hundred times the quantity specified in Appendix C with a sign or signs bearing the words: CAUTION RADIOACTIVE MATERIAL(S).

10 CFR 20.203(f) requires the licensee to ensure that each container of licensed material shall bear a durable, clearly visible label identifying the radioactive contents except as provided in Paragraph (f)(3).

Part I, Chapter 1, Section 1.7.1 of the License Application exempts the licensee from the requirements of 10 CFR 20.203 provided that all areas which house or temporarily store radioactive material are posted with signs incorporating the radiation symbol and the following warning:

> CAUTION RADIOACTIVE MATERIAL
>
> ANY AREA OR CONTAINER WITHIN THIS PLANT MAY CONTAIN RADIOACTIVE MATERIAL.

During the onsite audit, the inspector toured selected areas and observed posting and labeling. The inspector discussed with the licensee the exemption from posting and labeling containers as it pertained to the SERF. The exemption was granted with the intent that relatively low external radiation hazards exist at CNFP due to uranium processing. Since the addition of the SERF at CNFP a potential for significant (i.e. high radiation areas) external radiation exposure now exists with the introduction of service equipment contaminated with mixed fission products. The licensee was cognizant that the new hazards and the posting and labeling exemption could diminish the effect of warning signs and information on containers and areas within the SERF. However, the licensee stated and the inspector agreed that the exemption applied to all licensed activities. The inspector verified during tours of the

facility, the licensee had posted areas and labeled containers in accordance with license and 10 CFR 20 requirements.

No violations or deviations were identified.

c. Personnel Contamination Surveys

During tours of the facility on January 7-11, 1991, the inspector observed various individuals exit the controlled areas and perform a personal survey. No problems were noted with those personal surveys observed.

The inspector also noted that the access to the SERF has now been equipped with a whole body contamination monitor to help eliminate past problems with the spread of contamination outside the SERF by personnel clothing contamination. The inspector was unable to observe personnel using the new whole body monitor because no work was performed in the SERF during the onsite inspection.

No violations or deviations were identified.

10. SNM Sealed Source Radiological Controls (83822)

License Condition No. 9 requires the licensee to use licensed material in accordance with statements, representations, and conditions contained in the license application dated June 22, 1990.

Chapter 6 Section 6.1.5 of the license application requires the licensee to perform a leak test on all nonexempt sealed sources every six months.

Procedure AS-1115, Rev. 10, "Handling and Maintenance of Sealed Sources," dated September 14, 1989, requires the licensee to performed leak tests on all nonexempt sealed sources at intervals not to exceed six months.

The inspector reviewed records of sealed source leak tests performed from May 17, 1989 to November 19, 1990 and verified that the licensee had performed the test in accordance with procedure and determined that none of the sealed sources were leaking.

No violations or deviations were identified.

11. Safety and Licensing Department Organization and Staffing (83822)

Chapter 2, Section 2.1 of the License Application defines the functions and general organization for the Safety and Licensing Department. The inspector reviewed the licensee's organizational changes implemented since the last NRC inspection of the RP program conducted in March 1990 and documented in NRC Inspection Report (IR) 70-1201/90-02.

a. Organization

The changes in organizational structure, section responsibility and lines of authority were reviewed and discussed with licensee representatives.

The Quality and Safety Department, which previously reported to the plant manager and included the Manager, Health Physics and Licensing and the Manager, Industrial Safety and Environmental Control was divided into two groups. The Manager, Quality Assurance, now reports to the Company President; and the Manager, Safety and Licensing, now reports to the Plant Manager. The Safety and Licensing Department is responsible for Health Physics, Health-Safety, Licensing, Industrial Safety and Environmental Control. The Quality Control Department is responsible for Quality Control.

No violations or deviations were identified.

b. Staffing

Changes to the radiation protection staff since the previous NRC radiation protection inspection (IR 70-1201/90-02) were reviewed and discussed with cognizant licensee representatives.

The former Manager, Industrial Safety and Environmental Control has retired and the position which is now under Safety and Licensing is presently vacant. The former Manager, Health Physics and Licensing is now the Manager, Safety and Licensing. The former Manager Quality and Safety is now Manager, Quality Assurance.

The radiation protection (RP) technician staff levels were not changed since the previous NRC inspection of RP program activities.

Personal qualifications for the individuals reviewed met the conditions specified in the application.

No violations or deviations were identified.

12. Followup Items (92701)

The following inspector followup items (IFIs) and NRC Information Notices were reviewed and were discussed with cognizant licensee representatives.

a. Inspector Followup Items

- (Open) IFI 70-1201/90-02-01: Followup on licensee's corrective actions regarding high airborne radioactivity levels following vacuum cleaner bag changings.

Through discussions with licensee representatives, the inspectors determined that although the licensee had taken corrective actions to reduce high airborne radioactivity levels, the inspectors were unable to make evaluations of the corrective actions because no vacuum cleaner bag changes had been performed since the corrective actions had been implemented.

b. Information Notices

The inspector verified that the following INs were received by the licensee, reviewed for applicability, distributed to appropriate personnel and that action, as appropriate, was taken or planned.

- IN 88-08 Chemical Reactions with Radioactive Waste Solidification Agents
- IN 88-62 Recent Findings Concerning Implementation of Quality Assurance Programs by Suppliers of Transport Packages
- IN 88-100 Memorandum of Understanding Between NRC and OSHA Relating to NRC-Licensed Facilities (53 FR 43950, October 1988)
- IN 89-13 Alternative Waste Management Procedures in Case of Denial of Access to Low-Level Waste Disposal Sites
- IN 90-09 Extended Interim Storage of Low-Level Radioactive Waste by Fuel Cycle and Materials Licensees
- IN 90-14 Accidental Disposal of Radioactive Materials
- IN 90-31 Update on Waste Form and High Integrity Container Topical Report Review Status, Identification of Problems with Cement Solidification, and Reporting of Waste Mishaps
- IN 90-35 Transportation of Type A Quantities of Non-Fissile Radioactive Materials
- IN 90-44 Dose-Rate Instruments Underresponding to the True Radiation Fields
- IN 90-48 Enforcement Policy for Hot Particle Exposures
- IN 90-56 Inadvertent Shipment of a Radioactive Source in a Container Thought to be Empty
- IN 90-66 Incomplete Draining and Drying of Shipping Packages

13. Licensee Action on Previous Enforcement Action (92702)

a. (Closed) VIO 70-1201/90-02-03: Failure to include the total radioactivity amounts in the shipment on the accompanying waste manifest.

The inspector reviewed and verified implementation of corrective actions stated in the licensee's response dated May 14, 1990. Based on the review of licensee actions the inspector informed licensee representatives that this issue was considered closed.

b. (Closed) VIO 70-1201/90-02-04: Failure to provide adequate information required on shipping papers.

The inspector reviewed and verified implementation of corrective actions stated in the licensee's response dated May 14, 1990. Based on the review of licensee actions the inspector informed licensee representatives that this issue was considered closed.

c. (Closed) VIO 70-1201/90-02-05: Failure to survey the external surface of one empty UF6 cylinder for radiation and contamination and the containers of two fuel shipments for beta-gamma contamination.

The inspector reviewed and verified implementation of corrective actions stated in the licensee's response dated May 14, 1990. Based on the review of licensee actions the inspector informed licensee representatives that this issue was considered closed.

d. (Closed) VIO 70-1201/90-02-06: Failure to survey the internal surfaces of UF6 cylinders in 5 shipments and failure to include a verification statement for empty packages on shipping papers.

The inspector reviewed and verified implementation of corrective actions stated in the licensee's response dated May 14, 1990. Based on the review of licensee actions the inspector informed licensee representatives that this issue was considered closed.

14. Exit Interview

The inspection scope and results were summarized on January 11, 1991, with those individuals indicated in Paragraph 1. The general program areas reviewed and the potential noncompliances identified during this inspection and listed below were reviewed in detail.

Licensee representatives acknowledged the inspectors' comments. The licensee did not identify any material reviewed or received by the inspectors during this inspection as being proprietary.

Item Number	Description and Reference
70-1201/91-01-01	VIO - Failure to have or to follow personnel monitoring procedures for (1) evaluating extremity monitoring requirements (Paragraph 2.a), (2) conducting in vivo monitoring (Paragraph 3.b) and (3) wearing dosimetry (Paragraph 9.a). Multiple examples of a violation of License Condition No. 9.
70-1201/91-01-02	IFI - Review worker extremity doses for compliance with 10 CFR 20 after dosimetry correction factors have been verified or adjusted for accuracy (Paragraph 2.a).
70-1201/91-01-03	VIO - Failure to properly maintain current whole body exposure records as required (Paragraph 2.b). Violation of 10 CFR 20.401 requirements.
70-1201/91-01-04	VIO - Failure to follow procedures pertaining to the calibration of radiation survey instruments (Paragraph 4.b). Multiple examples of a violation of License Condition No. 9.
70-1201/91-01-05	VIO - Failure to follow procedures pertaining to employee training (Paragraph 6). Multiple examples of a violation of License Condition No. 9.