

U.S. NUCLEAR REGULATORY COMMISSION
REGION I

Report No. 50-219/85-40

Docket No. 50-219

License No. DPR-16 Priority Category

Licensee: GPU Nuclear Corporation

P. O. Box 388

Forked River, New Jersey 08731

Facility Name: Oyster Creek Nuclear Generating Station

Inspection At: Forked River, New Jersey

Inspection Conducted: December 21, 1985

Inspectors:

S. Sherbini
S. Sherbini, Radiation Specialist

2/6/86
date

for

S. Sherbini
J. Cioffi, Radiation Specialist

2/6/86
date

Approved by:

W. Pasciak
W. Pasciak, Chief
BWR Radiological Protection Section

2/7/86
date

Inspection Summary: Inspection on December 21, 1985 (Report No. 50-219/85-40)

Areas Inspected: Special safety inspection of the Radiation Control Program concerning the events leading to iodine uptakes in the thyroids of a number of personnel while working in the drywell. The inspection involved 8 inspector-hours onsite by two region-based inspectors.

Results: No violations were identified.

DETAILS

1.0 Persons Contacted

1.1 General Public Utilities

M. Littleton, Manager, Radiological Engineering
P. Scallon, Manager, Radiological Controls Field Operations
J. Derby, Deputy Manager, Radiological Controls Field Operations

1.2 USNRC

W. Bateman, Senior Resident Inspector
J. Wechselberger, Resident Inspector

2.0 Purpose

The purpose of this inspection was to investigate the events and circumstances that led to iodine uptakes by workers at the Oyster Creek Nuclear Generating Station.

3.0 Description

A reactor scram occurred at the Oyster Creek Nuclear Generating Station on the morning of December 15, 1985 (Sunday at 0745). Prior to the scram, it was known that a small leak existed in the coolant system. The leak rate was below the applicable administrative limits and therefore no immediate action had been taken to effect a repair. It was also suspected that the leak was from the feedwater part of the system, this conclusion was described by the licensee as being based on the very low activities found in water samples taken from the drywell. The scram provided an opportunity for the licensee's maintenance workers to make an entry into the drywell to repair the leak.

Purging of the inerted atmosphere in the drywell started after the reactor was shut down and continued throughout Sunday, December 15, 1985. The oxygen level, checked during a drywell entry using SCBAs, reached safe respirable levels on Monday morning, December 16, 1985. Air samples taken at that time showed a total airborne activity of 1.5 MPC*, mostly iodine. Several entries were then made by repair crews, some using respiratory equipment and some without. The first warning of higher than expected airborne activities came from a sample analysis completed at 0900 on Monday, December 16, 1985. The sample indicated a total airborne activity of 10.4 MPC of which 4.3 MPC was ^{131}I . ^{134}Cs and ^{137}Cs were also

* MPC (Maximum Permissible Concentration) as used in this report refers to the concentrations specified in Part 20, Appendix B, Table 1.

detected. Analysis of breathing zone samples confirmed these findings. All entries were suspended for about 2 hours, and were resumed with respiratory protection equipment (including charcoal cartridges) on the basis of samples taken at about 1020 that showed a drop in airborne activity to 2.0 - 3.6 MPC of which 1.3 - 2.5 was iodine. Entries with respiratory protection equipment were continued all day and by 1720 on Monday, December 16, 1985, air samples showed a drop in total airborne activity to about 0.7 MPC. On the basis of these readings, subsequent entries during that day were made without respiratory protection.

Repair work was completed and the reactor was restarted on Monday, December 16, 1985. Drywell entries were made at 0648 on Tuesday, December 17, 1985, using positive pressure air purifying respirators, to perform a 1000 pound inspection. No airborne samples had been collected prior to the entries. Analysis of samples collected during this entry showed total airborne activities ranging from 11 - 28 total MPC with 9 - 21 MPC iodine. As a result of this finding, all persons who made entries during the period December 15 - December 17, 1985 were assayed on the whole body counter. A total of 17 persons were involved and 15 of them were found to have thyroid uptakes of iodine.

Results from the whole body counter assays were obtained from the licensee by the NRC inspectors and a preliminary NRC analysis was performed to determine the extent of the exposures. The analysis was based on the ICRP report #2 internal dosimetry model and metabolic data. The retention function for a single intake was obtained from ICRP 10A. The results of this analysis for the highest exposed individual are shown below.

Inhaled activity: 34 MPC-Hr equivalent activity
 Percent maximum permissible organ burden: 9%
 Committed dose: 75 mrem

3.1 Findings

The licensee's internal exposure controls during the drywell entries by personnel on December 16 and 17, 1985 were reviewed against criteria contained in:

- 10 CFR 20.103, "Exposure of individuals to concentrations of radioactive materials in air in restricted areas,"
- 10 CFR 201, "Surveys,"
- Technical Specifications 6.11 and 6.13, "Radiation Protection Program" and "High Radiation Area," respectively, and
- ANSI Z88.2-1980, "Practices for Respiratory Protection."

The licensee's performance relative to these criteria was determined from interviews with the Radiological Engineering Manager and Radiological Controls Field Operations Manager; review of airborne

sampling and whole body counting data related to the above described events; and review of selected procedures including No. 915.12, Revision 11, "Radiation Work Permit," and No. 9300-ADM-4020.02, Revision 2, "Description and Selection of Respiratory Protection Equipment."

Within the scope of this review, no violations were identified and the intakes did not require an assessment by the licensee. However, the inspectors noted that the potential for permitting a significant uptake should be minimized by verifying anticipated levels (i.e., unmeasured prior to entry) in a more timely basis, especially when recent airborne results indicate the existence of an unidentified source of airborne radioactivity.

Procedure No. 9300-ADM-4020.02 discussed the situation when it is impractical or impossible to obtain current airborne radioactivity measurements prior to an entry. It stated that past airborne concentration histories for the area shall be used in estimating expected airborne radioactivity levels and that an air sample shall be taken during such an entry to verify actual levels. However, the licensee does not provide guidance concerning the timeliness of this assessment.

The licensee evaluated the Breathing Zone Air Samples (BZAs) taken during the entry to verify anticipated levels in the drywell after the work activity had been completed. The evaluation of the BZA results indicated the exposures to personnel resulting from the events described in this report were well below the regulatory limits, principally because the total time in the drywell was minimal.

Based on the above, the inspectors discussed with the licensee the need to review and revise, as necessary, the procedures for control of internal exposures when surveys prior to entry are not available and to address evaluating samples taken during entries into unknown areas on a more timely basis. This licensee stated that this problem would be studied and appropriate corrective actions would be taken. This item will be reviewed during a subsequent inspection (50-219/85-40-01).

4.0 Exit Interview

The inspector met with the Radiological Engineering Manager at the conclusion of the inspection on December 21, 1985. The inspector summarized the purpose, scope and findings of the inspection. At no time during this inspection was written material provided to the licensee by the inspectors.