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June 18, 2003

U.S. Nuclear Regulatory Commission
Washington, DC 20555

ATTENTION: Document Control Desk

SUBJECT: Calvert Cliffs Nuclear Power Plant
Unit No. 2; Docket No. 50-318; License No. DPR 69
Licensee Event Report 318/2003-002
Unintentional Reactor Protective System Actuation During Plant Heatup

The attached report is being sent to you as required under 10 CFR 50.73 guidelines. Should you have questions regarding this report, we will be pleased to discuss them with you.

Very truly yours,

for
Kevin J. Nietmann
Plant General Manager

KJN/MJY/bjd

Attachment

cc: J. Petro, Esquire
J. E. Silberg, Esquire
Director, Project Directorate I-1, NRC
G. S. Vissing, NRC
H. J. Miller, NRC
Resident Inspector, NRC
R. I. McLean, DNR

IE22

NRC FORM 366 (7-2001) U.S. NUCLEAR REGULATORY COMMISSION

APPROVED BY OMB NO. 3150-0104 EXPIRES 7-31-2004
Estimated burden per response to comply with this mandatory information collection request: 50 hours. Reported lessons learned are incorporated into the licensing process and fed back to industry. Send comments regarding burden estimate to the Records Management Branch (T-6 E6), U.S. Nuclear Regulatory Commission, Washington, DC 20555-0001, or by Internet e-mail to bjs1@nrc.gov, and to the Desk Officer, Office of Information and Regulatory Affairs, NEOB-10202 (3150-0104), Office of Management and Budget, Washington, DC 20503. If a means used to impose information collection does not display a currently valid OMB control number, the NRC may not conduct or sponsor, and a person is not required to respond to, the information collection.

LICENSEE EVENT REPORT (LER)

(See reverse for required number of digits/characters for each block)

1. FACILITY NAME	2. DOCKET NUMBER	3. PAGE
Calvert Cliffs Nuclear Power Plant	05000 318	1 OF 05

4. TITLE

Unintentional Reactor Protective System Actuation During Plant Heatup

5. EVENT DATE			6. LER NUMBER			7. REPORT DATE			8. OTHER FACILITIES INVOLVED	
MO	DAY	YEAR	YEAR	SEQUENTIAL NUMBER	REV NO	MO	DAY	YEAR	FACILITY NAME	DOCKET NUMBER 05000
04	19	03	2003	- 02	- 00	06	18	2003	FACILITY NAME	DOCKET NUMBER 05000

9. OPERATING MODE	3
10. POWER LEVEL	0

11. THIS REPORT IS SUBMITTED PURSUANT TO THE REQUIREMENTS OF 10 CFR : (Check all that apply)

20.2201(b)	20.2203(a)(3)(ii)	50.73(a)(2)(ii)(B)	50.73(a)(2)(ix)(A)
20.2201(d)	20.2203(a)(4)	50.73(a)(2)(iii)	50.73(a)(2)(x)
20.2203(a)(1)	50.36(c)(1)(i)(A)	X 50.73(a)(2)(iv)(A)	73.71(a)(4)
20.2203(a)(2)(i)	50.36(c)(1)(ii)(A)	50.73(a)(2)(v)(A)	73.71(a)(5)
20.2203(a)(2)(ii)	50.36(c)(2)	50.73(a)(2)(v)(B)	OTHER Specify in Abstract below or in NRC Form 366A
20.2203(a)(2)(iii)	50.46(a)(3)(ii)	50.73(a)(2)(v)(C)	
20.2203(a)(2)(iv)	50.73(a)(2)(i)(A)	50.73(a)(2)(v)(D)	
20.2203(a)(2)(v)	50.73(a)(2)(i)(B)	50.73(a)(2)(vii)	
20.2203(a)(2)(vi)	50.73(a)(2)(i)(C)	50.73(a)(2)(viii)(A)	
20.2203(a)(3)(i)	50.73(a)(2)(ii)(A)	50.73(a)(2)(viii)(B)	

12. LICENSEE CONTACT FOR THIS LER

NAME	TELEPHONE NUMBER (Include Area Code)
Michael J. Yox	410-495-6652

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

CAUSE	SYSTEM	COMPONENT	MANU-FACTURER	REPORTABLE TO EPIX	CAUSE	SYSTEM	COMPONENT	MANU-FACTURER	REPORTABLE TO EPIX

14. SUPPLEMENTAL REPORT EXPECTED			15. EXPECTED SUBMISSION DATE	MONTH	DAY	YEAR
YES (If yes, complete EXPECTED SUBMISSION DATE)	X	NO				

16. ABSTRACT (Limit to 1400 spaces, i.e., approximately 15 single-spaced typewritten lines)

On April 19, 2003, at approximately 1530 hours, the Calvert Cliffs Nuclear Power Plant Unit 2 Reactor Trip Circuit Breakers opened automatically on a trip signal from the Reactor Protective System. The trip signal was caused by a steam generator (SG) low pressure trip input. Unit 2 was shutdown with a plant heatup under way. Although Unit 2 Reactor Trip Circuit Breakers were closed to support surveillance testing, control element drive motors were de-energized, and control element assemblies were fully inserted into the core.

The actuation of the reactor trip protective function occurred during plant heatup when the low SG pressure trip bypass signal cleared at approximately 749.8 psia and the low SG pressure trip, which had not reset from the original shutdown, completed the logic circuits to initiate a reactor trip. Investigation revealed that both the low SG pressure trip and bypass functions were within allowable setpoints. The low SG pressure trip circuitry has a non-adjustable reset function that clears the trip signal approximately 25 - 40 psig above the trip setpoint. This reset function is a characteristic of each low SG pressure trip circuit card and is not a calibrated value. The combined setpoint and reset function overlap represented no failure of any specific component but identified an off-normal situation that will be procedurally avoided in the future.

1. FACILITY NAME	2. DOCKET	6. LER NUMBER			3. PAGE
		YEAR	SEQUENTIAL NUMBER	REVISION NUMBER	
CALVERT CLIFFS, UNIT 2	05000 318	2003	- 002	- 00	02 OF 005

17. NARRATIVE *(If more space is required, use additional copies of NRC Form 366A)*

I. DESCRIPTION OF EVENT

On April 19, 2003, at approximately 1530 hours, the Calvert Cliffs Nuclear Power Plant Unit 2 Reactor Trip Circuit Breakers (RTCBs) opened automatically on a trip signal from the Reactor Protective System (RPS). The trip signal was caused by a steam generator (SG) low pressure automatic bypass resetting prior to the trip signal reset. Unit 2 was in Operating Mode 3 with a plant heatup under way. Unit 2 Reactor Coolant System cold leg (T_{COLD}) temperature was approximately 521 degrees F. Reactor Coolant System pressure was approximately 1893 psia. Although Unit 2 RTCBs were closed to support surveillance testing at the time of the event, control element drive motors (CEDMs) were not energized and control element assemblies (CEAs) were fully inserted into the core. Unit 1 was operating at 100 percent rated power during this event and was unaffected by the RPS actuation on the opposite unit.

The actuation of the reactor trip protective function occurred during plant heatup when the low SG pressure trip bypass signal cleared on at least two of four channels at approximately 749.8 psia and the low SG pressure trip, which had not yet reset from the original shutdown, completed the logic circuits to initiate the reactor trip. Investigation revealed that both the low SG pressure trip and bypass functions were within their allowable setpoints. The low SG pressure trip circuitry has a non-adjustable reset function that clears the trip signal approximately 25 – 40 psig above the trip setpoint. This reset function is a characteristic of each low SG pressure trip circuit card and is not a calibrated value. This combination of setpoint and reset function overlap represented no failures of any specific component but identified an off-normal situation that will be procedurally avoided in the future.

No systems, structures, or components were inoperable at the time of this event that would have contributed to or influenced the event. The RPS actuation had no direct effect on reactivity control because the CEDMs were not energized and CEAs were fully inserted into the core. The RPS actuation indirectly affected reactivity control by causing feedwater regulating bypass valves to automatically respond to a trip signal, opening to a pre-determined post-trip value of 15% flow. This increase in relatively cold feedwater added positive reactivity to the reactor, however, adequate shutdown margin existed to maintain safe shutdown conditions. No additional safety system responses were necessary to place the plant in a safe condition. This event was self-revealing.

II. CAUSE OF EVENT

The RPS actuation occurred because of a combination of setpoint tolerance, system design, and operating conditions. Additionally, neither the test procedure nor the operators' assessment of the expected plant response identified the potential for the development of this plant condition. The low SG pressure trip provides protection against an excessive rate of heat extraction from the SGs during power operations. The trip is designed to assist the Engineered Safety Features Actuation System in the event of a main steam line break, and is only required in Operating Modes 1 and 2. The SG low pressure trip bypass allows for energizing CEDMs and raising CEAs

during startup while the reset function still enables the protective function to be reset early enough during startup to be effective if the operator neglects to reset the bypass enable switch.

The allowable setpoint band for the SG low pressure trip is from 700 – 733 psia decreasing. The reset function has an observed range of 25 – 40 psig, which is a non-adjustable characteristic of the individual circuit cards. The maximum value for reset of the SG low pressure trip is, therefore, 733 + 40 or 773 psia.

The allowable setpoint band for the SG low pressure trip bypass automatic removal function is 739.25 – 770 psia increasing. The actual Unit 2 RPS actuation occurred at approximately 749.8 psia, as measured by plant instrumentation. The RPS actuation was within the allowable setpoints of the RPS instrumentation and the system operated as designed. Steam Generator pressure was above the actual low pressure trip setpoint when the actuation occurred, however the trip inputs had not cleared because of the reset function tolerance band. Although there was no direct effect on reactivity control because the CEDMs were not energized, unintentional RPS actuations are considered a challenge to safety significant systems and are undesirable. This actuation did not represent a failure of any component or process to meet the intended safety function. Procedural barriers will be used in the future to prevent recurrence. Although this event had no impact on the opposite unit, Unit 1 is susceptible to the same event. The procedural barriers to prevent recurrence will be added for both Unit 1 and Unit 2.

III. ANALYSIS OF EVENT

This event is reportable in accordance with the following:

a) 10 CFR 50.73(a)(2)(iv)(A); "Any event or condition that resulted in manual or automatic actuation of any of the systems listed in paragraph (a)(2)(iv)(B) of this section, except when:

   (1) The actuation resulted from and was part of a pre-planned sequence during testing or reactor operation; or

   (2) The actuation was invalid and:

      (i) Occurred while the system was properly removed from service; or
      (ii) Occurred after the safety function had already been completed.

The low SG pressure trip is required in Operating Modes 1 and 2, per Calvert Cliffs Nuclear Power Plant Technical Specifications Table 3.3.1-1, Reactor Protective System Instrumentation. The low SG pressure trip safety function was not required while Unit 2 was in Mode 3 at the time of this event, therefore the event had minimal impact on reactivity control. The event is reportable, however, because the Nuclear Regulatory Commission is interested both in events where a system was needed to mitigate the consequences of an event and where a system actuated unnecessarily.

This event is considered a valid RPS actuation because:

- the RTCBs were closed at the start of the event, and

- the surveillance testing in progress did not anticipate the full trip actuation resulting in opening of all eight RTCBs, and
- the actuation resulted from a valid signal initiated in response to actual plant conditions or parameters satisfying the requirements for initiation of the safety function of the system.

Although the RTCBs were closed at the time of this event, the reactor was shutdown and the RPS actuation did not impact the availability of any systems or components necessary to maintain safe shutdown, remove residual heat, control the release of radioactive materials, or mitigate the consequences of an accident. There were no actual or potential safety consequences from this event. The unintentional RPS actuation did not impair any critical safety functions.

IV. CORRECTIVE ACTIONS

A. All related procedures are being reviewed for possible revision to eliminate the potential for recurrence of this specific event. Procedures will be revised to establish initial conditions such that tests cannot be conducted in the SG pressure range where this RPS actuation could occur.

B. All other RPS and Engineered Safety Features Actuation System trip inputs will be evaluated for the potential for similar unanticipated actuations resulting from configurations currently allowed by procedure.

V. ADDITIONAL INFORMATION

A. Component Failures

No component failures, as defined by NUREG-1022, Revision 2, occurred as a result of this event. No components experienced a termination of the ability of a component to perform its required function.

B. Previous Occurrences

A licensee event report was filed in 1993 (LER 318/93-002) which documented an inadvertent Engineered Safety Features actuation while performing surveillance testing. Calvert Cliffs Nuclear Power Plant Unit 2 experienced inadvertent Auxiliary Feedwater Actuation System and RPS actuations during performance of Auxiliary Feedwater System large flow surveillance testing when excessive differential pressure developed between the SGs. Although investigation determined the 1993 event should have been anticipated by operations staff, these events are similar. Both events involve intentionally placing the plant in a configuration that resulted in an unanticipated response of the RPS. Both root causes involve a lack of anticipation of a valid RPS actuation signal. The corrective actions of the 1993 event were effective in preventing future similar actuations. The current event is unique because the undocumented reset function prevented operators from properly anticipating the system response.

C. Component Identification

Component	IEEE 803 EIIS Function	IEEE 805 System ID
Reactor Trip Circuit Breaker (AC Circuit Breaker)	52	AA