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FROM: Iowa Elec. Light & Power Co. Palo, Iowa G.G.Hunt	DATE OF DOC 7-28-75	DATE REC'D 8-4-75	LTR XX	TWX	RPT	OTHER
TO: Mr. J. G. Keppler	ORIG 1 signed	CC	OTHER	SENT AEC PDR XX SENT LOCAL PDR XX		
CLASS: UNCLASS XXX	PROP INFO	INPUT	NO CYS REC'D 1	DOCKET NO: 50-331		

DESCRIPTION: Ltr trans the following:

ENCLOSURES: Abnormal Occurrence Supplemental Report for AO-50-331/74-32 on 8-9-74 re reactor cleanup area differential high temperature excess trip level....

(1 cy encl rec'd)

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PLANT NAME: Duane Arnold Plant

FOR ACTION/INFORMATION DHL 8-6-75

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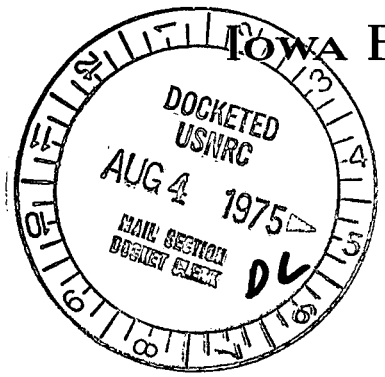

IOWA ELECTRIC LIGHT AND POWER COMPANY

General Office
CEDAR RAPIDS, IOWA
DUANE ARNOLD ENERGY CENTER
PALO, IOWA
JULY 28, 1975
DAEC - 75 - 302

Mr. James G. Keppler, Director
Office of Inspection and Enforcement
U. S. Nuclear Regulatory Commission - Region III
799 Roosevelt Road
Glen Ellyn, Illinois 60137

SUBJECT: Abnormal Occurrence A.O. 50-331/74-32
Supplemental Report

File: A-110, A-118a

Dear Mr. Keppler:

In accordance with Appendix A to Operating License DPR-49, Technical Specifications and Bases for Duane Arnold Energy Center, please find enclosed a written report on the subject recurring abnormal occurrence.

Mr. C. D. Feierabend of your office was first informed of this occurrence by telephone on August 20, 1974.

Very truly yours,

G. G. Hunt
Chief Engineer
Duane Arnold Energy Center

OCS/GGH/mg

cc: B. C. Rusche
C. W. Sandford
J. A. Wallace
H. W. Rehrauer - Chairman, Safety Committee
J. R. Newman
E. L. Hammond

8296

JUL 31 1975

IOWA ELECTRIC LIGHT AND POWER COMPANY

General Office

CEDAR RAPIDS, IOWA

Ltr Dated 7-28-75

SUBJECT: Abnormal Occurrence, Supplemental Report

REPORT NUMBER: AO 50-331/74-32

REPORT DATE: July 24, 1975 (Initial Report August 21, 1975)

OCCURRENCE DATE: August 9, 1974

FACILITY: Duane Arnold Energy Center, Unit No. 1, Palo, Iowa

Identification of Occurrence

Reactor Cleanup Area Differential High Temperature excess trip level setting, reportable per Appendix A, Operating License DPR-49, Specification 1.0.4.b.

Description of Occurrence

Surveillance Test Procedure (STP) 42A016, Reactor Water Cleanup System Steam Leak Detection Instrument Functional Test/Calibration, performed on August 9, 1974 exceeded the trip level setting given in Table 3.2-A of the Technical Specifications which lists the correct setting as $\Delta 14^{\circ}F$.

The Reactor Cleanup Area Differential High Temperature instrumentation consists of two trip systems with three instrument channels per trip system and in accordance with Technical Specifications there must be a minimum number of one operable instrument channel per trip system. STP 42A016 indicated that the setpoints on Trip System A were found set at $17^{\circ}F$, $34^{\circ}F$ and $39^{\circ}F$ and on Trip System B at $14^{\circ}F$, $37^{\circ}F$ and $14^{\circ}F$.

This same problem had occurred when STP 42A016 was performed two months previously (A.O. 50-331/74-26). A final report was therefore not submitted to NRC until a solution to the problem could be determined. Subsequent monthly surveillance tests indicated the following as found readings.

	Trip System A - °F Instrument Channel			Trip System B - °F Instrument Channel		
Date	A	C	E	B	D	F
9/9/74	13,	20,	24	11,	20,	0
10/7/74	11,	17,	22.5	9,	25,	0
11/11/74	12,	21,	25	9,	27,	0
12/12/74	12	17.5,	26.5	8.5,	29.5,	0
1/14/75	12,	19.5,	26	8,	26,	0
2/10/75	5,	5,	3	2.5,	13,	0
Sensor location changed as per DCR 374						
2/22/75	7,	15.5,	22	8,	23,	0
3/10/75	7.5,	15,	27	7,	25.5	0
4/7/75	7.5,	15.5,	27	8,	26,	0
5/14/75	7,	21,	20	8,	18,	0

Designation of Apparent Cause of Occurrence

The increase of the ambient temperature in the Reactor Cleanup Area under normal operating conditions due to the flow of hot water through pipes and equipment operation was enough to cause the differential temperature in some areas to increase more than 14°F and cause the Reactor Cleanup System to trip. After these trips the area was inspected for leaks and as none were found the trip point was raised just enough to keep the Reactor Cleanup System from tripping. This resulted in some of the instrument channels being set at values in excess of Technical Specification limits.

Analysis of Occurrence

At all times at least one instrument channel in each trip system remained set at or below the trip level setting specified in the Technical Specifications. In addition to this, there are three other systems available to detect leaks in the Reactor Water Cleanup System. The Reactor Water Cleanup High Flow Detection System compares flow entering the Cleanup System with flow leaving the Cleanup System. The Reactor Cleanup Area Ambient High Temperature System monitors the ambient temperature of the Reactor Cleanup Area to detect leaks where the temperature of the process water is greater than 120° and the Reactor Building Floor Drain Sump High Flow System detects sump high flow rate where the process water temperature is less than 120°F. The combination of these three other leak detection systems provided adequate assurance that a system leak would be detected.

Corrective Action

After the first occurrence on June 19, 1974 (A.O. 50-331/74-26) an engineering study was initiated to determine if a differential temperature of 14°F was appropriate. The study revealed that the design specification establishes 5 gpm unidentified leakage as the alarm point for leakage in the secondary containment. The temperature of the processed water at different points in the Reactor Water Cleanup System varies over a wide range. The reactor water temperature is approximately 550°F from the inlet connection to the tube side of the regenerative heat exchanger where it drops to approximately 230°F. After passing through the non-regenerative heat exchanger the water temperature is approximately 120°F until it reaches the shell side of the regenerative heat exchanger where the water temperature is raised to 437°F. The following table shows results of calculations of the area differential temperature increase due to a 5 gpm leak at the various water temperatures.

5 GPM Leak at T°F	Area Air Flow Rate-cfm	Differential Temperature Increase Due to 5 GPM Leak - Δ°F
120	750	10
230	750	37
437	750	62
550	1150	54

The temperatures shown above are dependent on reactor pressures and mode of operation rather than power level so these temperatures apply anytime during

normal plant operation. It appears that 14°F is a conservative temperature rise to use for leak indication in all cases except where the process water temperature is 120°F or less. In this case leaks are indicated as explained previously by the Reactor Building Floor Drain Sump High Flow System. The 14°F, however, is indicative only of temperature rise due to a leak in the Reactor Cleanup Area. Therefore, the trip level setting should be 14°F plus the normal temperature rise in the area due to plant operation.

The Reactor Clenaup Area is composed of two rooms: the Heat Exchanger Area and the Pump Area which are not connected. It was discovered that Instrument Channel D was monitoring air temperature entering one room and comparing it to air temperature leaving the other room so the consistently high temperature which TDS 2743D showed had, in fact, no meaning. One of the temperature sensors for Instrument Channel A and one of the temperature sensors for Instrument Channel B were also relocated within the same room to give a better indication of temperature differential across the cleanup area.

After the above indicated instrumentation changes were accomplished a test was performed measuring the ambient temperature rise across the Reactor Cleanup Area during normal operating conditions. The test results were as indicated below:

Instrument Channel		Average Ambient Temperature Rise Across Area - °F	Trip Level Setting Average Temperature Rise +14° - °F
TDS 2743	A	7.2	21 ± 2
	C	19.4	33 ± 2
	E	19	33 ± 2
	B	8	22 ± 2
	D	22.8	36 ± 2
	F	0	14 ± 2

STP 42A016 was revised to indicate the above trip level settings and approved by the Operations Committee on June 24, 1975. It was concluded that the trip level setting in Table 3.2-A of the Technical Specifications could be correctly interpreted as 14°F above the normal temperature rise in the room so that the above surveillance test procedure change and trip level setting change do not violate the Technical Specifications and that a Technical Specification change is not required.

Conclusion

The contents of this report were reviewed and approved by the DAEC Operations Committee on July 24, 1975. The Committee concluded that the occurrence did not present a hazard to the health and safety of the public.

G. G. Hunt
Chief Engineer
Duane Arnold Energy Center

OCS/GGH/mg

cc: B. C. Rusche, C. W. Sandford, J. A. Wallace, L. Liu, H. W. Rehrauer, J. R. Newman, E. L. Hammond