U.S. NUCLEAR REGULATORY COMMISSION
REGION I

Report Nos. 50-245/87-10
50-336/87-10
50-423/87-11

Docket Nos. 50-245
50-336
50-423

License Nos. DPR-21
DRP-65
NPF-49

Priority - - -

Category C C C

Licensee: Northeast Nuclear Energy Company
P. O. Box 270
Hartford, Connecticut 06141

Facility Name: Millstone Nuclear Power Station, Units 1, 2 and 3

Inspection At: Waterford, Connecticut

Inspection Conducted: May 18-20, 1987

Inspector: Harvey Gilmulsky for 6-19-87
J. J. Kottan, Radiation Laboratory Specialist date

Approved by: Harvey Gilmulsky for 6-19-87
W. J. Pasciak, Chief date
Effluents Radiation Protection Section

Inspection Summary: Inspection on May 18-20, 1987 (Combined Report Nos. 50-245/87-10, 50-336/87-10 and 50-423/87-11)

Areas Inspected: Routine announced inspection of the licensee's bioassay whole body counting program. Areas reviewed included: results of the whole body counting phantom analysis comparison, and procedures and data.

Results: Of the areas inspected, no violations were identified.

DETAILS

1. Individuals Contacted

Principal Licensee Employees

R. Haynes, Station Services Superintendent
*J. Kangley, Radiological Services Supervisor
W. Robinson, Assistant Radiation Protection Supervisor
R. Sachatello, Radiation Protection Supervisor
A. Tuttle, Station Technician
C. DeBiasi, Station Technician
*E. Laine, Radiation Protection Supervisor
*J. Sullivan, Radiation Protection Supervisor

The inspector also interviewed other licensee employees, including members of the health physics staff.

*Denotes those present at the exit interview.

2. Introduction

During this inspection, the licensee's capability to adequately perform radiological bioassay using a whole body counting system was reviewed. An NRC whole body counting phantom containing radioactive sources traceable to the National Bureau of Standards was submitted to the licensee for analysis. The phantom duplicated the nuclides and the organ burdens that the licensee might encounter during normal operation. The phantom was analyzed using the licensee's normal methods and equipment.

3. Comparison of Results

The licensee uses three whole body counting systems: a standup counter system, and two chair counter systems. The standup counting system consists of two 4"x4"x16" NaI (Tl) detectors coupled to a multichannel analyzer which is interfaced to a computer. Each chair counting system consists of a 3"x3" NaI (Tl) detector for body counting and a 1.5"x0.5" NaI (Tl) detector for thyroid counting which are coupled to a multichannel analyzer which is interfaced to a computer. The system software is supplied by a vendor. The NRC phantom was counted for 60 seconds in the standup counter and 600 seconds in the chair counter. The lung results are based on an average of five measurement and the GI tract results are based on an average of three measurements. Results of the comparisons are listed in Table I. Based on these results, no violations were identified in this area.

Initial results obtained from counting the phantom in the chair counting system indicated that the licensee had calibrated the chair counting systems for the lung diagnostic and GI tract diagnostic geometries with the body detector in the improper position. This resulted in the licensee's results being low by a factor of approximately two. During this inspection, the licensee recalibrated one chair for the lung diagnostic and GI tract diagnostic geometries. The data presented in Table I for the chair counting system is the data obtained after the recalibration. Data is presented from only one chair counting system because the licensee did not have enough time to recalibrate the other chair counting system during the inspection. The licensee's routine chair counting procedure requires that the initial whole body count is a whole body scan, and then if any activity is detected, a specific diagnostic count is performed. The licensee stated that since the incorrect calibrations were performed in March 1987, no diagnostic counts were performed with the chair counting systems. The licensee further stated that the other chair counting system would be recalibrated for the diagnostic count geometries. The inspector stated that completion of the recalibration would be reviewed during a subsequent inspection.

4. Procedures and Data

The licensee's procedures, HP908/2908/3908I, "Whole Body Counting (Chair)," and HP908/2900/3908I, "Whole Body Counting - Fastscan," were reviewed. Both procedures require daily source and background checks and, in addition, the chair procedure requires monthly source and gain checks. Efficiency calibrations are required on an annual basis. The inspector reviewed selected QC data for 1986 and 1987 to date. Based on this review, the inspector discussed the construction and use of control charts with the licensee as well as the need for data review, such as calibration data. The inspector noted that had the 1987 diagnostic geometry calibration data been plotted and compared to the 1986 diagnostic geometry, the improper calibration would have been discovered. The inspector stated that the licensee's whole body counting QC program and, in particular, the use of control charts would be reviewed during a subsequent inspection.

5. Exit Interview

The inspector met with the licensee representatives denoted in Paragraph 1 at the conclusion of the inspection on May 20, 1987. The inspector summarized the purpose and scope of the inspection and the inspection findings.

TABLE I

RESULTS* OF PHANTOM DATA

Standup Counting System

Isotope	Organ	NRC Known Value	Licensee Result	Licensee Result NRC Value
Co-60	Lung	65±9	92±4	1.42±0.21
Cs-137	Lung	92±12	149±4	1.62±0.22
Co-60	GI	59±8	98±4	1.66±0.24
Cs-137	GI	83±11	135±2	1.63±0.22

Chair Counting System

Isotope	Organ	NRC Known Value	Licensee Result	Licensee Result NRC Value
Co-60	Lung	65±9	61±5	0.94±0.15
Cs-137	Lung	92±12	95±4	1.03±0.14
Co-60	GI	59±8	92±8	1.56±0.25
Cs-137	GI	83±11	104±4	1.25±0.17

* All values in nanocuries.