Iowa Electric Light and Power Company

August 10, 1992
NG-92-3584

Mr. A. Bert Davis
Regional Administrator
Region III
U. S. Nuclear Regulatory Commission
799 Roosevelt Road
Glen Ellyn, IL 60137

Subject: Duane Arnold Energy Center
Docket No: 50-331
Op. License DPR-49
Licensee Event Report #92-012

Gentlemen:

In accordance with 10 CFR 50.73 please find attached a copy of the subject Licensee Event Report.

Very truly yours,

David L Wilson

David L Wilson
Plant Superintendent - Nuclear

DLW/JK/eah

cc: Director of Nuclear Reactor Regulation
Document Control Desk
U.S. Nuclear Regulatory Commission
Mail Station P1-137
Washington, D. C. 20555

NRC Resident Inspector - DAEC

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NRC Form 366A (5 89) U.S. NUCLEAR REGULATORY COMMISSION

LICENSEE EVENT REPORT (LER)

APPROVED OMB NO 3150 0104

EXPIRES 4/30/92

ESTIMATED BURDEN PER RESPONSE TO COMPLY WITH THIS INFORMATION COLLECTION REQUEST 50 0 HRS FORWARD COMMENTS REGARDING BURDEN ESTIMATE TO THE RECORDS AND REPORTS MANAGEMENT BRANCH P 530) U S NUCLEAR REGULATORY COMMISSION WASHINGTON DC 20555 AND TO THE PAPERWORK REDUCTION PROJECT (3150 0104) OFFICE OF MANAGEMENT AND BUDGET WASHINGTON DC 20503

FACILITY NAME (1)
Duane Arnold Energy Center

DOCKET NUMBER (2) 0 5 0 0 0 3 3 1

PAGE (3) 1 OF 0 6

TITLE (4) Potential Degradation of Control Room Habitability due to Lack of Seismic Qualification of Cable Spreading Room Vent and Damper

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
0 7	1 7	9 2	9 2	— 0 1 2	— 0 0	0 8	1 0	9 2	None	0 5 0 0 0
										0 5 0 0 0

OPERATING MODE (9)	N	THIS REPORT IS SUBMITTED PURSUANT TO THE REQUIREMENTS OF 10 CFR § (Check one or more of the following) (11)			
POWER LEVEL (10)	1 0 0	20 402(b)	20 405(c)	80 73(a)(2)(iv)	73 71(b)
		20 405(a)(1)(i)	80 36(c)(1)	80 73(a)(2)(v)	73 71(c)
		20 405(a)(1)(ii)	80 36(c)(2)	80 73(a)(2)(vii)	OTHER (Specify in Abstract below and in Text NRC Form 366A)
		20 405(a)(1)(iii)	80 73(a)(2)(i)	80 73(a)(2)(viii)(A)	
		20 405(a)(1)(iv)	X 80 73(a)(2)(ii)	80 73(a)(2)(viii)(B)	
		20 405(a)(1)(v)	80 73(a)(2)(iii)	80 73(a)(2)(x)	

LICENSEE CONTACT FOR THIS LER (12)

NAME	TELEPHONE NUMBER AREA CODE
John D. Kerr, Technical Support Specialist	3 1 9 8 5 1 - 7 4 9 2

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)

During March and April of 1992, when the plant was in cold shutdown during a refueling outage, testing was done on the Cable Spreading Room (CSR) carbon dioxide fire suppression system and its affect on control room habitability. Due to carbon dioxide infiltration into the control room, a temporary vent damper assembly was installed in the CSR.

In June, testing determined that the required positive pressure in the control room under accident conditions could not be met if the vent damper assembly failed open. On 7-10-92, with the plant at 99.9% power, the vent damper assembly was determined to be non-seismic. There was no immediate effect on plant safety but it was recognized that operator action would be required to assure control room habitability was not degraded during a seismic event.

The cause for the lack of seismic qualification and the root cause for the positive pressure test failure was the failure to recognize the need for assured closure of the vent damper given the variation in unidentified leaks in the system. A safety related and seismic modification will replace the current vent damper assembly. Temporary procedure changes provide compensatory actions until the modification is complete. Responsible personnel have been made aware of the sensitivity of the system and the unidentified leaks are being pursued.

I. DESCRIPTION OF EVENT

On 3-22-92, with the reactor shutdown and defueled, a special test of the Cable Spreading Room (CSR) carbon dioxide fire suppression system was conducted. This test was designed to demonstrate the adequacy of the fire suppression system (CARDOX) in achieving and maintaining a CSR atmosphere with acceptable levels of carbon dioxide (CO_2). The test was also designed to monitor the effect of the CARDOX discharge on the control room atmosphere. The control room is located directly above the CSR. The test specified 19.5% as the minimum level of oxygen necessary for continued occupancy of the control room by personnel without self contained breathing apparatus. During the test, personnel noted leakage of the CO_2 gas up through cable penetrations in the floor. Monitoring of oxygen levels in the control room found varying oxygen levels as low as 15% at floor level. This event was reported in LER 92-004 dated 4-21-92.

The cause of the excess intrusion of carbon dioxide into the control room during this test on 3-22-92 was an unacceptably high pressure in the CSR during the initial stages of CARDOX operation. The cable penetrations between the CSR and the control room were unable to maintain an air tight seal under this high pressure. This test demonstrated that there was an insufficient venting capability for the CSR if CARDOX were initiated. One of the corrective actions to improve this venting was to add a temporary vent and damper to the CSR. The special test was rerun on 4-5-92 when the plant was still in cold shutdown. The temporary vent opened when the CSR pressure reached 1" wg. The results of the test were very positive with respect to both control room habitability and the functioning of CARDOX as a fire suppression system. See LER 92-04 for details. The plant completed its refueling and maintenance outage and started up on 4-24-92.

As a long term corrective action to assure control room habitability upon CARDOX initiation, the additional venting capability for the CSR that was tested on 4-5-92 was left in place until permanent modifications are completed. This temporary modification consists of a 25 inch square duct vent from the CSR door to the outside atmosphere. This vent was installed with a backdraft damper that operates to relieve pressure at 1" wg. This modification was designed and constructed as non-safety related with no seismic requirements.

Radiation protection for operating personnel in the control room under accident conditions is provided by the operation of either of two air filtration trains in conjunction with control room shielding. Potentially radioactive fission products in the outside air during accident conditions are removed by these air filter trains. The clean air delivered by the Standby Filter Unit (SFU) pressurizes the control room, preventing unfiltered air from entering the control room. The technical specification bases specify the control room pressure be maintained at least .10"wg (above outdoor pressure under calm wind conditions) in the event of a control room isolation and SFU system initiation.

The vent and damper discussed above serve as part of the pressure boundary of the control building envelope. Testing has shown that 0.10" wg or greater pressure can be achieved in the control room with the temporary vent and damper installed and in its normally closed position. Control room pressure testing prior to vent installation showed that the .10" wg pressure requirement could be met even with the CSR door open. This suggested that the temporary vent installation need not be safety related or seismically qualified. However, testing in June showed that control room pressure was only .06" - .07" wg with either the CSR door intentionally open or with the vent damper blocked open. These test results show that the control building envelope leaks and SFU performance varies from test to test. Therefore, control room habitability may be degraded when this damper is failed open, depending on envelope leakage and SFU performance. This shows that the CSR vent and damper should be safety related and seismic to provide greater protection against potential degradation of control room habitability without reliance on operator action. This concern was identified on 6-15-92 and was documented in a Nonconformance Report requiring evaluation of the installed configuration. On 7-10-92 (plant at 99.9% power), during the evaluation of the Nonconformance Report, it was determined that the vent was supported by structures that were not reasonably qualifiable for seismic events and operator action would be required to respond to the potential failure of the vent damper assembly to ensure control room positive pressure of at least .10" wg. On 7-14-92 the procedure for earthquake was revised (See Corrective Actions). This condition was determined to be reportable and was reported to NRC via telephone notification under 10CFR50.72 (b)(1)(ii)(C) on 7-17-92, as a condition during operation that results in the nuclear power plant being in a condition not covered by the plant's operating and emergency procedures.

II. CAUSE OF EVENT

Review of the SFU pressure test results indicates there are more than one specific cause for the recent lower than expected values for positive pressure in the control room. It is believed there are some currently unidentified leaks in the control building ventilation positive pressure system. Correcting these leaks is an ongoing engineering effort. However, all of the recent failures to achieve at least .10" wg positive pressure, as specified by the technical specification bases, were with either the CSR door intentionally blocked open or with the temporarily installed vent damper blocked open. The CSR doors are normally locked closed and alarmed. Therefore, the relevant cause for the positive pressure test failure (.07" wg) was the open position of the vent damper, in conjunction with the unidentified leaks.

Although the damper in the temporary vent is normally closed, the closed position cannot be assured during a seismic event. The cause for this is that the temporary modification that installed the vent and damper was non-safety related with no seismic requirements. As discussed above, this was because pressure testing prior to the modification, with the CSR door open, showed that the .10" wg pressure requirement was met. This configuration was considered to be, and was later demonstrated to be, equivalent to having the vent damper blocked open. However, as discussed above, the pressure was only .07" wg with the installed vent damper blocked open. Therefore, the cause for the lack of seismic qualification of the vent damper assembly, and the root cause for the positive pressure test failure, was the failure to recognize that assured closure of the temporary vent damper may be required in order to meet the .10" wg pressure requirement given the variation in unidentified leaks in the system combined with variation in system performance.

III. ANALYSIS OF EVENT

The capability of the control building ventilation system to maintain at least .10" wg positive pressure in the control room is maintained during normal operation. Airborne radiation protection for control room personnel is also assured in the unlikely event, such as an earthquake, that the CSR vent damper inadvertently opens or otherwise fails to provide an envelope boundary. This assurance is provided by the ability of the system to maintain a positive pressure of .07" wg in the control room with the damper open. This satisfies the UFSAR analyses in that control room positive pressure is assured such that infiltration is minimized.

Infiltration would be readily detectable and actions could be taken to isolate the ductwork opening (See Corrective Actions). The damper is a heavy duty, static pressure controlled, backdraft damper (Ruskin BD6). Failure of this damper to close is considered highly unlikely. The current configuration of the vent damper assembly is non-seismic. The corrective actions discussed below provide adequate assurance that in the event of an earthquake or SFU actuation, the vent damper assembly will provide an adequate seal so that the control building positive pressure can be established and maintained when required.

Consideration was given to removing the vent damper assembly and returning the system to its original configuration. This would resolve the control room pressure issue but would increase the potential for CO2 intrusion into the control room. Isolating the CSR CARDOX system and placing a fire watch in the area would resolve the CO2 issue but requires a major piece of fire suppression equipment to be removed from service. The current condition does not have a significant effect on plant or personnel safety.

IV. CORRECTIVE ACTIONS

A safety related and seismically qualified permanent modification will replace the currently installed temporary vent and damper. This design change is scheduled to be field complete in December 1992. Until the permanent change is complete, the following temporary procedure changes shall remain in effect:

1. To assure that the temporary vent and damper remain intact and closed following an earthquake, the procedure for earthquake has been revised to require a visual inspection of the vent damper assembly after an earthquake. If the vent damper assembly appears to be incapable of providing a seal, it will be repaired to restore the control building envelope.

2. The annunciator response procedure for the control building intake radiation monitor has been revised to require verification that the control building pressure is positive. If this pressure is not positive, a visual inspection of all doors, ducts, and dampers, including the CSR vent and damper, will be conducted to assure control building integrity.

An Engineering Evaluation, a Justification for Conditional Release, and a 10CFR50.59 Safety Evaluation have been prepared, reviewed, and approved to support the adequacy of these corrective actior The preparation and review of these documents have provided adequa corrective actions for the root cause of this condition because the people responsible for this condition were involved in the prepration and review of these documents and are now more sensitive to the ystem capabilities. The preparation and review of this LER further emphasize the root cause. The administrative requirements for maintaining the control building envelope are being reviewed. This review will be complete and the necessary controls will be in place by 9-11-92.

V. ADDITIONAL INFORMATION

A. Previous Similar Events

A review of DAEC LERs since 1984 identified four instances of lack of seismic qualification of equipment; LERs 91-10, 88-12, 87-16, 87-21. A review of DAEC LERs since 1984 identified four instances of deficiencies with ventilation systems; LERs 92-04, 91-13, 89-12, 84-06. As discussed in the text above, corrective actions in LER 92-04 led to the condition reported in this LER.

B. EIIS System Codes

Cable Spreading Room Fire Suppression System -- KQ
Control Room Ventilation System -- VI

This condition is being reported pursuant to 10CFR50.73 (a)(2)(ii)(C), as a condition during operation that results in the nuclear power plant being in a condition not covered by the plant's operating and emergency procedures.