

U. S. NUCLEAR REGULATORY COMMISSION  
REGION I

Report No. 50-219/93-19  
Docket No. 50-219  
License No. DPR-16  
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: August 16-20, 1993

Inspector: *Richard K. Struckmeyer* 9/8/93  
Richard K. Struckmeyer, Senior Radiation Specialist  
Effluents Radiation Protection Section (ERPS)  
Facilities Radiological Safety and  
Safeguards Branch (FRSSB) Date

Approved by: *Robert J. Bores* 09/09/93  
Robert J. Bores, Chief, ERPS, FRSSB  
Division of Radiation Safety and Safeguards (DRSS) Date

Areas Inspected: Announced safety inspection of the Radiological Environmental Monitoring Program and Meteorological Monitoring Program including: management controls, quality assurance audits, calibration of measuring and test equipment (air samplers and meteorological instrumentation), and implementation of the above programs.

Results: Within the areas inspected, the licensee implemented effective Radiological Environmental Monitoring and Meteorological Monitoring programs. Two apparent violations of NRC requirements were identified. These were: failure to document biennial review of meteorological monitoring instrument calibration procedures (see Section 4.3); and failure to approve a prospective vendor's QA program for calibration services prior to procurement of those services (see Section 3.2).

## DETAILS

### 1.0 Individuals Contacted

#### 1.1 Licensee Personnel

- \*J. Andrescavage, Licensing  
M. Browne, Environmental Scientist Sr. II
- \*R. Fenti, Manager - OC Site QA
- \*R. Fitts, Quality Assurance Auditor
- \*T. Hanlon, Sr. Contract Administrator, Acquisitions Dept.
- \*E. Johnson, Technical Functions
- \*S. Levin, Director, Operations and Maintenance
- \*D. McMillan, Manager System Engineering, Technical Functions
- \*L. Newton, Operations QA Monitor
- \*J. Rogers, Sr. Licensing Engineer  
P. Schwartz, Environmental Scientist Sr. II
- \*J. Solakiewicz, Operations QA Manager
- \*R. Stoudnour, Sr. Engineer, Chemistry  
P. Thompson, Site Audit Manager
- \*R. Thoms, Manager Procurement QA
- \*J. Vouglitois, Manager - Environmental Controls
- \*D. Weigle, Environmental Scientist Sr. II

#### 1.2 NRC Personnel

- \*D. Vito, Sr. Resident Inspector

\* Denotes those present at the exit interview on August 20, 1993.

Other licensee employees were contacted and interviewed during this inspection.

### 2.0 Purpose

The purpose of this routine inspection was to review the licensee's implementation of the Radiological Environmental Monitoring Program and Meteorological Monitoring Program.

### 3.0 Management Controls

The inspector reviewed the licensee's management controls for the Radiological Environmental Monitoring Program (REMP), including assignment of responsibility, program audits, and corrective actions for identified inadequacies and problem areas in the program.

### 3.1 Organization and Program Changes

The inspector reviewed the organization and administration of the REMP. There have been no significant changes since the previous inspection. The program is administered by an Environmental Scientist Sr. II, who reports to the Manager of Environmental Controls. This group reports to GPU Nuclear (GPUN) Corporate Management, independent of the Oyster Creek site management. The Environmental Scientist reviews the performance and/or analytical data generated by its contractors. Sample collections are performed by two environmental technicians who report to the Environmental Scientist, and by employees of Radiation Monitoring Company (RMC), under contract to GPUN. Routine analyses are performed by the Environmental Radiation Laboratory of GPUN. Quality control samples are analyzed by Teledyne Isotopes, Inc. Results are sent to Environmental Controls, where they are reviewed and compiled into the annual Radiological Environmental Monitoring Program report.

### 3.2 Quality Assurance Audits

The inspector reviewed the following Quality Assurance Audit Reports as part of the evaluation of the implementation of the Technical Specification (TS) requirements.

S-OC-91-06 Environmental Monitoring, May 17 - October 4, 1991

S-OC-92-05 Environmental Contols, May 27 - December 7, 1992

S-OC-93-08 ODCM/REMP, May 26 - June 29, 1993

These audits were conducted by Site Audits - Oyster Creek, which reported to the Manager, Site QA, during the indicated time intervals in 1991, 1992, and 1993. None of these audits identified findings of safety significance. The inspector noted that audit S-OC-91-06 documented one observation concerning lack of approved, controlled drawings for meteorological monitoring instruments. Audit S-OC-92-05 identified one deficiency of significance for the REMP: failure to provide ground water analysis results capable of determining if reporting limits had been violated (satisfactorily closed during audit S-OC-93-08).

Audits of the Environmental Radiation Laboratory were performed by Site Audits -TMI, which also reports to the Manager, Site QA. The inspector reviewed the following audits:

S-TMI-91-23 TMI Environmental Controls, October 23, 1991 - January 13, 1992

S-TMI-92-15 TMI Environmental Controls, October 5, 1992 - January 25, 1993

The 1991 audit had no findings concerning the laboratory. The 1992 audit had one minor recommendation.

The above audits were performed by qualified personnel and were of sufficient technical depth to properly assess the implementation of the programs. Appropriate and timely responses to audit findings were received.

The inspector also reviewed the Nuclear Procurement Issues Committee (NUPIC) audit of Teledyne Isotopes, Inc., led by New York Power Authority (NYPA) (Audit Number 92-18), August 3 - 6, 1992. All remaining open items were closed by NYPA in its letter to the QA Manager of Teledyne Isotopes, dated July 29, 1993.

The inspector reviewed the 1992 NUPIC audit of Halliburton NUS Environmental Corporation Consulting Division, conducted by Virginia Power (Audit Number QAA 92-44), July 28 - 31, 1992. The inspector noted that this audit contained no reference to meteorological monitoring instrument calibration services. The licensee was unable to provide any other recent audit that covered this area. The licensee began using the services of Halliburton NUS on February 8, 1993, for calibration of its meteorological monitoring instruments. The licensee stated that the referenced audit covered consulting services supplied by Halliburton NUS, and that an audit of calibration services was not performed. The licensee further indicated that acquisition of the calibration services proceeded nevertheless due to an error by Procurement in reading the numerical code that indicates which vendor services have been properly audited and approved. The inspector stated that the issuance of a contract to a vendor whose QA program for calibration services had not been approved by GPUN Quality Assurance prior to contract award was a violation of 10 CFR Appendix B, Paragraph IV. (50-219/93-19-01)

The licensee's Operations QA Audits Department issued Quality Deficiency Report QDR No. 93-024 to Procurement QA on August 19, 1993. Prior to the conclusion of the inspection the licensee obtained a copy of an audit (No. 92-012-201) of Halliburton NUS Environmental Services Division performed by Arizona Public Service Company. This audit covered Quality Assurance related to the Palo Verde Nuclear Generating Station's Meteorological Data Acquisition and Processing.

The inspector had no further questions in this area.

#### 4.0 Implementation of the Radiological Environmental Monitoring Program

##### 4.1 Direct Observation

The inspector examined selected sampling stations, including air samplers for iodines and particulates, gardens for broad-leaf vegetation, and TLD stations. All air sampling equipment at the selected locations was operational at the time of the inspection. Leafy vegetables were available at the designated sites. TLDs were placed at locations designated in the Offsite Dose Calculation Manual.

##### 4.2 Review of Annual Reports

The inspector reviewed the Radiological Environmental Monitoring Program Annual Reports for 1991 and 1992. These reports provided a comprehensive summary of the results of the REMP around the Oyster Creek Nuclear Generating Station and met the Technical Specification and ODCM reporting requirements. The reports were complete and the reviewed data indicated no adverse radiological impact on public health or the environment.

##### 4.3 Review of REMP Procedures

The inspector reviewed selected licensee environmental monitoring procedures. Based on this review, the inspector determined that the licensee has good procedures for implementation of the REMP.

The inspector also reviewed the licensee's air sampler calibration procedures and records. Calibrations of gas meters and vacuum gauges are performed annually. Results of these calibrations were within the specified acceptance criteria.

Paragraph 4.8.1 of 1000-ADM-1218.01, GPU Nuclear Policy, Plan and Procedure System, states that "A documented review at least every two years is required for plans and procedures identified as within the QA scope." The inspector noted that no documentation was available to indicate that the required biennial review of procedures for calibration of meteorological monitoring instrumentation had been performed. The inspector stated that this lack of documented review is a violation of the licensee's procedure 1000-ADM-1218.01. (50-219/93-19-02) Prior to the conclusion of the inspection the licensee completed a review of these procedures and began preparing the proper documentation to meet the intent of 1000-ADM-1218.01.

The inspector had no further questions in this area.

#### 4.4 Intercomparison of TLD Results

The U. S. Nuclear Regulatory Commission (NRC) Direct Radiation Monitoring Network is operated by the NRC (Region I) to provide continuous measurements of the ambient radiation levels around nuclear power plants throughout the United States. Each site is monitored by arranging approximately 30 to 50 thermoluminescent dosimeter (TLD) stations in two concentric rings extending to about five miles from the power plant. The monitoring results are published in NUREG-0837 quarterly.

One of the purposes of this program is to serve as a basis of comparison with similar programs conducted by individual utilities which operate nuclear power plants. Four NRC TLDs are collocated with licensee TLDs at the Oyster Creek site. The locations of these TLDs are as indicated in Table 1.

The licensee monitors the environmental radiation levels with four TLDs at each specified location. Some locations have two sets of four TLDs. The licensee and NRC both use the Panasonic Model 801 dosimeter, which contains two elements of lithium borate activated with copper, ( $\text{Li}_2\text{BO}_7:\text{Cu}$ ) and two elements of calcium sulfate activated with thulium ( $\text{CaSO}_4:\text{Tm}$ ). The NRC uses only the calcium sulfate elements for routine environmental monitoring. The Oyster Creek monitoring periods do not directly coincide with the quarterly periods of the NRC. Table 2 lists the range of dates corresponding to those NRC quarters and Oyster Creek monitoring periods for which the comparison was undertaken.

During this inspection the monitoring results of collocated TLDs were compared, and the results are listed in Table 3. The NRC "historical average" data are also provided as a basis for comparison of NRC results with those of the licensee. The historical averages shown here are the same as reported in NUREG-0837, Vol. 13, No. 2, for these collocated stations. These reported values are the mean  $\pm$  1 standard deviation for all quarters (starting in 1983) for which net data were available. The relatively small standard deviations indicate that the NRC results have remained consistent over the ten-year period. The licensee results are generally somewhat below those of the NRC, and may be due to different methods of calibration of the two systems. The inspector had no further questions in this area at this time.

#### 4.5 Quality Control Program for REMP

The inspector reviewed the licensee's program for quality control of analytical measurements for radiological environmental samples. One aspect of quality control consists of measurements of duplicate samples performed by the contractor laboratory. Both the primary and the QC laboratories participated in the EPA cross-check program, and conducted an internal QC program. Periodic reports of QC results are supplied to the licensee. The data indicate, with few exceptions, agreement between the primary contractor laboratory and the QC laboratory. Where discrepancies were found, reasons for the differences were investigated and resolved.

#### 5.0 Meteorological Monitoring Program

The inspector examined the licensee's meteorological monitoring program through direct observation, discussions with personnel, and examination of procedures and records for calibration of equipment. The primary meteorological tower is equipped with wind speed, wind direction, and temperature sensors at the 33, 150, and 380-foot elevations. There are also redundant sensors at the 33 and 380-foot elevations. The inspector observed the sensors and their readouts in the equipment house at the base of the tower, as well as the readouts in the control room. The meteorological data are available in the equipment house via digital display from the system computer and via analog strip chart recorders. The data are available in the control room via digital display from the system computer. The inspector noted that the temperature strip chart recorder had been out of service since July 30, 1993, and the motor that drives the chart for the redundant 380-foot wind speed/wind direction sensors had been out of service since August 13, 1993. Repair requests had been submitted to repair these defects.

The licensee performs calibrations of the meteorological sensors on a quarterly basis. There are no Technical Specification requirements for calibration of these sensors. The inspector reviewed selected calibration records, with emphasis on the wind speed, wind direction, and temperature sensors. All reviewed calibration results were within the licensee's defined acceptance criteria.

The inspector had no further questions in this area at this time.

#### 6.0 Exit Interview

The inspector met with the licensee representatives (denoted in Section 1.1 of this inspection report) at the conclusion of the inspection in August 20, 1993. The inspector summarized the purpose, scope, and findings of the inspection. The licensee acknowledged the inspection findings.

Table 1

## Collocated Environmental TLDs at Oyster Creek

NRC No.	Distance*	Azimuth**	Oyster Creek No.	Distance*	Azimuth**
7	2.2	176	8	2.3	180
9	2.8	159	79	2.9	162
19	2.1	231	9	2.0	230
43	9.1	46	92	9.2	48

\* Distance measured in miles

\*\* Azimuth measured in degrees

NOTE: Distance and azimuth values were measured independently and do not necessarily agree; however, collocation of these TLDs has been confirmed by inspection.



Table 2

Dates of TLD Deployment, 1991 - 2nd Quarter 1993

Year/Quarter	N R C		Oyster Creek	
	From	To	From	To
1991 / 1	01-10-91	04-11-91	01-21-91	04-15-91
1991 / 2	04-11-91	07-11-91	04-15-91	07-08-91
1991 / 3	07-11-91	10-10-91	07-08-91	09-31-91
1991 / 4	10-10-91	01-09-92	09-31-91	12-23-91
1992 / 1	01-09-92	04-08-92	12-23-91	03-16-92
1992 / 2	04-08-92	07-09-92	03-16-92	06-08-92
1992 / 3	07-09-92	10-08-92	06-08-92	08-31-92
1992 / 4	10-08-92	01-07-93	08-31-92	11-23-92
1993 / 1	01-07-93	04-08-93	02-17-93 *	05-12-93
1993 / 2	04-08-93	07-08-93	05-12-93	08-03-93

\* Note: To "resynchronize" the NRC and Oyster Creek monitoring periods, the Oyster Creek period beginning 11-23-92 and ending 02-17-93 was skipped for the purpose of this comparison.

Table 3

Environmental TLD Monitoring Results (mR/quarter)\*  
 Comparison of NRC TLDs Collocated with Oyster Creek TLDs

Monitoring Period	NRC no.: OC no.:	7 8	9 79	19 9	43 92
1991/1st Quarter	NRC	13.2 ± 0.6	10.3 ± 0.5	11.3 ± 0.6	13.4 ± 0.6
	OC	10.2 ± 0.3	8.4 ± 0.2	11.0 ± 0.4	11.5 ± 0.3
2nd Quarter	NRC	12.4 ± 0.5	9.8 ± 0.5	10.8 ± 0.5	13.8 ± 0.6
	OC	10.5 ± 0.4	10.0 ± 0.5	11.0 ± 0.3	11.9 ± 0.6
3rd Quarter	NRC	NC†	NC†	NC†	NC†
	OC	9.2 ± 0.4	9.4 ± 0.3	9.9 ± 0.2	11.1 ± 0.4
4th Quarter	NRC	12.6 ± 0.5	missing	missing	14.3 ± 0.5
	OC	11.3 ± 0.3	11.3 ± 0.3	12.7 ± 0.4	13.8 ± 0.6
1992/1st Quarter	NRC	12.2 ± 0.6	10.9 ± 0.5	10.5 ± 0.5	14.6 ± 0.6
	OC	10.0 ± 0.2	8.8 ± 0.5	10.5 ± 0.6	11.8 ± 0.3
2nd Quarter	NRC	missing	11.5 ± 0.5	12.3 ± 0.5	14.9 ± 0.6
	OC	11.0 ± 0.4	10.1 ± 0.5	11.2 ± 0.1	11.6 ± 0.3
3rd Quarter	NRC	12.3 ± 0.5	10.9 ± 0.5	11.4 ± 0.5	15.0 ± 0.6
	OC	11.1 ± 0.5	8.8 ± 0.4	11.3 ± 0.3	11.6 ± 0.3
4th Quarter	NRC	12.4 ± 0.6	11.6 ± 0.6	13.2 ± 0.6	14.1 ± 0.7
	OC	10.5 ± 0.5	9.9 ± 0.4	10.2 ± 1.2	11.5 ± 0.3
1993/1st Quarter	NRC	12.0 ± 0.5	9.9 ± 0.5	10.4 ± 0.5	14.8 ± 0.6
	OC	10.7 ± 0.2	9.5 ± 0.3	11.1 ± 0.2	12.5 ± 0.2
2nd Quarter	NRC	12.0 ± 0.5	11.5 ± 0.5	12.4 ± 0.5	13.7 ± 0.6
	OC	9.3 ± 0.3	8.8 ± 0.5	10.4 ± 0.3	11.1 ± 0.7
NRC Historical Average	NRC no.:	7	9	19	43
From 1983/1st Qtr to 1993/2nd Qtr	average	11.9 ± 3.2	10.5 ± 2.9	11.1 ± 2.7	14.1 ± 3.6

\* All results are in milliroentgens and are normalized to a 90-day quarter.  
 All data are shown as Result ± 1 standard deviation.

† NC = No Comparison (Net data not available for NRC TLDs because transit control was missing).