Commonwealth Edison
Quad Cities Nuclear Power Station
22710 206 Avenue North
Cordova, Illinois 61242
Telephone 309/654-2241

RLB-92-071

March 23, 1992

U. S. Nuclear Regulatory Commission
Document Control Desk
Washington, DC 20555

Reference: Quad Cities Nuclear Power Station
Docket Number 50-254, DPR-29, Unit One

Enclosed is Licensee Event Report (LER) 92-007, Revision 00, for Quad Cities Nuclear Power Station.

This report is submitted in accordance with the requirements of the Code of Federal Regulations, Title 10, Part 50.73(a)(2)(iv). The licensee shall report any event or condition that resulted in manual or automatic actuation of any Engineered Safety feature.

Respectfully,

COMMONWEALTH EDISON COMPANY
QUAD CITIES NUCLEAR POWER STATION

R. L. Bax
Station Manager

RLB/TB/plm

Enclosure

cc: J. Schrage
T. Taylor
INPO Records Center
NRC Region III

030185

IE22

LICENSEE EVENT REPORT (LER)

Form Rev 2.0

Facility Name (1)	Docket Number (2)	Page (3)
Quad Cities Unit One	0 5 0 0 0 2 5 4	1 of 0 5

Title (4) Control Room HVAC Ventilation Isolation Due To Chlorine Analyzer Malfunction From An Inadequate Calibration And Probe Filling Procedures.

Event Date (5)			LER Number (6)			Report Date (7)			Other Facilities Involved (8)	
Month	Day	Year	Year	Sequential number	Revision Number	Month	Day	Year	Facility Names	Docket Number(s)
									Quad Cities Unit Two	0 5 0 0 0 2 5 5
0 2	2 8	9 2	9 2	0 0 7	0 0	0 3	2 6	9 2		0 5 0 0 0

OPERATING MODE (9)		THIS REPORT IS SUBMITTED PURSUANT TO THE REQUIREMENTS OF 10CFR (Check one or more of the following) (11)			
	4	20.402(b)	20.405(c)	X 50.73(a)(2)(iv)	73.71(b)
POWER LEVEL (10)	1 0 0	20.405(a)(1)(i)	50.36(c)(1)	50.73(a)(2)(v)	73.71(c)
		20.405(a)(1)(ii)	50.36(c)(2)	50.73(a)(2)(vii)	Other (Specify in Abstract below and in Text)
		20.405(a)(1)(iii)	50.73(a)(2)(i)	50.73(a)(2)(viii)(A)	
		20.405(a)(1)(iv)	50.73(a)(2)(ii)	50.73(a)(2)(viii)(B)	
		20.405(a)(1)(v)	50.73(a)(2)(iii)	50.73(a)(2)(x)	

LICENSEE CONTACT FOR THIS LER (12)

Name	TELEPHONE NUMBER
	AREA CODE
Michael Harms Ext. 2159	3 0 9 6 5 4 - 2 2 4 1

COMPLETE ONE LINE FOR EACH COMPONENT FAILURE DESCRIBED IN THIS REPORT (13)

CAUSE	SYSTEM	COMPONENT	MANUFACTURER	REPORTABLE TO NPRDS		CAUSE	SYSTEM	COMPONENT	MANUFACTURER	REPORTABLE TO NPRDS

SUPPLEMENTAL REPORT EXPECTED (14)		Expected Submission Date (15)	Month	Day	Year
Yes (If yes, complete EXPECTED SUBMISSION DATE)	X NO				

ABSTRACT (Limit to 1400 spaces, i.e. approximately fifteen single-space typewritten lines) (16)

ABSTRACT:

On February 28, 1992, Unit One was in the RUN mode at 100 percent of rated core thermal power. Unit Two was in the REFUEL mode at 0 percent of rated core thermal power. At 2203 hours, the Control Room [NA] (CR) isolation dampers [DMP] closed and the CR ventilation system [VI] automatically entered the recirculation mode of operation due to a high concentration signal from the chlorine analyzer. An Emergency Notification System (ENS) phone call was made at 2240 hours per 10CFR50.72 (b)(2)(ii).

The apparent cause of the event was an inadequate calibration procedure which allowed the probe to be calibrated incorrectly, making it susceptible to erratic behavior. An apparent contributing cause of the event was an inadequate probe filling procedure which allowed salts to build up on the probe tip, also making it susceptible to erratic behavior.

The immediate corrective actions included dispatching an Equipment Operator (EO) to the local panels who verified that the chlorine analyzer had alarmed and the CR isolation dampers had closed. Future corrective actions will include revising the calibration, functional testing, and filling procedures.

This report is being submitted to comply with 10CFR50.73(a)(2)(iv).

PLANT AND SYSTEM IDENTIFICATION:

General Electric - Boiling Water Reactor - 2511 MWt rated core thermal power.

EVENT IDENTIFICATION: Control Room HVAC Ventilation Isolation Due To Chlorine Analyzer Malfunction From An Inadequate Calibration And Probe Filling Procedure.

A. CONDITIONS PRIOR TO EVENT:

Unit: One Event Date: February 28, 1992 Event Time: 2203
Reactor Mode: 4 Mode Name: RUN Power Level: 100%

This report was initiated by Deviation Report D-4-01-92-019.

RUN Mode (4) - In this position the reactor system pressure is at or above 825 psig, and the reactor protection system is energized, with APRM protection and RBM interlocks in service (excluding the 15% high flux scram).

B. DESCRIPTION OF EVENT:

On February 28, 1992, Unit One was in the RUN mode at 100 percent of rated core thermal power. Unit Two was in the REFUEL mode at 0 percent of rated core thermal power. At 2203 hours, the Control Room [NA] (CR) isolation dampers [DMP] closed, the CR ventilation system [VI] automatically entered the recirculation mode of operation, and the "Control Room Standby HVAC System Major Trouble" alarm [ALM], G-12, annunciated [ANN] on the 912-1 panel [PL] in the main CR.

An Equipment Operator (EO) was dispatched to the Toxic Gas Analyzer panel, 1/2-9400-103 and the Standby Heating, Ventilation, and Air Conditioning (HVAC) local contr panel, 1/2-9400-105. At the Toxic Gas Analyzer panel, the EO observed that the chlorine analyzer was indicating 1.15 parts per million (ppm) chlorine gas concentration and the "XAL-26 Chlorine Concentration High" light [IL] was lit. He also noted that the "Toxic Gas Analyzer Trouble" and the Toxic Gas Concentration High" alarms were annunciating on the 1/2-9400-105 panel. The EO then acknowledged the alarms, verified that the CR isolation dampers had closed as designed, and placed the toxic gas sample point selector switch [HS] in position "C" for the recirculation mode of operation. Concurrently, the main CR notified the Radiation Protection (RP) and Instrument Maintenance (IM) departments of the toxic gas isolation. RP was asked to sample for chlorine gas at the CR HVAC outside air intake. Meanwhile, IM personnel performed a walkdown of the analyzer and verified that the chlorine analyzer was providing a high concentration signal which had caused the isolation dampers to close. Nuclear Work Request (NWR) Q98515 was written for IM personnel to troubleshoot and repair the analyzer.

At 2232 hours, RP contacted the Shift Engineer (SE) and the main CR to report that no chlorine gas was detected at the outside air intake. Also at 2232 hours, the Toxic Gas Analyzer was declared inoperable and QOS 5750-01, "Control Room Ventilation Toxic Gas Inoperable Outage Report," was initiated.

At 2240 hours, an Emergency Notification System (ENS) phone call was made per 10CFR50.72(b)(2)(ii).

On March 10, 1992, a representative from Anacon, Inc. the manufacturer of the chlorine analyzer, arrived at the station to assist IM personnel with troubleshooting. During troubleshooting, the representative noted that the chlorine probe tip had a slight buildup of salts. He commented that this buildup caused the probe to develop an abnormally high standing output, which could in turn cause the analyzer to provide false high concentration signals. The representative suggested that the IM department revise QIP 5700-2, "Filling Procedure for the Chlorine Analyzer Probe." This revision should include steps to alternate the installed probe with a probe from the storeroom every time the procedure was performed. This procedure should also include steps to visually inspect and, if needed, fill the probe that was going to be returned to the storeroom. The representative suggested that implementing these revisions would allow the probe adequate time to reach equilibrium after being filled because it would not be returned to service until the filling procedure was performed again. This longer equilibrium time after filling would also significantly reduce the chance of salts building up on the probe tip.

On March 11, 1992, the representative returned to the station to continue troubleshooting with the IM personnel. During calibration of the chlorine analyzer using the Dynacalibrator, the representative noticed that the overflow valve on the back of the Dynacalibrator was procedurally left open. He stated that this was incorrect because it allowed most of the chlorine gas being used for calibration to escape into the room without ever passing over the probe tip. This calibration method would result in a probe that was calibrated with 1 ppm of chlorine gas instead of 5 ppm, making the probe extremely sensitive. Additionally, this method would result in operating the probe logic circuitry at the outer limits of its design range, making the circuitry response very unstable. Both of these results could cause the probe to produce false high concentration signals very often and in random patterns. The representative suggested that the IM department revise QIS 79-1, "Chlorine Analyzer Calibration Procedure" and QIS 79-2, "Chlorine Analyzer Functional Test Procedure" to include steps to ensure that the overflow valve was closed during calibration and functional testing. When IM personnel performed a calibration again with the overflow valve closed, the calibration that resulted matched almost identically to the calibration of the probe done at the factory. The vendor representative commented that this is what should occur during a good calibration.

The March 19, 1992, repairs were completed on the analyzer under NWR Q98515. The analyzer was declared operable and QOS 5750-01 was completed at 1020 hours.

C. APPARENT CAUSE OF EVENT:

This report is being submitted in accordance with 10CFR50.73(a)(2)(iv), which requires the reporting of any event or condition that results in a manual or automatic actuation of an Engineered Safety Feature (ESF).

The apparent cause of the event was an inadequate calibration procedure that allowed the probe to be calibrated incorrectly. This calibration method caused the probe to become oversensitive. This method also caused the analyzer's logic circuitry to operate at the outer limits of its design range, making the circuitry response very unstable.

An apparent contributing cause of the event was an inadequate filling procedure which allowed salts to build up on the probe tip. This salt buildup caused the probe to develop an abnormally high standing output, which in turn could cause the probe to produce false high concentration signals.

D. SAFETY ANALYSIS OF EVENT:

The safety significance of the event was minimal. Upon receiving a high chlorine concentration signal from the Toxic Gas Analyzer, the CR isolation dampers closed and the CR ventilation system automatically entered the recirculation mode of operation. This system response was the design response. RP also verified that no chlorine gas was present at the CR HVAC outside air intake. Therefore, the CR operators were never in danger of toxic gas overexposure during the event.

E. CORRECTIVE ACTIONS:

There were several immediate corrective actions taken for the CR ventilation isolation. An EO was dispatched to the Toxic Gas Analyzer panel and the CR Standby HVAC local control panel. At the panels, the EO verified that the chlorine analyzer was alarming and that the CR isolation dampers had closed as designed. The EO then placed the toxic gas sample point selector switch in position "C". Also at this time, RP sampled for and found no chlorine gas at the CR HVAC outside air intake and IM personnel performed a walkdown of the chlorine analyzer. NWR Q98515 was written for IM personnel to troubleshoot and repair the analyzer.

Additional corrective actions included repairing the analyzer under NWR Q98515, declaring the analyzer operable, and completing QOS 5750-01.

Several future corrective actions will be taken for this event. The station will obtain written vendor recommendations on probs care and alternation frequency from Anacon, Inc. (NTS #254200921901). The station will revise QIS 79-1, QIS 79-2, and QIP 5700-2 to ensure that calibrations, functional tests, probe fillings, and probe alternations are performed properly (NTS #2542009201902). Additionally, the station will investigate the availability of other analyzers that have demonstrated reliable performance under similar operating conditions (NTS #2542009201903).

F. PREVIOUS EVENTS:

Previous events where chlorine analyzer problems were noted are as follows:

1) DVR 04-01-87-014, "Control Room HVAC Chlorine Monitor Inoperable Due to Low Temperature."

2) DVR 04-01-87-060 (LER 87-013), "Control Room Ventilation Isolation Due to Chlorine Monitor Problems Caused by Defective Procedures or Corrosion."

3) DVR 04-01-87-71 (LER 87-014), "Control Room Ventilation Isolation Caused by Chlorine Analyzer Spike During Electrical Storm."

4) DVR 04-01-88-001 Supplement Rev. 1, "Control Room HVAC Chlorine Analyzer Inoperable Due to Erratic Readings Caused by Dried Out Probe."

5) DVR 04-01-88-012 (LER 88-005), Control Room Ventilation Isolation Due to Personnel Error and Cause Not Determined."

6) DVR 04-01-89-003, "Control Room Ventilation Toxic Gas Analyzer Inoperable Due to Failure of the Chlorine and Sulfur Dioxide Monitors.

7) DVR 04-01-89-128 (LER 89-026) Supplement, Rev. 1, "Control Room HVAC Isolation Due to Dried Out Chlorine Probe Caused by Cold, Dry Weather."

8. DVR 04-01-91-144 (LER 91-023), "Control Room HVAC Isolation Due to a Dried Out Chlorine Analyzer Probe Due to Unknown Cause."

G. COMPONENT FAILURE DATA:

There is no component failure associated with this event.