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Catawba Nuclear Station  
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DUKE POWER

February 13, 1992

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

Subject: Catawba Nuclear Station  
Docket No. 50-414  
LER 414/92-002

Gentlemen:

Attached is Licensee Event Report 414/92-002 concerning ENGINEERED SAFETY FEATURES SYSTEM ACTUATION OCCURRED WHEN THE STEAM DUMP SYSTEM VALVES MODULATED OPEN DUE TO UNKNOWN CAUSE.

This event was considered to be of no significance with respect to the health and safety of the public.

Very truly yours,

W. R. McCollum  
Station Manager

/lhc

Attachment

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LICENSEE EVENT REPORT (LER)

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 (F-530), U.S. NUCLEAR REGULATORY COMMISSION, WASHINGTON, DC 20546, AND TO THE PAPERWORK REDUCTION PROJECT (3150-0104), OFFICE OF MANAGEMENT AND BUDGET, WASHINGTON, DC 20503.

FACILITY NAME (1) Catawba Nuclear Station, Unit 2 DOCKET NUMBER (2) 0 5 0 0 0 4 1 1 4 PAGE (3) 1 OF 0 5

TITLE (4) ENGINEERED SAFETY FEATURES SYSTEM ACTUATION OCCURRED WHEN THE STEAM DUMP SYSTEM VALVES MODULATED OPEN DUE TO UNKNOWN CAUSE

| 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) |
| 01   | 15  | 92   | 92             | 002               | 00              | 02              | 13  | 92   |                               |  | 0 5 0 0 0        |
| <p>THIS REPORT IS SUBMITTED PURSUANT TO THE REQUIREMENTS OF 10 CFR § (Check one or more of the following) (11)</p> |     |      |                |                   |                 |                 |     |      |                               |  |                  |

|                             |                   |                                     |                     |  |
|-----------------------------|-------------------|-------------------------------------|---------------------|--|
| OPERATING MODE (9) <u>3</u> | 20.402(b)         | <input checked="" type="checkbox"/> | 80.73(a)(2)(iv)     | 73.71(b)   |
| POWER LEVEL (10) <u>10</u>  | 20.405(a)(1)(i)   | <input type="checkbox"/>            | 80.73(a)(2)(v)      | 73.71(c)   |
|                             | 20.405(a)(1)(ii)  | <input type="checkbox"/>            | 80.73(a)(2)(vi)     | OTHER (Specify in Abstract below and in Text, NRC Form 386A) |
|                             | 20.405(a)(1)(iii) | <input type="checkbox"/>            | 80.73(a)(2)(vii)(A) |  |
|                             | 20.405(a)(1)(iv)  | <input type="checkbox"/>            | 80.73(a)(2)(vii)(B) |  |
|                             | 20.405(a)(1)(v)   | <input type="checkbox"/>            | 80.73(a)(2)(ix)     |  |

LICENSEE CONTACT FOR THIS LER (12)

NAME: R. C. Futrell, Compliance Manager TELEPHONE NUMBER: 810 3813 111-13 16 15

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)

YES (If yes, complete EXPECTED SUBMISSION DATE)  NO

EXPECTED SUBMISSION DATE (15)

| MONTH | DAY | YEAR |
|-------|-----|------|
|       |     |      |

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

On January 15, 1992, at approximately 1326 hours, an unexpected Engineered Safety Feature (ESF) Actuation occurred on Unit 2 while in Mode 3, Hot Standby. The ESF Actuation, P-12 (Lo Lo Tave), occurred when three banks of valves in the Steam Dump System modulated open thus bringing average Reactor Coolant System (NC) temperature (Tave) below P-12 setpoint of 553 degrees F. Control Room Operators took immediate action by taking the Steam Pressure Controller to manual and attempted to close the Steam Dump Valves. By the time the valves had closed, the P-12 actuation had occurred. The appropriate personnel, including the Nuclear Regulatory Commission (NRC), were notified of this event and a work request (W/R) was initiated to investigate and repair the inadvertent opening of the Condenser Dump Valves. No problems were found with the Condenser Dump Valves or Steam Pressure Controller upon completion of the work request. The cause for this event is unknown. Corrective action will include installing a recorder to capture the event should it recur while in the steam pressure mode.

LICENSEE EVENT REPORT (LER)  
TEXT CONTINUATION

ESTIMATED BURDEN PER RESPONSE TO COMPLY WITH THIS INFORMATION COLLECTION REQUEST 60.0 HRS FORWARD COMMENTS REGARDING BURDEN ESTIMATE TO THE RECORDS AND REPORTS MANAGEMENT BRANCH (P-630) U.S. NUCLEAR REGULATORY COMMISSION, WASHINGTON, DC 20556, AND TO THE PAPERWORK REDUCTION PROJECT (3150-0104), OFFICE OF MANAGEMENT AND BUDGET, WASHINGTON, DC 20503.

|  |  |                |                   |                 |          |        |
|--|--|----------------|-------------------|-----------------|----------|--------|
| FACILITY NAME (1)<br><br>Catawba Nuclear Station, Unit 2 | DOCKET NUMBER (2)<br><br>0 5 0 0 0 4 1 4 | LER NUMBER (5) |                   |                 | PAGE (3) |        |
|  |  | YEAR           | SEQUENTIAL NUMBER | REVISION NUMBER |          |        |
|  |  | 9 2            | — 0 0 2           | — 0 0           | 0 2      | OF 0 5 |

TEXT (if more space is required, use additional NRC Form 306A's) (17)

BACKGROUND

The purpose of the Steam Dump [EIIS:JI] (IDE) System is to: 1) enable the Reactor to follow Main Turbine [EIIS:TRB] load reductions of less than 5%/min ramp or 10% step change and 15%/min ramp or 30% step change; 2) allow unit load reduction from 100% to plant auxiliary loads without a Reactor trip; 3) allow a Turbine trip and Reactor trip from 100% without lifting the Main Steam [EIIS:SB] (SM) System Safety Valves [EIIS:V]. The system accomplishes its purpose by the use of five banks of dump valves divided into condenser dumps and atmospheric dumps. Condenser dump valves are divided into three banks with three valves per bank. Atmospheric dump valves are divided into two banks with four and five valves per bank, respectively. The total capacity of the Steam Dump System is 71.5% of the total unit capacity.

The condenser and atmospheric dump valves are controlled by one of three controllers [EIIS:KC] (steam pressure, load rejection, plant trip). The selected controller actuates to control Tave at or near a set reference signal. The reference signal to the dump valves is filtered through a pneumatic circuit which contains block valves and arming valves. This "block" circuit prevents cooldown below 553 degrees F to ensure Tave remains above the minimum temperature for criticality.

The Steam Generator (S/G) Blowdown [EIIS:WI] (BB) System assists in maintaining proper S/G shell side water chemistry by removing non volatile materials that would otherwise concentrate in the shell side of the S/Gs. This is accomplished by bleeding saturated condensate from locations near the bottom of the S/Gs to the BB tank.

The P-12, Lo Lo Tave Interlock, is part of the Engineered Safety Features Actuation System. The purpose of the interlock is to block steam dump valve actuation to prevent excessive cooldown below the minimum temperature for criticality. The setpoint for P-12 is 553 degrees F on any two of four NC System loops.

Catawba Technical Specifications state: the Engineered Safety Features Actuation System (ESFAS) instrumentation channels and interlocks shown in Table 3.3-3 shall be operable per the requirements below.

Applicability: As shown in Table 3.3-3  
(A portion of table is shown)

| Functional Unit    | Total No. of Channels | Channels to Trip | Minimum Channels Operable | Applicable Modes | Action |
|--------------------|-----------------------|------------------|---------------------------|------------------|--------|
| Low-Low Tavg, P-12 | 4                     | 2                | 3                         | 1, 2, 3          | 20     |

LICENSEE EVENT REPORT (LER)  
TEXT CONTINUATION

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-330), U.S. NUCLEAR REGULATORY COMMISSION, WASHINGTON, DC 20556, AND TO THE PAPERWORK REDUCTION PROJECT (3150-0104), OFFICE OF MANAGEMENT AND BUDGET, WASHINGTON, DC 20503.

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| FACILITY NAME (1)<br><br>Catawba Nuclear Station, Unit 2 | DOCKET NUMBER (2)<br><br>0   5   0   0   0   4   1   4 | LER NUMBER (8) |                                    |                              | PAGE (3) |    |       |
|  |  | YEAR<br>9   2  | SEQUENTIAL NUMBER<br>—   0   0   2 | REVISION NUMBER<br>—   0   0 | 0   3    | OF | 0   5 |

TEXT (if more space is required, use additional NRC Form 388A's) (17)

Action 20 - with less than the minimum channels operable, within one hour determine by observation of the associated permissive status light(s) that the interlock is in its required state for the existing plant condition, or apply Specification 3.0.3.

EVENT DESCRIPTION

On January 15, 1992, at 1325 hours, Unit 2 was in Mode 3, Hot Standby. A Reactor trip had previously occurred at 0214 hours on January 15, 1992 (See LER 414/92-001). The plant was maintaining Reactor Coolant System (NC) Tave at approximately 557 degrees F using the Steam Dump System and S/G Blowdown System with four NC pumps [EIIS:P] operating to convey heat to the steam generators.

At 1326 hours, Steam Dump Banks 1, 2, and 3 began to modulate open.

At 1327 hours, a Control Room Operator (CRO) noticed the steam banks were modulating open and NC system average temperature (Tave) was decreasing. The Operator took the pressure controller from auto to manual to close the steam dump valves.

At 13:27:19 hours, all Steam Dump Valves in Banks 1, 2, and 3 were open.

At 13:27:23 hours, Steam Dump Valves in Banks 1, 2, and 3 started to close.

At 13:27:35 hours, Steam Dump Valves in Banks 1, 2, and 3 were closed.

At 13:27:35 hours, P-12 actuation occurred with Reactor coolant temperature Tave at 553 degrees F.

At 1328 hours, Reactor coolant temperature Tave had decreased to 550.5 degrees F (550.5 degrees F was the lowest temperature reached during the transient).

At 1330 hours, Reactor coolant temperature Tave had increased to 551.6 degrees F.

At 1337 hours, P-12 reset with Reactor Coolant Temperature Tave at 553 degrees F.

At 1345 hours, Reactor coolant temperature Tave had returned to 557 degrees F.

At 1500 hours, Operations initiated W/R 60116OPS to investigate and repair the inadvertent opening of Steam Dump Banks 1, 2, and 3.

At 1602 hours, NRC was notified of the ESF actuation.

LICENSEE EVENT REPORT (LER)  
TEXT CONTINUATION

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 (F-630), U.S. NUCLEAR REGULATORY COMMISSION, WASHINGTON, DC 20555, AND TO THE PAPERWORK REDUCTION PROJECT (3150-0104), OFFICE OF MANAGEMENT AND BUDGET, WASHINGTON, DC 20503.

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TEXT (if more space is required, use additional NRC Form 388A's) (17)

At 1700 hours, Instrument and Electrical (IAE) technicians and Component Engineering (CE) started investigating the reason for the inadvertent Steam Dump Valve modulation. IAE technicians checked the input of the steam pressure controller, the setpoint of the controller, the output of the controller, and the output of the driver going to the Electric to Pneumatic (E/P) converter for the Steam Dump Valves. The results of the test conducted on the Steam Pressure Controller did not reveal a cause of the transient. No computer point or any other recorded data could be referenced for the time period of the event, because there is no computer point or recorder between the pressure transmitter and the steam pressure controller.

At 2200 hours, CE decided to install a recorder to capture the event should it recur as the unit was going through the pressure mode.

On January 16, 1992, the inputs and outputs to the pressure controller were monitored during Unit 2 startup. No spikes or erroneous signals were received by the recorders. CE placed W/R 60116OPS on the Unit 2 trip list so that the recorder can be reconnected to monitor the pressure controller when the plant is in the same condition.

CONCLUSION

The root cause of this event is unknown. As a result of the subsequent investigation by IAE and CE, no cause could be determined as to why the Steam Dump Valves modulated open.

CE has added W/R 60116OPS to the Unit 2 trip list so that a recorder can be installed to monitor the steam pressure controller during Unit Startup following a Reactor trip or when the unit has been manually shutdown.

A review of the Operating Experience Program data base for the past 24 months prior to this event identified one incident involving a P-12 actuation. LER 413/90-025 involved a P-12 actuation due to a defective procedure and deficient communication. Since the root cause for these two ESF actuations were different, this incident is considered not to be a recurring event.

CORRECTIVE ACTION

IMMEDIATE

- 1) CROs took the steam pressure controller from auto to manual in an attempt to close the Steam Dump Valves.

SUBSEQUENT

- 1) Operations initiated W/R 60116OPS.



LICENSEE EVENT REPORT (LER)  
TEXT CONTINUATION

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.

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|  |  | YEAR           | SEQUENTIAL NUMBER | REVISION NUMBER |          |          |
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TEXT (if more space is required, use additional NRC Form 305A's) (17)

- 2) IAE installed a recorder to monitor the steam pressure controller during Unit 2 startup on 1/16/92.

PLANNED

- 1) Install a recorder to monitor the steam pressure controller during Unit 2 startup following a Reactor trip or when the unit has been manually shutdown.

SAFETY ANALYSIS

The P-12 (Lo Lo Tave) interlock is an ESF actuation which blocks Steam Dump valves actuation to protect against excessive plant cooldown below the minimum temperature for criticality. Its setpoint is 553 degrees F on any two out of four NC System loops. If the logic is satisfied, then the Steam Dump Valves are failed closed until NC System temperature is above 553 degrees F.

During this incident, the P-12 interlock responded properly and as expected to the signal generated.

The cooldown portion of the transient is bounded by the inadvertent opening of a Steam Generator Relief or Safety Valve described in FSAR Section 15.1.4. The total NC temperature decrease was approximately 6.5 degrees F.

The health and safety of the public were not affected by this incident.