

U. S. NUCLEAR REGULATORY COMMISSION

REGION III

Report No. 50-331/84-11(DRP)

Docket No. 50-331

License No. DPR-49

Licensee: Iowa Electric Light and Power Company
IE Towers, P. O. Box 351
Cedar Rapids, IA 52406

Facility Name: Duane Arnold Energy Center

Inspection At: Palo, IA

Inspection Conducted: July 18 - 26, 1984

Enforcement Conference: August 8, 1984

Inspector: L. S. Clardy

Approved By: *D.C. Boyd*
D. C. Boyd, Chief
Projects Section 2D

10-26-84
Date

Inspection Summary

Inspection from July 18 - 26, 1984 (Report No. 50-331/84-11(DRP))

Areas Inspected: Special announced inspection of the sequence of events on July 18, 1984, concerning the inoperability of the Standby Liquid Control system. The inspection involved a total of 36 inspector-hours by one NRC inspector including 0 inspector-hours onsite during off-shifts.

Results: One violation was identified.

DETAILS

1. Persons Contacted

- +S. Tuthill, Senior Vice President
- +R. McGaughy, Manager, Nuclear Division
- +*D. Mineck, Plant Superintendent-Nuclear
- P. Ward, Director, Nuclear Division
- R. Hannen, Assistant Plant Superintendent-Operations
- +K. Young, Assistant Plant Superintendent-Radiation Protection and Security
- C. Mick, Operations Supervisor
- H. Giorgio
- *W. Miller, Technical Support Supervisor
- *J. Vinquist, Assistant Plant Superintendent-Technical Support
- +D. Wilson, Manager, Nuclear Licensing

In addition, the inspector interviewed several other licensee personnel including shift supervising engineers, control room operators, auxiliary operators, and chemistry technicians.

+Denotes those present at the enforcement conference on August 8, 1984.

-Denotes those present at the management meeting on July 26, 1984.

*Denotes those present at the exit interview on July 27, 1984.

2. Standby Liquid Control (SBLC) Inoperability

On July 18, 1984 the licensee performed a Technical Specification required monthly surveillance test on the SBLC system using Surveillance Test Procedure (STP) 44C001 to determine the boron concentration in the system.

To perform the STP a chemistry technician must open an air valve to the SBLC tank to sparge the system. The technician who performed the air sparging mistakenly shut the SBLC tank isolation valve, V-26-01, instead of opening the air sparge valve, V-26-11. When he realized he had manipulated the wrong valve he tried to return it to its original position but not having remembered how far he had first turned it, unknowingly left it closed. The valve remained closed for approximately five hours until two operators walking by the valve on their way to a work station recognized the mispositioning and notified the control room. It was immediately returned to the open position.

During this time the SBLC system was inoperable and would not have been able to perform its intended function because the closed valve would have prevented the flow of borated water.

This is a violation (331/84-11-01).

3. Detailed Sequence of Events and Causes

The chemistry department performs daily sensor checks on its instruments using surveillance test procedures (STP). These STPs first must be approved by the shift supervisor. A technician normally takes all the required chemistry STPs for that day to the control room for approval although he may not be the person assigned to perform all of the checks. At this time he also receives any keys necessary to operate locks in the system to be tested.

On July 18, the technician performing the sensor checks was not assigned to perform STP 44C001 and in fact was not qualified to perform it. Although having previous nuclear experience he was a contract technician who had been at DAEC for only one month.

After returning from the control room the technician was informed by another technician that the person who performs the daily sensor checks also starts the air sparge for STP 44C001. In an attempt to be helpful the technician tried to line up the air sparge. The technician mistook V-26-01, the SBLC tank isolation valve, for V-26-11, the air sparge valve. He unlocked V-26-01, shut it, then relocked it. Since he could not hear the air sparge he realized he had moved the wrong valve so he again unlocked it with the intention of putting it back to the position in which he found it. However, he could not remember how far he had moved it so moved it only a few turns and then relocked it. Since this is a gate valve it takes several turns to move it off its seat and the number of turns is not directly proportional to the opening of the valve. His action left the valve in an essentially closed position. The technician then contacted the chemistry lab and inquired about the location of V-26-11 but did not inform anyone that he manipulated V-26-01. He then opened V-26-11. The recorded time of this event was 10:45 a.m. on STP 44C001.

At 2:30 p.m. the air sparge was secured and the STP completed and taken to the control room for review. As required by the STP an operator was dispatched to verify the position of V-26-11. He did not and would not necessarily be expected to verify the position of V-26-01 because that valve was not part of the procedure and normally would not have been moved. Shortly thereafter, at about 3:00 p.m., two operators on their way to the refuel floor recognized by stem position that V-26-01 was shut. They immediately reported this to the control room and V-26-01 was opened and locked in position at 3:30 p.m.

Valve V-26-01 is a rising stem 3 inch gate valve. When fully closed there is about one inch of stem above the handwheel and when fully opened there are about six inches of stem above the handwheel. Both of the operators who found the valve mispositioned and the operator who repositioned it report that there was one to two inches of stem above the handwheel and that the valve was probably fully shut.

The licensee performed a complete SBLC valve lineup after the event. There were no further discrepancies.

4. Areas Inspected

- The inspector also reviewed the key log for July 18, control room logs, STP 44C001, chemistry technician qualifications and the SBLC valve lineup done after the event.

There were no other noncompliances noted in these areas. A weakness noted was the chemistry technician qualification program. The licensee used different qualification programs for Iowa Electric chemistry technicians than for contractor chemistry technicians. The licensee now requires all technicians to qualify under the more stringent Iowa Electric qualification program.

5. Corrective Actions

The following corrective actions have been taken by the licensee:

- . Administrative controls have been implemented such that safety-related valves can be manipulated only by operations personnel.
- . A review of valve locking policy is being performed to determine if certain valves can be left unlocked (such as the air sparge valve), or if the use of separate padlocks on surveillance related valves will prevent inadvertent manipulation of safety-related valves.
- . A decision has been made to increase the number of technicians and to make them part of the Iowa Electric Company staff instead of part of the contractor staff. Position openings have been posted.
- . A commitment has been made to provide better supervision over the technicians.
- . The chemistry technicians (and all plant personnel) now must get approval only for the STPs that they will perform and not for STPs that will be performed by other personnel.
- . The event and its implications has been discussed with all plant personnel with emphasis on control of plant personnel and individual actions. Indoctrination training on the subject also will be strengthened.

6. Licensee Strengths

The licensee is to be commended that two operators, who had no assigned responsibilities for this system but who were passing through the area, were alert enough to recognize that the valve was mispositioned and who then called the control room. Because of this action the valve was opened immediately and locked in its correct position. The licensee emphasizes to all plant personnel during training that they should be alert in their daily routines for abnormal conditions.

7. Licensee Meetings

a. July 26 Management Meeting

Items discussed during this meeting were the SBLC event, personnel errors, procedural adherence, and the Trial Inspection Program. The licensee also was informed that its level of communication with the NRC, both formal (as in LERs) and informal, was very good:

Specific corrective actions for the SBLC event are mentioned in the body of this report. General corrective actions for personnel errors are discussed in paragraph 7c.

b. July 27 Exit Meeting

The scope and findings of the inspection were discussed.

c. August 8 Enforcement Conference

The items discussed during the enforcement conference were personnel errors, the SBLC event and RIII concerns that licensee corrective actions were not effective in preventing or reducing the upward trend in personnel errors.

The licensee had experienced several previous events associated with personnel errors. Region III informed the licensee of these concerns in Inspection Report Nos. 331/83-15(DRP), 331/83-16(DRP, and 331/84-02(DRP). Region III's concerns were that corrective actions and management attention were not adequate or effective in reducing personnel errors. A further concern was that the trend in personnel errors could lead to a more severe event such as the Standby Liquid Control system inoperability.

A brief history of some recent personnel errors includes: five missed surveillances in 1983; four missed surveillances in 1984; on November 8, 1983 both recirculation pumps tripped during surveillance testing resulting in a reactor trip; on January 7, 1984 a main steam relief opened during surveillance testing; on April 20, 1984 a reactor scrammed during startup due to operator error; on May 5, 1984 a High Pressure Coolant Injection system initiated during testing; on May 7, 1984 a Reactor Core Isolation Cooling system isolated during testing; on May 25, 1984 deenergization of torus level, containment pressure, and nitrogen makeup pressure during calibration; and on June 18, 1984 the "B" river water supply was inoperable due to improper clearing of a tag out.

The licensee presented its specific corrective actions for the SBLC event (paragraph 2.0) and its general corrective actions.

The licensee general corrective actions are as follows:

(1) Disciplinary Action

- (a) Verbal reprimand
- (b) Written reprimand
- (c) Suspension
- (d) Dismissal

(2) Increased Management Attention

- (a) More direct supervision of workers
- (b) Better implementation of supervisors' specific duties and responsibilities
- (c) Day shift on-duty work supervisor with no other duties
- (d) Personnel error review board

(3) Increase Plant Awareness of Errors

- (a) Special meetings held to discuss errors and solutions with plant personnel
- (b) Task force to study causes and corrective actions
- (c) Routine meetings with a common agenda for all personnel to discuss plant items
- (d) Prompt procedure changes when problems are noted with procedures
- (e) Additional and more thorough training on plant modifications
- (f) Display board with items such as number of personnel errors, and number of accident free days

The NRC personnel concur with these actions but believe the licensee should consider stronger use of a punishment/reward system; that a review board should have different members or meet at different levels depending on the severity of the event; and increased supervision and communication during surveillance.