U.S. NUCLEAR REGULATORY COMMISSION

REGION III

Report Nos. 50-373/90019(DRSS); 50-374/90020(DRSS)

Docket Nos. 50-373; 50-374 License Nos. NPF-11; NPF-18

Licensee: Commonwealth Edison Company
Post Office Box 767
Chicago, IL 60690

Facility Name: LaSalle County Nuclear Station, Units 1 and 2

Inspection At: LaSalle County Nuclear Station Site, Marseilles, Illinois

Inspection Conducted: August 13-17, 1990 (On-site)
August 20-23, 1990 (Telephone discussions)

Inspectors: J. E. House — Date: 9-10-90

R. B. Holtzman — Date: 9-10-90

Approved By: M. C. Schumacher, Chief
Radiological Controls
and Chemistry Section — Date: 9-10-90

Inspection Summary

Inspection on August 13-17, 1990 and telephone discussions August 20-23, 1990(Report Nos. 50-373/90019(DRSS); 50-374/90020(DRSS))
Areas Inspected: Routine unannounced inspection of: (1) the chemistry program including procedures, organization and training (IP 79701, 84750); (2) reactor systems water quality control programs (IP 79701, 84750); (3) quality assurance/quality control program in the laboratory (IP 84750); (4) nonradiolgical confirmatory measurements (IP 79701); and (5) the Radiological Environmental Monitoring Program (REMP) (IP 84750).
Results: The licensee maintains a water quality control program that conforms to the EPRI BWR Owners Group Guidelines. Overall water quality was satisfactory. The nonradiological confirmatory measurements were good. Laboratory instrumentation and the QA/QC program were generally improved. The laboratory quality control (QC) program has been strengthened by the recent addition of a QC Chemist. No violations or deviations were identified.

DETAILS

1. Persons Contacted

[1]G.J. Diederich, Station Manager, LaSalle County Station (LSCS)
[1]W.R. Huntington, Technical Superintendent, LSCS
[1]P.T. Nottingham, Chemistry Supervisor, LSCS
[1]J.A. Schuster, Lead Chemist, LSCS
[1]T.A. Hammerich, Regulatory Assurance Supervisor, LSCS
[1]J.A. Borm, Nuclear Quality Programs (QA), CECo
[2]M. Burgess, Nuclear Technical Services Director, CECo
[2]J. Burns, Nuclear Services Supervisor, CECo
[1]R.A. Whitley, Laboratory Quality Chemist
S. Wilkenson, Unit 1 Chemist, LSCS
D. Rhoads, Unit 2 Chemist, LSCS
[2]K. Klotz, REMP/GSEP Corrdinator, LSCS
[2]J. Thean, Quality Control Chemist, LSCS

[1]R. A. Kopriva, Resident Inspector, NRC

The inspectors also interviewed other licensee personnel in the course of the inspection.

[1]Denotes those present at the plant exit interview on August 17, 1990
[1]Telephone discussions held August 20-23, 1990.

2. Licensee Action on Previous Inspection Findings (IP 92701)

a. (Closed) Open Item (50-373/89009-01; 50-374/89009-01): Licensee to spike reactor water with anions, split sample with Brookhaven national Laboratory, analyze sample and send results to RIII. The licensee has performed the sample split. The comparisons are presented in Table 1 with the comparison criteria in Attachment 1. The results show one agreement and two disagreements in three analyses. However, as the NRC reference laboraotory is not available, there is no way to follow up on these discrepancies. The licensee's performance in the nonradiological confirmatory measurements program and in the interlaboratory comparison program indicates that the licensee's analytical data was generally reliable (Sections 5 and 6).

b. (Closed) Open Item (50-373/89009-02; 50-374/89009-02): Licensee to improve high range boron analysis and implement control chart for boron assay. The licensee has reviewed and modified the boron assay, and established control charts for this analysis. The boron results in the current confirmatory measurements comparisons were agreements.

c. (Closed) Open Item (50-373/89009-03; 50-374/89009-03): Licensee proposal to recalibrate the ion chromatograph (IC) only when the control falls outside of 2 standard deviations (SD). The station follows the corporate QA program that establishes minimum QA

parmeters. A review of selected data indicates that the licensee meets or exceeds these requirements.

3. Management Controls, Organization and Training (IP 84750)

The inspectors reviewed the organization and staffing of the chemistry group. The laboratory was reorganized to reflect the new corporate management in which the Chemistry group was separated from Health Physics. The Chemistry Supervisor reports to the plant Technical Superintendent. The Lead Chemist, a Quality Control (QC) Chemist (new position), and two Laboratory Foremen report to the Supervisor. Four Chemists/Chemical Engineers and an Engineering Assistant report to the Lead Chemist. Eighteen Chemistry Technicians (CT) are permanently assigned to the laboratory; 13 are "A" CTs and meet the ANSI N18.1-1971 qualification requirements, one is a "B" CT in training and four have just started training. Presenly, the Radiation Protection foremen provide CT supervision on the back shifts. The addition of an experienced QC Chemist, who is independent of the laboratory chemists is a strength for the Chemistry Group.

No violations or deviations were identified.

4. Water Chemistry Control Program (IP 79701, 84750)

The inspectors reviewed the water chemistry control program. The operational chemistry limits and action levels were consistent with the EPRI BWR Owners Guidelines. The licensee monitors water quality with inline monitors for conductivity, pH, dissolved oxygen and silica (in condensate). Other parameters such as chloride, sulfate and reactor water silica are monitored by grab sampling. The inline instrumentation of the makeup water system has been upgraded with digital monitors and improved recorders. Similar improvements have been scheduled for the other systems.

A chemist reviews the laboratory data daily. Extensive trend charts, which include reactor power levels, are available in Chemistry for assessing plant water quality in various systems, including reactor coolant specific conductivity, silica, dissolved oxygen, sulfate, and radioactivity parameters; similar charts are maintained for condensate and polisher effluents and feedwater (FW). Charts covering monthly periods are produced weekly onsite; long-term (18-month) charts are produced monthly for upper management.

A review of selected data indicated that Units 1 and 2 have operated below Action Level 1, except for excursions during power changes or during startup/shutdown conditions. The RCS specific conductivities were somewhat higher than those in most BWR plants, ranging around 0.08 umhos/cm in both units. The most recent Chemistry and Radwaste Assessment (October 30-November 3, 1989) noted that the elevated conductivity appears to be due to high chromate levels (about 40 ppb) in the feed water. Licensee representatives stated that the chromate appears to come from the feed water heater drains. The chromate monitoring program has been enhanced as one measure to determine the source of chromate so that corrective action can be taken, if necessary.

The oxygen concentrations in U-2 FW were about 70 ppb, somewhat above the achievable values of 20-50 ppb, but within the 200 ppb range allowed by vendor guidelines and corporate directives. Licensee representatives stated that this was not a high priority item at present and that available resources were being allocated to the FW chromate problem.

The inspectors reviewed selected analyses of boron volume/concentration in the Standby Liquid Control tanks. These volume/concentrations appeared to be within the acceptable ranges. The licensee now uses sodium pentaborate (NapB) enriched in the B-10 isotope to meet the 10 CFR 50.62 ATWS requirements. The licensee's current procedures call for boron to be enriched to 45% of the B-10 isotope as compared to about 18% B-10 in naturally-occurring boron. Vendor data showed that all lots nad 45% enrichment.

The inspectors examined and discussed operation of the HRSS system with licensee representatives. System oversight is assigned to a specific chemistry staff member. A licensee representative stated that the CTs and several supervisors were trained to operate the system.

No violations or deviations were identified.

5. Confirmatory Measurements (IP 79701, 84750)

The inspectors submitted chemistry samples to the licensee for analyses as part of a program to evaluate the laboratory's capabilities to monitor nonradiological chemistry parameters in various plant systems with respect to various Technical Specification and other regulatory and administrative requirements. These samples had been prepared, standardized, and periodically reanalyzed (to check for stability) for the NRC by the Safety and Environmental Protection Division of Brookhaven National Laboratory (BNL). The samples were analyzed by the licensee using routine methods and equipment.

A single dilution was prepared by licensee personnel as necessary to bring the concentrations within the ranges normally analyzed by the laboratory, and run in triplicate in a manner similar to that of routine samples. The results are presented in Table 2 with the the criteria for agreement presented at the end of the table. These criteria are derived from the BNL results of the present samples and the relative standard deviations (RSD) for the respective analyses derived from the results of the 1986 interlaboratory comparisons with participating plant laboratories (Table 2.1, NUREG/CR-5422). The acceptance criteria were that the licensee's value should be within $\pm$ 2 SD of the BNL value for agreement and between 2 and 3 SD for qualified agreement.

The licensee determined ten analytes at three concentrations each. Of the initial 30 analyses, 25 were agreements, 3 were qualified agreements and 2 were disagreements. A qualified agreement is considered an agreement but indicates that a deficiency may exist in the assay. Most of the analyses in this comparison were performed by the Laboratory Quality Chemist, rather than by the CTs.

All of the metal analyses performed on a direct coupled plasma spectrophotometer instrument (DCP) showed a negative bias of approximately 10%. Ten of the 12 DCP analyses were agreements and two were qualified agreements (high concentration iron and nickel). The laboratory supervisor performed minor instrument repairs and reran the high level metal samples. This comparison saw a decrease in the negative bias and achieved all agreements. The licensee was not aware of this consistent bias until it was pointed out by the inspectors. The bias suggests possible weaknesses in instrument maintenance or calibration.

The original high-level chloride, a disagreement, was analyzed outside of the calibration range of the ion chromatograph (IC). Agreement was achieved following recalibration of the IC to include the range of analysis. The three sodium concentrations were originally analyzed on the IC and all showed negative biases of up to 25% with the low-level sample being in disagreement. The difficulties were caused by the elution profile and the sample matrix, which contains lithium at about four times the concentration of sodium. The two peaks co-elute with sodium appearing in the tail of lithium which makes resolution of the two peaks difficult. The low sodium was reanalyzed on the DCP and gave an agreement. The high-level silica was a qualified agreement and had a positive bias of 12%. The licensee's instrumentation for this analysis is being upgraded significantly (Section 6).

No violations or deviations were identified.

6. Implementation of the Chemistry Program (IP 84750)

The inspectors reviewed the chemistry programs, including physical facilities and laboratory operations. Housekeeping was good and space appeared to be adequate for the existing workload. Procedures are being developed for a Milton-Roy Spectronic 1200 Spectrophometer to replace the obsolescent colorimeters in current use for the silica analysis.

The inspectors reviewed the nonradiological chemistry QA/QC program, as defined by a licensee corporate directive, "Nuclear Operations Chemistry Quality Control Program", Revision 3, January 16, 1989. Concerns relating to control charts were discussed with licensee representatives. Completed charts were normally removed from the instrument manual leaving the technician with an inadequate history for comparison of current instrument performance. A licensee representative agreed to keep the most recent completed chart in the book. The control charts have statistical bases, a mean with control limits set at ± 2 standard deviations (SD). In reviewing the IC charts, the inspectors noted that the intrarun (precision) data based on the performance check sample results done at the beginning of the sample batch and those at the end of the batch run, showed much lower variabilities than those based on the interrun (bias) data obtained from the day-to-day performance check data. The inspectors stated to licensee representatives that these differences suggest instrument drift with time, that could be reduced by more frequent calibrations. licensee representatives stated they would review the matter.

The inspectors' review of the licensee's corporate Interlaboratory Comparison Program from the second quarter 1989 through the second quarter 1990 were in agreement in 80-100% of the samples in each of the quarters. The licensee also participates in a monthly vendor-supplied (NWT) interlaboratory comparison program. Data from the last six intercomparisons were variable, but improved over time. Licensee performance was comparable to that of the other laboratories and similar to that of the overall variability for all participants.

The licensee has implemented a QA/QC program to monitor the inline instrumentation under the corporate NOD Directive NOD-CY.8, "Nuclear Operation In-Line Chemistry Instruments Quality Control Program," Revision 1, July 1, 1988 and plant procedure LCF-150-3, "Inline Instrument Standardization and Performance Checks Schedule for Quality Control Purposes," Revision 8, July 6, 1990. The inline readings are compared to standardized sensors in parallel or serial process streams using various acceptance criteria, e.g., conductances above 0.3 umho/cm should be within ±10%, while those below 0.3 µmho/cm should be within ±0.03 µmho/cm of the laboratory values.

The inspectors reviewed the Chemical Technician (CT) Testing Program as defined in LCP 810-20, Rev. 4, August 12, 1989. CTs are tested annually with unknowns prepared by supervisors. A review of selected date indicated that CTs are being tested as required and the procedure is being followed.

No violations or deviations were identified.

7. Radiological Environmental Monitoring Program (REMP)(IP 84750)

The inspectors reviewed the REMP, including the 1988 and 1989 Annual Environmental Reports, and final 1988 and 1989 monthly environmental reports, which contain the individual measurements for the respective years.

The Annual Environmental Reports appeared to comply with the REMP requirements. All of the required samples were collected and analyzed, except as noted in the report, and a perusal of the results showed them to be reasonable. The measurements appeared to be acceptable.

The inspectors examined environmental air sampling stations around the plant and observed a licensee representative check the systems for operability, and leakage. The pumps and filter trains on the seven air samplers on the seven observed appeared to be operating satisfactorily, both with respect to vacuum and flowrate. Each had a calibration record attached.

The REMP appeared to be conducted in an acceptable manner.

No violations or deviations were identified.

8. Audits and Appraisals (IP 84750)

The Inspectors reviewed the most recent assessment of chemistry and radwaste by the corporate QA Department, October 30 - November 3, 1989. The audit team consisted of chemistry/radwaste personnel from corporate and Quad Cities, and a contractor. The auditors appeared to address in adequate detail the nonradiological chemistry quality assurance program. Items identified in the audit appeared to have been addressed in a timely manner.

No violations or deviations were identified.

9. Open Item

Open items are matters which have been discussed with the licensee, which will be reviewed further by the inspectors, and which involve some action on the part of the NRC or licensee, or both. No new open items were identified during this inspection.

10. Exit Interview (IP 30703)

The scope and findings of the inspection were reviewed with licensee representatives (Section 1) at the conclusion of the inspection on August 17, 1990. The inspectors discussed the observations on the quality control program including control charts, results of the confirmatory measurements, standby liquid control system and plant water systems. Subsequent telephone discussions were held with representatives of the corporate and plant staff members on August 20-23, 1990.

During the exit interview, the inspector discussed the likely informational content of the inspection report with regard to documents or processes reviewed by the inspector during the inspection. Licensee representatives did not identify any such documents or processes as proprietary.

Attachments:
1. Table 1, Nonradiological Interlaboratory Split Sample Results, Second Quarter, 1989
2. Attachment 1, Criteria for Comparing Analytical Measurements (Nonradiological)
3. Table 2, Nonradiological Confirmatory Measurements Results, August 13-17, 1990

TABLE 1
Nonradiological Interlaboratory Split Sample Results
Lasalle County Nuclear Station
Second Quarter 1989

Analyte	Analytical Method[a]	NRC[b] Y ± SD	Licensee X ± SD	Ratio Z ± SD	Comparison[c] ±2 SD
		Concentration, ppb			
Reactor Coolant					
Fluoride	IC	51.7 ± 2.6	53.2 ± 2.7	1.029 ± 0.074	A
Chloride	IC	64.6 ± 3.2	46.7 ± 2.3	0.723 ± 0.051	D
Sulfate	IC	79.6 ± 4.0	47.7 ± 2.4	0.600 ± 0.043	D

a. Analytical method:
IC Ion chromatogphy

c. BNL uncertainties were not determined; they are assumed to be ± 5% relative standard deviation (RSD). Licensee uncertainties also assumed to be ± 5% RSD.

b. Comparison
A Agree
D Disagree

TABLE 2
Nonradiological Confirmatory Measurements Results
Lasalle County Nuclear Station
August 13-17, 1990

Analyte		Method[1]	Conc[2]	Ratio[3]	Acceptance Ranges[4] ± 2RSD	± 3RSD	Result[5]
			ppb				
Fluoride	A	IC	5	1.057	0.875-1.125	0.813-1.187	A
	B		10	1.008	0.875-1.125	0.813-1.187	A
	C		20	0.953	0.875-1.125	0.813-1.187	A
Chloride	A	IC	7	0.975	0.933-1.067	0.900-1.100	A
	B		15	0.990	0.917-1.081	0.879-1.121	A
	C		25	1.127	0.926-1.074	0.895-1.105	D
(Rerun)	C		25	1.022	0.926-1.074	0.895-1.105	A
Sulfate	A	IC	5	1.067	0.895-1.105	0.842-1.158	A
	B		10	1.073	0.895-1.105	0.868-1.132	A
	C		14	1.061	0.900-1.100	0.867-1.133	A
Iron	G	DCP	1	0.905	0.904-1.096	0.854-1.146	A
	H		2	0.914	0.903-1.097	0.857-1.143	A
	I		3	0.892	0.903-1.097	0.855-1.145	A+
(Rerun)	I		3	0.928	0.903-1.097	0.855-1.145	A
Copper	G	DCP	1	0.916	0.904-1.095	0.859-1.141	A
	H		2	0.909	0.904-1.096	0.857-1.143	A
	I		3	0.918	0.904-1.096	0.857-1.143	A
Nickel	G	DCP	1	0.943	0.936-1.064	0.906-1.094	A
	H		2	0.948	0.938-1.062	0.908-1.092	A
	I		3	0.934	0.938-1.062	0.907-1.093	A+
(Rerun)	I		3	1.052	0.938-1.062	0.907-1.093	A
Chromium	G	DCP	1	0.970	0.905-1.095	0.855-1.145	A
	H		2	0.941	0.903-1.097	0.854-1.146	A
	I		3	0.950	0.903-1.097	0.853-1.147	A
Sodium	J	IC	4	0.741	0.863-1.137	0.784-1.216	D
	K		10	0.865	0.859-1.141	0.788-1.212	A
	L		15	0.863	0.862-1.138	0.789-1.211	A
(Rerun)	J	DCP	100	1.000	0.863-1.137	0.784-1.216	A
Silica	S	Color	50	1.034	0.906-1.094	0.859-1.141	A
	T		100	0.973	0.909-1.091	0.860-1.136	A
	U		150	0.876	0.907-1.093	0.857-1.143	A+

Analyte		Method[1]	Conc[2]	Ratio[3]	Acceptance Ranges[4] ± 2RSD	± 3RSD	Result[5]
			ppm				
Boron	D	Titr	1000	1.004	0.979-1.021	0.968-1.032	A
	E		3000	1.002	0.979-1.021	0.968-1.032	A
	F		5000	0.996	0.979-1.021	0.968-1.032	A

1. Methods: Titr - Titration
   IC - Ion Chromatography
   Color - Colorimetric
   DCP - Direct Coupled Plasma Spectrophotometry

2. Conc: Approximate concentration analyzed.

3. Ratio of Licensee mean value to NRC mean value.

4. The SD in the fifth and sixth columns represents the coefficient of variation obtained from averaging licensee data from the preceding cycle (Table 2.1 of NUREG/CR-5244). A result is considered to be in agreement if it falls within the ± 2 SD range; a qualified agreement if it lies outside ± 2 SD, but within ± 3 SD; and in disagreement if it is outside the ± 3 SD range.

5. Result:
   A = Agreement: Licensee value is within ±2 SDs of the NRC mean value.
   A+ = Qualified agreement, licensee is between ± 2 and ±3 SDs of the NRC value.
   D = Disagreement: licensee value is outside ± 3 SDs.