U.S. NUCLEAR REGULATORY COMMISSION
REGION I

Report No. 50-322/85-40

Docket No. 50-322

License No. CPPR-95 Priority - Category B

Licensee: Long Island Lighting Company

P.O. Box 618

Wading River, New York 11792

Facility Name: Shoreham Nuclear Power Station

Inspection At: Wading River, New York

Inspection Conducted: October 15-18, 1985

Inspectors: Harvey Zibulsky 11-27-85
H. Zibulsky, Chemist date

Approved by: W. J. Pasciak 11-29-85
W. J. Pasciak, Chief date
BWR Radiological Protection Section

Inspection Summary:
Inspection on October 15-18, 1985 (Report No. 50-322/85-40)

Areas Inspected: Routine, announced inspection of the nonradiological chemistry program. Areas reviewed included measurement control and analytical procedure evaluations. The inspection involved 27 inspector hours by one NRC region based inspector.

Results: No violations were identified.

Details

1. Individuals Contacted

* J. Schmitt, Radiological Controls Division Manager
* R. Petricek, Radiochemistry Supervisor
* C. Seaman, Quality Control Division Manager
* R. Grunseich, Supervisor, Nuclear Licensing
* G. Romeo, Laboratory Supervisor
* R. Gaschott, Laboratory Foreman
* M. Villaran, Compliance
T. Bulischeck, PASS Chemist
S. Sprengel, Laboratory Technician
S. Chan, Laboratory Technician
R. Hawkins, Laboratory Technician

*denotes those present at the exit interview.

The inspector also interviewed other licensee employees including members of the chemistry staff.

2. Measurement Control Evaluation

The adequacy and effectiveness of the licensee's nonradiological chemistry quality control program was reviewed against the requirements of Section 6.8 of the Technical Specifications, licensee's Procedure 71.018.01, Rev. 5, "General Laboratory Operation," and standard industrial practices.

The licensee's performance relative to these requirements and standards was determined by review of records, discussions with licensee personnel, and observations by the inspector.

The licensee was using the same standard solution for calibration and measurement control. This observation was made by the NRC inspector in Inspection No. 50-322/85-15. The licensee has committed to prepare and analyze measurement control standards independent of calibration standards. This will be an inspector follow-up item (85-40-01).

The inspector observed that the reported results for chloride were not within the calibration standards range. The lowest chloride calibration standard was 20 ppb and the reported values were less than 10 ppb. The licensee committed to change the calibration standard concentrations to incorporate a lower measurement range.

The inspector identified that the licensee had generated only one measurement control chart with acceptance criteria of ± 2 sigma while several different types of analyses were required by the Technical Specifications. The inspector informed the licensee that control charts should be generated for the analyses required by Technical Specification, and vendor and fuel warranties. The licensee committed to generate control charts

for boron, chloride, metals, and any other elements that may be feasible. This will be reviewed during a future inspection (Inspector Follow-up Item 85-40-02).

The standby liquid tank and reactor coolant tank were sampled and duplicate samples were sent to Brookhaven National Laboratory (BNL) for independent verification. Boron analysis will be performed on the standby liquid tank samples and chloride and metal analyses on the reactor coolant sample. On completion of the analyses by both laboratories, a statistical evaluation will be made (Inspector Follow-up Item 85-40-3).

No violations were identified.

3. Analytical Procedures Evaluation

During the inspection, standard chemical solutions were submitted by the inspector to the licensee for analysis. The standard solutions were prepared by BNL for NRC Region I, and were analyzed by the licensee using normal methods and equipment. The analysis of standards is used to verify the licensees capability to monitor chemical parameters in various plant systems with respect to Technical Specifications and other regulatory requirements. In addition, the analysis of standards is used to evaluate the licensee's analytical procedures with respect to accuracy and precision.

The results of the standard measurements comparison indicated that with the exception of the three copper measurements, all of the results were in agreement under the criteria used for comparing results (see attachment 1). The disagreements may be due to a poor calibration standard. This could not be verified because the licensee did not have a measurement control program for the metals (see paragraph 2). This analysis will be repeated when control charts are complete.

No violations were identified.

4. Exit Interview

The inspector met with the licensee representatives (denoted in paragraph 1) at the conclusion of the inspection on October 18, 1985, and summarized the scope and findings of the inspection. At no time during this inspection was written material provided to the licensee by the inspector.

Capability Test Results

Shoreham

Chem. Parameter	NRC Value	Lic. Value	Ratio (Lic/NRC)	Comparison
	Results in parts per billion (ppb)			
Chloride	10.3±0.7	<20	-	Agreement
	27.7±2.8	28.3±2.9	1.02±0.15	Agreement
	69.7±3	68.3±7.6	0.98±0.12	Agreement
	Results in parts per million (ppm)			
Boron	1014±15	1076±20.8	1.06±0.03	Agreement
	3047±26	3050±60.6	1.0	Agreement
	5040±130	4918±41	0.98±0.03	Agreement
Iron	1.28±0.09	1.17±0.02	0.91±0.07	Agreement
	2.39±0.10	2.49±0.02	1.04±0.04	Agreement
	3.43±0.21	3.37±0.03	0.98±0.06	Agreement
Copper	1.33±0.01	1.43±0	1.08±0.01	Disagreement
	2.60±0.04	2.76±0	1.06±0.02	Disagreement
	3.84±0.04	3.95±0	1.03±0.01	Disagreement
Nickel	1.32±0.16	1.34±0	1.0	Agreement
	2.58±0.13	2.70±0	1.05±0.05	Agreement
	3.79±0.07	3.88±0	1.02±0.02	Agreement
Chromium	1.20±0.10	1.10±0	0.92±0.08	Agreement
	2.69±0.05	2.60±0	0.97±0.02	Agreement
	3.74±0.28	3.75±0	1.0	Agreement

ATTACHMENT

Criteria For Comparing Analytical Measurements

This attachment provides criteria for comparing results of capability tests. In these criteria the judgement limits are based on the uncertainty of the ratio of the licensee's value to the NRC value. The following steps are performed:

(1) the ratio of the licensee's value to the NRC value is computed

$$\left(\text{ratio} = \frac{\text{Licensee Value}}{\text{NRC Value}}\right);$$

(2) the uncertainty of the ratio is propagated.[1]

If the absolute value of one minus the ratio is less than or equal to twice the ratio uncertainty, the results are in agreement.
($|1-\text{ratio}| \geq 2$ uncertainty)

[1] $Z=\frac{x}{y}$, then $\frac{Sz^2}{Z^2} = \frac{Sx^2}{x^2} + \frac{Sy^2}{y^2}$

(From: Bevington, P. R., Data Reduction and Error Analysis for the Physical Sciences, McGraw-Hill, New York, 1969)