



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

Report Nos. 50-280/79-49 and 50-281/79-69

Licensee: Virginia Electric and Power Company  
Richmond, Virginia 23261

Facility Name: Surry Power Station

Docket Nos. 50-280 and 50-281

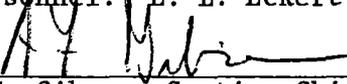
License Nos. DPR-32 and DPR-37

Inspection at Surry Site near Williamsburg, Virginia

Inspector:   
S. C. Ewald

9/4/79  
Date Signed

Accompanying Personnel: E. L. Eckert

Approved by:   
A. F. Gibson, Section Chief, FF&MS Branch

9/10/79  
Date Signed

SUMMARY

Inspection on August 14-16, 1979

Areas Inspected

This routine unannounced inspection involved 21 inspector-hours onsite in the areas of solid waste procedures, review of an unplanned liquid release, August 13, 1979 and review of information relating to the assessment of a personnel exposure on August 12, 1979.

Results

No apparent items of noncompliance or deviations were identified.

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## DETAILS

### 1. Persons Contacted

#### Licensee Employees

- \*W. L. Stewart, Station Manager
- \*T. L. Wilson, Superintendent Operations
- \*R. M. Smith, Supervisor Health Physics
- \*R. L. Baldwin, Supervisor Administrative Services
- \*F. L. Rentz, Resident QC Engineer
- \*M. D. Tower, System QA

Other licensee employees contacted included five Health Physics technicians.

\*Attended exit interview

### 2. Exit Interview

The inspection scope and findings were summarized on August 16, 1979 with those persons indicated in Paragraph 1 above. Items discussed included two unresolved items.

### 3. Licensee Action on Previous Inspection Findings

Not inspected.

### 4. Unresolved Items

Unresolved items are matters about which more information is required to determine whether they are acceptable or may involve noncompliance or deviations. New unresolved items identified during this inspection are discussed in paragraph 7.

### 5. Unplanned Liquid Release, August 13, 1979

On August 13, 1979, a seal failed on the primary grade water tank pump, discharging approximately 210 gallons of water (1 gpm) which ran over a concrete walk to a storm drain. The storm drain discharged directly to the discharge canal. The total activity released was estimated at 0.25 millicuries, excluding tritium. This is  $3.78 \times 10^{-3}$  percent of 10 CFR 20 Appendix B, Table II, Column 2 limits and includes a dilution factor. The licensee took smear samples around the area and found no removable activity.

The following day the inspector surveyed the area. No removable activity was found on the concrete. A soil sample was taken near the storm drain and was analyzed. The sample was found to be of higher activity than contained in the water released. Licensee representatives stated that the higher activity was probably due to spills occurring several years earlier in the area around the storm drain. Licensee representatives roped off and

covered the area with plastic. The plastic was to be covered with gravel. The inspector took five soil samples from the outside areas, inside the radiation control area. After analysis, it was determined that none of the samples showed any activity above normal levels.

6. Solid Waste Procedures

- a. The inspector reviewed Health Physics Procedure HP-3.9-4, revised and approved 8/1/79. The revisions involved incorporating several separate procedures addressing packaging and shipment of radioactive waste into a single procedure. The inspector had two comments on the procedure. One concerned an error in the calculation of thermal heat generated per curie of activity. The values for energy per disintegration were incorrect. The Health Physics Supervisor stated this error had been identified and was being corrected.
- b. The inspector discussed with licensee representatives questions about the technique used to estimate activity in resin liners. The basis for the licensee's figures is an analysis performed by the Army Corps of Engineers published in 1966. The inspector performed independent estimates for comparison and was in approximate agreement for the 10 cubic foot liners. However, there were apparent discrepancies for values relating to the larger 60 cubic foot liners. The inspector stated this item would be reviewed in depth during a subsequent inspection.

7. Worker Exposure, August 12, 1979

- a. On August 12, 1979 a contract worker entered a portion of Reactor Coolant Pipe in the "B" cubicle in Unit 2 containment resulting in occupational exposures as tabulated below. The individual's previous whole body exposure for the calendar quarter was 720 mrem. The licensee conservatively assigned the 581 mrem dose as whole body exposure resulting in a total quarterly dose of 1301 mrem. 10 CFR 20.101 limits whole body exposure to 1250 mrem/quarter unless specific requirements, detailed in 20.101(b), are met. These requirements had not been fully met, as discussed below, and the licensee informed the inspector they were investigating the event as an apparent exposure exceeding regulatory limits. The following discussion is based on the inspector's review of relevant documents, interviews with the particular worker, his supervisor, and the cognizant health physics technicians.

Workers Exposure (as measured by TLD)

8/2/79 Trunk of Body 324 mrem (skin & whole body)  
Trunk of Body 270 mrem (whole body)  
Head 581 mrem (skin & whole body)  
Wrist 768 mrem (skin & whole body)

- b. The inspector reviewed and discussed the various administrative controls in effect including Radiation Work Permit (RWP) No. RWP-SGRP-314, dose control point action, Station dose limits, and work site health physics coverage. The inspector noted all RWP requirements, including special head and wrist dosimetry, were met. Discussions with the workers and the health physics technician at the dose control point revealed the worker was informed that his remaining quarterly dose was 280 mrem in conformance with the station administrative limit of 1000 mrem/quarter. A dose control slip was written limiting the worker to 180 mrem for the shift. These slips are normally carried by the worker during the work shift to help assure his exposure is controlled to station limits. The dose slip was not carried by the worker and was apparently misplaced or not received by the worker. The health physics technician covering the job location was told the worker's remaining dose was 600 mrem and he confirmed this number with the worker's supervisor. The worker's supervisor stated he was also told the worker had 600 mrem of remaining dose. While several possible causes of this discrepancy (280 vs. 600 mrem of remaining dose) were discussed, the inspector was unable to determine the specific cause of the discrepancy. The inspector noted that procedures in effect at the time did not require a dose slip.
- c. The inspector reviewed the workers dose file and discussed the completion of the NRC Form-4 (Dose History) required by 10 CFR 20.101(b) prior to a workers exceeding 1250 mrem/ quarter. The worker had indicated he worked previously at another facility and the Health Physics Supervisor limited his dose to 1000 mrem/quarter pending receipt of an exposure report from the other facility. Investigation subsequent to the exposure revealed the exposure history had been received on site but had not been routed to the individual's dose file. The inspector verified the NRC Form-4 had not yet been completed on August 12.
- d. The inspector discussed with health physics staff the surveys that had been performed and previous exposure experience relating to this event. Gamma-radiation dose rate surveys had been performed indicating radiation levels of 1 to 3 rem/hr. Typical exposures received by other workers entering this area were approximately 300 mrem (whole body) per entry. The inspector performed surveys at a similar location in the "A" cubicle, results indicating levels up to 2 rem/hr.
- e. The inspector reviewed TLD measurements performed after August 12 that indicated a significant fraction of the workers head TLD exposure may have been attributable to beta dose or low energy gamma/X-ray dose. Five TLDs were exposed near a similar section of reactor coolant pipe in the A-cubicle and indicated average doses of 220 mrem (skin & whole body) and 150 mrem (whole body) or approximately a 2:1 whole body to skin dose ratio. Dosimetry supplied to workers who entered the B-cubicle reactor coolant pipe on August 17 indicated approximately a 3:1 whole body to skin dose ratio.

- f. The inspector discussed previous beta dose (skin exposure) experiences and beta survey programs with licensee representatives. The licensee does not, at the present time, conduct any beta dose rate surveys. The Health Physics Supervisor stated that previous exposure experience with reactor coolant system components shows the gamma (whole body) dose is always the limiting factor and, therefore, performing gamma surveys to control exposures will also assure adequate control of beta (skin) exposures. The inspector stated such an analysis should be formally documented and kept on file and licensee representatives agreed to document these conclusions. The inspector noted that the licensee had no functional instruments, excepting TLDs, that could be used to survey for beta dose rate indications. The inspector acknowledged comments that calibration and use of beta dose rate survey instruments incorporates errors in interpreting the instruments response. The inspector stated that, while these uncertainties might exist, instruments that could provide a beta dose rate survey information would still be valuable for planning purposes and exposure control/reduction. Licensee representatives acknowledged the inspectors comments and agreed to review their beta dose rate experiences and the advisability of a beta dose rate survey program. The inspector stated the licensees beta dose survey program would be unresolved (280/79-49-01; 281/79-69-01) pending the licensees review.
- g. The inspector discussed the exposure of the worker in question with licensee management during the inspection and in telephone conversations on August 17, 1979. The licensee is continuing the investigation of the exposure and indications as of August 17 were that between 60 and 285 mrem of the workers head TLD dose indication is attributable to skin exposure. Based on these figures, it appears the workers whole body exposure was below 10 CFR 20.101 limits. The inspector stated that the workers exposure would be considered an unresolved item (280/79-49-02; 281/79-69-02) pending completion of the licensees review and assessment of the event.