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

Report No.: 50-338/78-23

Docket No.: 50-338

License No.: NPF-4

Licensee: Virginia Electric and Power Company
P. O. Box 26666
Richmond, Virginia 23261

Inspected at: North Anna Power Station

Inspection conducted: August 14, 1978

Inspector: W. J. Millsap

Reviewed by: A F Gibson 9/21/78
A. F. Gibson, Chief Date
Radiation Support Section
Fuel Facility and Materials Safety Branch

Inspection Summary

Inspection on August 14, 1978 (Report 50-338/78-23)
Areas Inspected: Whole body counting practices and procedures, and a test count of the NRC phantom on the whole body counter. The inspection involved six inspector-hours on site by one NRC inspector.
Results: In the one area inspected, no items of noncompliance or deviations were identified.

Details I Prepared by: W. J. Millsap 21Sept78
W. J. Millsap, Radiation Specialist Date
Radiation Support Section
Fuel Facility and Materials Safety Branch

Dates of Inspection: August 14, 1978

Reviewed by: A F Gibson 9/21/78
A. F. Gibson, Chief Date
Radiation Support Section
Fuel Facility and Materials Safety Branch

1. Persons Contacted

Virginia Electric and Power Company (VEPCO)

*W. R. Cartwright, Superintendent of Station Operations
*W. W. Cameron, System Health Physics Supervisor
*D. M. Hopper, Health Physics Supervisor
*R. F. Queener, Health Physicist
*F. P. Miller, Senior Engineering Technician, QA

*Denotes those present at the exit interview.

2. Questionnaire Review

The inspector reviewed with a licensee representative the licensee's answers to questions concerning whole body counting sent to him in a letter signed by J. T. Sutherland, dated July 31, 1978. A summary of certain aspects of these results is given below.

a. Whole Body Counting System

This system utilizes a shadow-shielded scanning-type whole body counter whereby the subject lies supine on a pallet which is mechanically driven at a reproducible rate under the detector such that the subject's entire body is viewed by the detector. The detector is a 8" diameter x 4" thick NaI(Tl) crystal.

The shadow shield is constructed of 6" thick low background steel (sides and bottom) and is fitted with a stainless steel liner on the inside. The detector is shielded on the sides and top with 6" of low background steel.

The system uses a Nuclear Data Model 100 multichannel analyzer with 256 channels in use by the detector. Each channel represents approximately 10 kev of energy.

Data reduction is presently accomplished on-site using a hand calculational technique; however, computer capability is being developed.

The detector is calibrated for the following radionuclides: I-131, Cs-137, Cs-134, Mn-54, Fe-59, Co-60, Co-58 and K-40.

Calculated lower limits of detection based on the background spectrum are: I-131, approximately 20 nCi; Co-60, approximately 40 nCi; and Cs-137, approximately 10 nCi. The normal period of count is 600 seconds.

b. Procedures

The North Anna Power Station Procedure HP3.1.3 (Personnel Dosimetry - Bioassay) states that station employees will be given a whole body count as soon as practicable after assignment to the station; that station employees who routinely enter Restricted Control Areas will be routinely counted, normally yearly, but at least every 16 months; that station employees not routinely entering Restricted Control Areas will be routinely counted every three years; and that station employees or any other individuals assigned duties at the station are to be whole body counted whenever deemed necessary by Health Physics.

Procedure HP-3.1.3.3 (Whole Body Counter Calibration - Human Phantom Method) states that the whole body counter will be calibrated with the REMCAL human phantom filled with the various radionuclides in aqueous solution. The REMCAL phantom, obtained from Alderson Research Laboratories, Inc., is constructed of plastic and is equivalent to an average man in size and contours. This phantom provides for the selective loading of various organs with radioactive solutions. Procedure HP-3.1.3.4 (Whole Body Counter Operation) states that the detector efficiency shall be verified monthly, or prior to use if the counter is not used routinely, by use of an efficiency reference source.

The inspector discussed with a licensee representative the need for a defined frequency for the calibration of the whole body counter; for defined frequencies for energy and efficiency checks of the whole body counter which reflect actual practice; for instituting procedural control of the whole body counting of non-VEPCO personnel working at the station; and for predetermined action levels and actions based on the degree of internal contamination. The licensee representative agreed to consider these matters.

3. Test Count of the NRC Phantom

At the request of the inspector, the licensee counted a torso phantom provided by the inspector. The licensee informed the inspector of the amount of each radionuclide detected in the phantom. Since this phantom will be counted by other licensees in Region II, the acutal amount of each radionuclide present in the phantom at the time of the count was not communicated to the licensee at the time of this inspection. A summary report will be provided to participating licensees at the conclusion of the test program.

4. Exit Interview

The inspector met with the Superintendent of Station Operations and other members of the staff at the conclusion of the inspection on August 14, 1978, and summarized the scope and findings of the inspection. Items discussed included procedural comments (paragraph 2.b) and issuance of a summary report once the test program is completed.