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

Report No. 70-1151/81-11

Licensee: Westinghouse Electric Corporation
Nuclear Fuel Division
Columbia, South Carolina 29205

Docket No. 70-1151

License No. SNM-1107

Inspectors: JBKahle 9/1/81
J. B. Kahle Date Signed

CMPuckett 9/1/81
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Approved by: CM Hosey 9/1/81
C. M. Hosey, Acting Section Chief Date Signed
Engineering Inspection Branch
Engineering and Technical Inspection Division

SUMMARY

Inspection on August 10-14, 1981

Areas Inspected

This routine, unannounced inspection involved 63 inspector-hours onsite in the areas of radiation protection procedures, instrumentation, external and internal exposure control, posting and labeling, contamination control, notifications and reports and previous inspection findings.

Results

Of the seven areas inspected, no violations or deviations were identified in five areas; four items of noncompliance were found in two areas: Failure to provide operable instrumentation, failure to use the frisker monitor when leaving the control area, failure to establish and implement procedure to monitor for fixed contamination, and failure to take immediate action when fixed contamination levels were greater than five times the action level.

REPORT DETAILS

1 Persons Contacted

Licensee Employees

*M. D'Amore, Plant Manager
*E. Bonanno, Chemical Operations Manager
*W. Britton, Manufacturing Manager
*W. Goodwin, Regulatory Compliance Manager
*C. Sanders, Radiological and Environmental Engineering Manager
*L. Weatherford, Health Physics Operations Manager
*E. Reitler, Fellow Engineer
R. Burklin, R&E Engineer
R. Hayes, R&E Engineer
R. Fischer, R&E Engineer
J. Heath, R&E Engineer
T. Shannon, R&E Engineer
G. Lowder, Chemical Manufacturing Supervisor
N. Storrs, Manufacturing Engineer

Other licensee employees contacted included 8 technicians and 6 operators.

*Attended exit interview

2. Exit Interview

The inspection scope and findings were summarized on August 17, 1981 with those persons indicated in paragraph 1 above. Management acknowledged the apparent violations which were identified during the inspection.

3. Licensee Action on Previous Inspection Findings

(Closed) Open Item, 79-14-03, Recording of Filter dP Data on Recirculating Air Units. Step 1 of the procedure has been changed to require that the differential pressure across the filter be read and recorded weekly instead of daily. An examination of logs in the powder, pellet and QC areas showed that the dP result had been recorded practically daily and that filters had been changed before the differential pressure across the filters exceeded the operating limits.

(Closed) Open Item, 80-03-01, DOP Testing of New Filter Installations. The inspector verified that the new filter installations have been completed and examined the records that showed that each filter unit had been DOP tested with satisfactory results. A licensee representative showed the inspector the air sample test results of the air concentrations discharged from the process equipment ventilation systems. The units are sampled for one week out of each month. The results were all less than five percent of the MPC value.

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. No unresolved items were identified during this inspection.

5. Underground Piping for Radioactive Waste Liquids

The transfer of radioactive waste liquids and the potential and consequence for leaks were discussed with the licensee. Licensee representatives stated that piping for the radioactive liquid wastes from the process quarantine tanks to the waste treatment facility was not underground. The licensee has two options for transfer, overhead piping which was recently installed and piping which is contained in a concrete trench. The inpector traced both piping systems. A licensee representative stated that any piping leaks in the trench would drain to a sump which would be pumped to the radioactive waste system.

6. Radiation Protection Procedures

a. The licensee essentially has two types of procedures that pertain to radiation protection. The Regulatory Compliance Section issues a procedures manual which contains procedures pertaining to health physics, nuclear criticality safety, environmental control and nuclear material safeguards. These procedures are approved by the Plant Manager and pertain to all individuals who are employed by the licensee. Distribution of the manual is made to pratically all operating management and supervision. This manual contains the procedures that provide the health physics guidances and requirements for individuals associated with radiation and radioactive materials. Examples of these procedures are general health physics rules, protective clothing, contamination control, dosimetry program, bioassay program, respiratory protection program, radiation work permits, etc. The radiological and environmental engineering function is assigned the responsibility for issuance, review and revision of the regulatory compliance procedures manual.

b. The health physics operations function has established a set of implementing procedures for its function. These procedures pertain to the work performed by the HP operations staff and are approved by the Regulatory Compliance Manager. These procedures provide the detail work requirements performed by the HP operations staff. There are approximately 100 health physics operating procedures.

c. It was noted that the issuance date of several of the procedures was 1977 or 1978. The review and revision system was discussed with licensee representatives. A licensee representative agreed that a

documented procedures review program was necessary and stated that such a program would be initiated to assure that all health physics procedures would be reviewed and revised as necessary, at a minimum of every two years.

d. It appeared from a review of selected procedures from the regulatory compliance procedures manual that all facets of radiation safety were covered. From a review of selected HP operating procedures and other inspection activities, procedures pertaining to contamination surveys for fixed contamination and checking operability of instruments had not been developed. The licensee agreed to establish such procedures. See paragraph 10.b.(10), 10 b.(11), 10 b.(14) and 7.a.(2).

7. Instruments and Equipment

a. (1) Sections 2.2.4 and 3.2.1 of the license application requires that the licensee maintain and calibrate radiation survey instruments. During tour of the work areas, the inspector observed the operability and use of contamination survey instruments at controlled area exits, observed that current calibration stickers were affixed to survey instruments and observed the physical placement of survey instruments relative to their use. One instrument, an Eberline RM3A, Westinghouse serial number 9838, was observed by the inspector to have a punctured mylar window on its detector, rendering it inoperable. This instrument was in use on August 10, 1981 at the boundary between the limited and clean areas in the men's locker room. A second instrument, an Eberline RM-19, Westinghouse serial number 24303, located at Exit #8 from the controlled area was observed by the inspector on August 11, 1981, to not be functioning. In both cases, licensee representatives in the company of the inspector took action to have the instruments replaced with operational units.

(2) Discussion with the facility Health Physics Supervisor revealed that although an instrument check was a feature of the housekeeping daily check sheet, and was normally performed daily, due to a personnel shortage the check had not been performed for about four days. The inspector stated that functional checks for instruments are required prior to each use or, in the case of instruments in continuous use, a functional check should be performed daily. The housekeeping daily check sheet noted above was not a check required to be performed by a facility procedure and expedience had led to irregular checks of instrument function.

(3) The inspector stated that failure to have a procedure requiring that operational or functional checks on survey instruments in use was a violation of License Condition 38, in that surveys for

personnel contamination necessary to comply with action points and limits in the license (the survey being a check of instrument function) were not performed (Violation 81-11-01).

b. The inspector reviewed the calibration records for portable survey instruments to verify that the calibrations had been performed at the required frequencies and after repairs. The inspector had no further questions.

c. The inspector selected a portable survey instrument (Eberline PAC-4G) and checked the accuracy of its calibration using a National Bureau of Standards (NBS) certified radioactive source. The instrument responded properly and the inspector had no further questions.

8. External Exposure Control

a. During tours of the plant the inspector verified that personnel were wearing TLD badges for monitoring required by 10 CFR 20.202(a). The TLD badges are covered with plastic to prevent contamination of the badges. A licensee representative stated that the plastic is changed monthly as a precautionary measure to prevent background radiation from surface contamination. The TLD badges are changed on a quarterly basis.

b. An examination of the exposure records for 1980 showed that personnel doses did not exceed the limits specified in 10 CFR 20.101(a). A licensee representative stated that Form NRC-4 information was maintained as a precautionary measure in the event extended doses specified in 10 CFR 20.101(b) were received.

c. An examination of the records showed that an external radiation survey of the entire plant was conducted on September 9, 1980. No unusual radiation levels were detected, the highest radiation levels being in the fuel assembly storage area, approximately 5-6 mr/hr.

9. Internal Exposure Control

a. Air Sampling

(1) The licensee has approximately 175 station air samplers for collecting air samples three shifts a day, seven days a week. This amounts to approximately 3600 station air samples per week. Weekly computer printouts, "7 Day Summaries - Implant Air," provide daily station air sample results per shift, weekly average results per shift, the number of sample results which exceed 25, 50 and 100 percent of MPC and the weekly averages which exceed 25, 50 and 100 percent of MPC. Average air concentrations of uranium in the control area range from 7 to 11 percent of the MPC of 1 X

10^{-10} microcuries per milliliter. An examination of the records showed that 10-16 air sample results exceeded the 100 percent of MPC value per week with very few weekly averages over 25 percent of the MPC value. Documentation was examined to verify that additional air samples were collected and an investigation performed in accordance with the license requirement when results exceeded MPC valves. Maintenance activities were the main cause of the higher results.

(2) The time, with a mask and without a mask, that each individual worker spends at each air sample station is recorded daily by shift. With this data and the station air sample results the exposure for each individual is computed in MPC-hrs. As a precautionary measure the licensee uses a mask factor of 10 rather than 50 for computing individual exposures. An examination of the records revealed that the 40 MPC-hr level was not exceeded for routine operations. Maintenance activities are responsible for the higher levels. Personnel exposures to airborne concentrations of uranium were below the 10 CFR 20 limits.

(3) Air sampling filter media counting and calculating techniques were discussed with licensee representatives. A one inch Whatman 41 filter media is used to collect particulates at a 0.5 cfm flow rate. The licensee uses a collection efficency factor of 0.81 and an alpha absoption factor of 0.7 for calculating results. The collection efficiency factor agrees with the ANSI Standard value for Whatman 41. The alpha self absorption factor was determined by the licensee.

b. Urinalysis

The inspector reviewed licensee procedures RC-204, "Bioassay Program," and 04-01, "Routine Urine Sample Program." The procedures reflect the requirements of the license conditions. Conversion area and maintenance personnel submit urine samples on a monthly basis and pellet area personnel submit on a semi-annual basis. Analyses are performed by Controls for Environmental Pollution (CEP). The lower detectable level (LDL) is 2 micrograms per liter which equates to approximately 5 dpm/liter for the average enrichment of the uranium processed by the licensee. An examination of the records showed results close to the LDL which indicates that personnel are not over exposed to airborne concentrations of uranium or receiving a signification uptake of uranium.

c. In-vivo

Individuals who work in the control area are counted quarterly for lung deposition of uranium in the license's on-site body counter. Special counts are performed when individuals are involved in incidents, high

airborne activity measurements, high nasal smears or suspicion of uranium inhalation. An examination of the lung count data revealed that the highest results for individuals were approximately 150 micrograms U-235. A lung burden is 260 micrograms of U-235. Analysis of the data showed that individuals had not inhaled a quantity of radioactive material in excess of the 10 CFR 20 limits.

d. Respiratory Protection

The inspector observed workers don, use and remove respirators in the controlled area. The inspector discussed the respiratory protection program with various licensee representatives. Two workers' records were examined to determine the adequacy of the licensee's program regarding training, medical qualification for respirator use, prior exposure restriction, bioassay results and maximum permissible concentration (MPC) hour calculations. No discrepancies were noted.

10. Contamination Control

a. Personnel Contamination Surveys.

(1) During the plant tour mentioned in paragraph 7 of this report, the inspector noted numerous licensee employees leaving the contamination controlled area (going from the limited area change room to the clean area men's locker room). The inspector selected the peak traffic time on August 20, 1981, during shift change to second shift to observe personnel frisking (self contamination survey) practices. Very few (less than about 1/10) of the individuals leaving the controlled area availed themselves of the use of the installed frisker despite the presence of a member of licensee management and a Health Physics Technician. The inspector observed at least four individuals to exit the limited area, don street clothes, and proceed out of this area of the plant without checking themselves for contamination. It should be noted that due to the large number of persons traversing the area the potential number of individuals not frisking was much greater than four, but the inspector was certain that four failed to do so.

(2) Those individuals who did frisk, despite instructions posted on the wall nearby for their use, did not in any case perform a whole body survey, instead only cursorily frisked their hands and/or feet. In no case was an individual observed to hold the detector 1/8 to 1/4 inch from the body surface in accordance with the instructions. Typical distances observed were 1/2 to 2 inches. Due to the response time of the instrument used, a slow rate of probe motion is required to detect significant levels of contamination - typically 1-2 inches/second - but no individual was observed utilizing the instrument at this speed of scan, all were much more rapid.

(3) The inspector subsequently informed the licensee representative that failure to perform personnel monitoring in accordance with licensee procedure RC-200 was a violation of License Condition 9, in that Section 3.1.2 (page 252 of the license application) requires that shift supervisors will assure that all operations are carried out in accordance with instruction supplied by higher management RC-200, Section 5.1.3 requires personnel to monitor themselves for contamination prior to donning street clothes (Violation 81-11-02).

b. Area Contamination Surveys

(1) Due to the poor personnel monitoring practices observed above, the inspector performed a fixed contamination survey in the clean area of the men's locker room on August 10, 1981. This survey was verified at the time it was performed by the licensee representatives present.

(2) Section 3.2.4 of the license application requires action to be taken when contamination reaches the action levels specified in Table 3.2.4.1. If the contamination exceeds the action level but is less than 5 times that level action must be taken within 24 hours. If the observed level is 5 times or greater than the action level, immediate action is required. Immediate action is defined as immediate decontamination or isolating the affected area as appropriate.

(3) The inspector measured fixed contamination levels of approximately 5000 counts per minute (CPM) on the carpet adjacent to the monitoring point in the clean area of the men's locker room. Subsequent measurements disclosed a pattern of decreasing fixed contamination levels indicative of the tracking of radioactive material out of the limited area into the clean area. For this case, a clean area, fixed contamination levels are assigned an action level of 250 cpm by Table 3.2.4.1. Both the licensee management representative and the Health Physics Technician were made aware of, and verified, the observed fixed contamination levels.

(4) No attempt was made to restrict access by other personnel, nor was the area posted or barricaded, nor was an attempt to decontaminate the area made until approximately one hour had elapsed, and then action was taken at the prompting of the inspector. It should be noted that the contamination observed by the inspector was adherent to the carpet and in the judgement of the inspector posed no immediate hazard, hence, the inspector did not immediately prompt the licensee to act. The action required in this case, as determined by the inspector, would be to restrict access to the area promptly, and provide employees with information by way of

posted signs until decontamination could be accomplished. The inspector informed the licensee that failure to take the immediate action dictated by Section 3.2.4 of the license application was a violation of License Condition 9 (Violation - 81-11-03).

(5) During the evening of August 10 and the morning of August 11, 1981, the licensee attempted to decontaminate the affected carpeted area to no avail. Further consideration resulted in the decision to remove the carpet by the licensee, and it was disposed of as radioactive waste.

(6) During a tour of the controlled and surrounding areas by the inspector in the company of a licensee representative on August 11, 1981, the inspector noted that four other exits from the controlled area also exhibited a potential for deposition of radioactive material due to personnel failing to monitor themselves. These areas were the Daniels exit, the UF6 bay exit, and Docks 3 and 4.

(7) Surveys performed by the inspector and verified by a licensee representative indicated the following:

Daniels exit	1500 cpm
UF6 bay exit	5000 cpm
Dock 4	500 cpm
Dock 3	350 cpm

(8) Action taken by the licensee in each of these cases was timely and appropriate.

(9) When questioned by the inspector, the facility Health Physics Supervisor stated that only loose contamination surveys had been documented as having been taken for some time in these areas. Owing to a lack of specificity in procedures regarding surveys, differentiation between loose and fixed surveys was not proceduralized - both were refered to as "survey." Technicians had apparently neglected to perform fixed surveys and this resulted in a gradual buildup of fixed contamination being undetected and action levels exceeded.

(10) The inspectors were told by licensee representatives that as of August 12, 1981, all technicians had been instructed to perform both types of surveys. Further, the plant manager committed to changing all affected procedures to unmistakeably differentiate survey types by August 21, 1981.

(11) The inspector informed licensee representatives that failure to survey for fixed contamination was a violation of License Condition 38 requiring surveys be taken as necessary to comply with action points and limits in the license (Violation - 81-11-04).

(12) As a result of the above, the inspector performed surveys on the roof of the facility, in the vicinity of ventilation exhausts and intakes. One spot, resulting from a drain from a ventilation exhaust pipe, was found to exceed the fixed contamination immediate action level, but was an isolated area. Action taken by the licensee was timely and proper. Several ventilation intake louvers were found to have fixed contamination levels up to 5000 cpm. The licensee could not offer a verifiable explanation for this phenomenon. The louvers were cleaned but the fixed contamination levels remained above the immediate action level so they were isolated. The licensee stated that he would investigate this matter and take appropriate action as required (IFI - 81-11-05).

(13) The inspector reviewed Health Physics Operating Procedure 05-15, Entitled Release of Material or Equipment, and noted that it permitted release at 25,000 disintegration per minute per 100 cm^2 (d/m/100cm^2), yet Annex C to the license sets this limit at 15,000 d/m/100 cm^2. A licensee representative stated that the 15,000 value was used but the procedure was in error. The inspector questioned licensee representative regarding the frequency of procedure review for a accuracy and compliance with the license and applicable regulations. The licensee representative responsible stated that no formal review program existed, but that procedures were changed promptly whenever found warranting.

(14) At the request of the inspectors, the plant manager committed to have a full review of all radiation protection procedures completed every two years and upon each license change, amendment, or renewal.

11. Posting and Labeling

The inspector verified that the areas were posted in accordance with 10 CFR 20.203(b), 10 CFR 20.203(d) and 20.203(e) and those requirements specified by license conditions.

12. Notification and Reports

(a) The inspector verified that notices to workers, required by 10 CFR 19.11, were posted near the entrance to plant where all employees enter.

(b) The inspector verified that radiation protection records were maintained in accordance with 10 CFR 20.401 and that reports and notifications were issued pursuant to 10 CFR 19.13, 10 CFR 20.407, 10 CFR 20.408 and 10 CFR 20.409. From discussions with individuals and observation of a training tape it appeared that individuals were given instructions pursuant to 10 CFR 19.12. Verification was made that the ALARA Committee made a formal report to the plant manager every six months in accordance with License Condition 21.