

U.S. NUCLEAR REGULATORY COMMISSION

REGION III

Report No. 50-374/86005(DRSS)

Docket No. 50-374

License No. NPF-18

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

Facility Name: LaSalle County Station, Unit 2

Inspection At: LaSalle Site, Seneca, IL

Inspection Conducted: January 16-17 and 23, 1986

Inspector: *R.B. Holtzman*
R. B. Holtzman

2/12/86
Date

M. C. Schumacher
Approved By: M. C. Schumacher, Chief
Radiological Effluents and
Chemistry Section

2/12/86
Date

Inspection Summary

Inspection on January 16-17 and 23, 1986, (Report No. 50-374/86005(DRSS))

Areas Inspected: Special, announced onsite followup of Licensee Event Report (LER) 85040, "Standby Liquid Control (SBLC) Tank Concentration High," including inspection of the chemistry laboratory, boron analyses, QC/QA program, and operation of the SBLC system. The inspection involved 15 inspector-hours onsite by one NRC inspector.

Results: No violations or deviations were identified during this inspection.

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DETAILS

1. Persons Contacted

¹R. O. Bishop, Services Superintendent, LSCS
¹D. Berkman, Assistant Services Superintendent, LSCS
¹R. M. Jeisy, Station QA Supervisor, LSCS
^{1,2}S. E. Wilkinson, Unit 2 Chemist, LSCS
¹L. R. Aldrich, Rad/Chem Supervisor, LSCS
J. Schuster, Acting Lead Chemist, LSCS
¹M. J. Jordan, NRC Senior Resident Inspector
D. Vander Ploeg, Rad/Chem Technician, LSCS
P. S. Watford, Performance Engineer, LSCS
J. Shetterly, Shift Supervisor, LSCS

¹Present at plant exit interview on January 17, 1986

²Telephone conversation on January 23, 1986

2. Licensee Action on Previous Inspection Findings

- a. (Closed) Open Item (50-373/85033-01): Review of Licensee Event Report (LER) 50-374/85040, "Standby Liquid Control (SBLC) Concentration High." The resident inspectors reviewed administrative aspects of this LER. Pursuant to that review, the licensee modified chemistry procedures to improve communications between the chemistry and operation groups and to standardize the method of determining tank volume. The current inspection reviewed technical aspects relating to sampling and analysis to determine boron concentration in the SBLC tank. Several procedural weaknesses possibly affecting analytical accuracy were identified. Licensee resolutions of these matters will be followed under Open Items (50-374/85005-01 and 50-374/86005-02).

3. General

Licensee Event Report (LER) 50-374/85040, dated September 20, 1985 and revised October 31, 1985, reported boron concentrations in the SBLC tank above technical specification limits during a 15-hour period on August 22-23, 1985. The LER described licensee actions taken to return concentrations to acceptable limits by feed and bleed dilution. Tank concentrations did not behave as predicted by the chemistry staff and three adjustments were required before the concentration was reduced from 14.7% by weight of sodium pentaborate to below the Technical Specifications (T/S) limiting value of 13.8%. Licensee chemistry personnel attributed these difficulties to possible error in measurement of water added to and/or withdrawn from the tank during the adjustments, and to possible errors in the determination of the concentrations.

4. Review of Boron Analyses and SBLC System Operations

The inspector observed the collection and analysis of a sample from the SBLC tank. The Rad/Chem Technician (RCT) collected the sample following procedure LCP-310-09, "Standby Liquid Control Solution Tank Sampling," Revision 1, October 23, 1985, after the tank had been air-sparged for several hours to assure mixing. The RCT understood and followed the sampling procedure closely.

The analysis was done according to procedure LCP-110-09 "Determination of High Range Boron (Sodium Pentaborate)," Revision 5, October 29, 1985. This is a mannitol potentiometric titration method in which the borate is titrated with NaOH solution, which is standardized against potassium hydrogen phthalate. The RCT appeared knowledgeable in the procedure and followed it step-by-step. He generally demonstrated good laboratory technique, except that after he used a glass rod to remove partial drops from the buret to add to and stir the solution, he removed the rod and wiped it clean with a paper towel. This technique results in some loss of sample which, if done often, would lower the boron concentration result by an undetermined, but probably, small amount.

Several apparent weaknesses related to quality control were identified by the inspector's review of the analysis. The uptake of atmospheric carbon dioxide or other laboratory gases in the sample or standard solutions, is not controlled, contrary to the usual recommendations, for such procedures¹. The expected effect would be a positive bias error in the analysis which may be compensated to some extent by a similar effect in the standard solutions, but the licensee has apparently not evaluated it. The effect may also depend on how rapidly titrations are performed. The procedure requires standardization of the sodium hydroxide and the determination of sample specific gravity and boron concentration be done in triplicate. This gives a measure of precision for the particular determination, but the standardization results are not plotted to determine variability with time or with individual analyst performance, nor are blind samples used to evaluate analytical reliability. This is a particularly important aspect of quality control given the long interval between successive RCT assignments in the laboratory.

Some trending of SBLC tank analysis results is done by plotting and tabulating the results on a copy of T/S Figure 3.1.5-2, which graphically displays the allowed operating area for combined tank volume and concentration. However, its usefulness as a QC measure is weakened by not including the results obtained prior to adjustments on the SBLC solution.

Finally, the titer of the sodium hydroxide standard is determined using potassium hydrogen phthalate, but no check is made against a boron standard to confirm consistency between the two methods.

¹"Standard Test Method for Boron in Water, D3082-79," in Annual Book of ASTM Standards, Volume 11.01, Water (1984), pp. 335-344.

The licensee's review of the analyses associated with this event noted that the sodium hydroxide titer was somewhat higher than seen during preceding or subsequent analyses, but in the absence of control charts and boron standard results, it was uncertain that the value was outside the expected variation.

In summary, the inspector's review of boron analyses identified weaknesses in QC that contribute to reduced confidence in the accuracy and precision associated with this analysis. The licensee agreed to review the boron analysis procedure, including the effects of carbon dioxide absorption, use of boron standards and improved QA practices, and to make necessary changes. This will be examined in subsequent inspections. (Open Item 50-374/86005-01).

The licensee's review of the event also identified a possible problem in the measurement of SBLC tank volume and volume changes. Routine daily observations of tank level by the operations group is based on level meter and sight glass readings whereas the chemistry group measures tank level with a measuring tape attached to a plumb bob. Level indication by these three methods are frequently in disagreement, in some instances, by perhaps as much as two hundred gallons. Uncertainty in level readings associated with water addition to the SBLC tank is believed to have possibly contributed to the failure of the system concentration to behave as predicted during this event. As a corrective measure, the licensee is specifying the use of the apparently more reliable "plumb bob" method. Revision of the applicable Operating Department procedure will be reviewed during a subsequent inspection. (Open Item 50-374/86005-02).

5. Open Items

Open items are matters which have been discussed with the licensee, which will be reviewed further by the inspector, and which involve some action on the part of the NRC or licensee or both. Open items disclosed during the inspection are discussed in Section 4.

6. Exit Interview

The inspectors discussed the inspection findings with licensee representatives (Section 1) at the conclusion of the onsite inspection on January 17, 1986, and by telephone on January 23, 1986. In response to inspector comments, licensee representatives agreed to review QA/QC practices associated with boron analyses and make necessary procedure changes (Section 4).

During the inspection 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.