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 RECIPIENT NAME RECIPIENT AFFILIATION

SUBJECT: LER 90-014-00: on 901213, unplanned automatic actuation of steam generator blowdown isolation valves. Caused by failure to fully understand design of radiation monitoring sys. Operations to review & revise procedures. W/910114 ltr.

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January 14, 1991

10 CFR 50.73

U. S. Nuclear Regulatory Commission
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Washington, D.C. 20555

Gentlemen:

Docket 50-305
Operating License DPR-43
Kewaunee Nuclear Power Plant
Reportable Occurrence 90-014-00

The attached Licensee Event Report for reportable occurrence 90-014-00 is being submitted in accordance with the requirements of 10 CFR 50.73, "Licensee Event Report System."

Sincerely,

K. H. Evers
Manager-Nuclear Power

SLB/jms

Attach.

cc - INPO Records Center
Mr. Patrick Castleman, US NRC
US NRC, Region III

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LICENSEE EVENT REPORT (LER)

FACILITY NAME (1) **Kewaunee Nuclear Power Plant** DOCKET NUMBER (3) **05000305** PAGE (2) **1 OF 04**

TITLE (4) **Failure to Fully Understand the Design of the Radiation Monitoring System Results in Incorrect Assumption Which Causes an Inadvertent ESF Actuation During Pipe Radiography**

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)
12	13	90	90	014	00	01	14	91	N/A		050000
									050000		

OPERATING MODE (9) **N** THIS REPORT IS SUBMITTED PURSUANT TO THE REQUIREMENTS OF 10 CFR § (Check one or more of the following) (11)

20.602(b)	<input type="checkbox"/>	20.608(a)	<input checked="" type="checkbox"/>	20.736(a)(2)(iv)	<input type="checkbox"/>	73.71(b)	<input type="checkbox"/>
20.602(a)(1)(i)	<input type="checkbox"/>	20.20(a)(1)	<input type="checkbox"/>	20.736(a)(2)(v)	<input type="checkbox"/>	73.71(a)	<input type="checkbox"/>
20.608(a)(1)(B)	<input type="checkbox"/>	04.20(a)(2)	<input type="checkbox"/>	20.736(a)(2)(vi)	<input type="checkbox"/>	OTHER (Specify in Abstract below and in Text, NRC Form 305A)	
20.608(a)(1)(M)	<input type="checkbox"/>	00.736(a)(2)(i)	<input type="checkbox"/>	04.736(a)(2)(viii)(A)	<input type="checkbox"/>		
20.608(a)(1)(iv)	<input type="checkbox"/>	04.736(a)(2)(ii)	<input type="checkbox"/>	04.736(a)(2)(viii)(B)	<input type="checkbox"/>		
20.602(a)(1)(v)	<input type="checkbox"/>	20.736(a)(2)(iii)	<input type="checkbox"/>	04.736(a)(2)(i)	<input type="checkbox"/>		

LICENSEE CONTACT FOR THIS LER (12)

NAME **Thomas J. Webb - Plant Nuclear Engineer** TELEPHONE NUMBER **414 388-2560**

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

CAUSE	SYSTEM	COMPONENT	MANUFACTURER	REPORTABLE TO NPROS	CAUSE	SYSTEM	COMPONENT	MANUFACTURER	REPORTABLE TO NPROS

SUPPLEMENTAL REPORT EXPECTED (14)

YES (If you complete EXPECTED SUBMISSION DATE) NO

EXPECTED SUBMISSION DATE (15) **N/A** MONTH DAY YEAR

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

This report describes an unplanned automatic actuation of the steam generator blowdown isolation valves, an engineered safety feature (ESF). The valves closed and isolated steam generator blowdown and blowdown sampling at 1910 and 1956 on December 13, 1990, with the plant at 100% power. The valves closed as designed on a high radiation signal from R-15, condenser air ejector gas monitor. The high radiation signal was generated as a result of radiography in the turbine building in the vicinity of the detector for R-15.

Prior to starting the radiography, the "Operation Selector" switch on the R-15 drawer was rotated from the "Operate" position to the "Reset" position. It was believed that placing the switch in "Reset" blocked all signals to the actuation circuitry for R-15. However this assumption, which was based on existing operating procedures and past operating practices for R-15, was incorrect. Placing the switch to "Reset" does not block the signal from a saturated detector.

To prevent recurrence of this event a temporary change has been approved to jumper out the actuations associated with R-15 during radiography. Operations will review and revise their procedures as necessary to ensure they accurately reflect the design of R-15. This report will be included in the required reading for the Operators, the Shift Technical Advisors, and Instrument and Control personnel.

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TEXT (If more space is required, use additional NRC Form 366A's) (17)

Description of Event

This report describes the unplanned automatic actuation of the steam generator [SG] blowdown isolation valves [ISV], an engineered safety feature (ESF). The steam generator blowdown isolation valves (BT-2A, BT-2B, BT-3A, and BT-3B) and steam generator blowdown sample isolation valves BT-31A and BT-31B closed when R-15 (condenser air ejector gas monitor) [MON] alarmed high. The high radiation signal was generated during pipe [PSP] radiography in the turbine building [NM] in the vicinity of the detector [DET] for R-15.

At 1906 on December 13, 1990, with the plant at 100% power, the control room was notified that radiography was about to begin in the turbine building. As previously planned, the Control Room Operator rotated the "Operation Selector" switch [HS] for R-15 from the "Operate" position to the "Reset" position. Placing the switch in "Reset" results in a loss of control room indication for R-15 and grounds out the voltage conditioning circuitry for R-15; i.e., removes the circuitry from service. It was thought that placing the switch in "Reset" would prevent actuation of the R-15 high alarm [RA] and the equipment actuations associated with the alarm.

At 1910, as the X-ray source was being moved through its transfer tube into position for the first radiograph, R-15 alarmed for 3 seconds. As a result, valves BT-2A, BT-2B, BT-3A, BT-3B, BT-31A, and BT-31B closed. At the time it was believed that steam generator sample isolation valves BT-32A and BT-32B should also have closed.

After verifying that R-15 radiation levels were normal, the operators re-established blowdown and began investigating the event. An equipment operator was dispatched to observe the next radiograph to determine if it could have caused the actuation.

At 1956 the second radiograph had been completed, the source was in its transfer tube and was being returned to its storage container when the alarm for R-15 actuated. As designed, valves BT-2A, BT-2B, BT-3A, BT-3B, BT-31A, and BT-31B closed. Steam generator sample isolation valves BT-32A and BT-32B again did not close. Grab samples were taken of steam generator liquid and condenser air ejection to verify normal activity levels. Analysis of the samples showed no detectable activity. The blowdown valves were left in the closed position to prevent further unnecessary actuations. A work request was written requesting that maintenance personnel investigate why valves BT-32A and BT-32B failed to close.

LICENSEE EVENT REPORT (LER) TEXT CONTINUATION

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

In order to confirm their suspicion, the personnel involved set up constant communications between the X-ray technicians and the control room. At 2110, the R-15 high alarm actuated while the X-ray source was in its transfer tube. Further investigation determined that when the source was in the transfer tube, the detector for R-15 could have been exposed to as much as 7 R/hr (rem per hour). However, when the source was in position to take an X-ray, the detector was only exposed to approximately 75 mrem/hr.

Once radiography was completed, R-15 was returned to service at 0151 on December 14 and blowdown was re-established at 0243 on December 14.

Cause of Event

The valves were closed when the detector for R-15 was exposed to high radiation during pipe radiography. The investigation determined that when the radiographic source was being positioned and was in the transfer tube, the detector for R-15 was in a radiation field of approximately 7 R/hr.

To prevent this type of event, plant management had decided that the "Operation Selector" switch for R-15 should be placed in the "Reset" position during radiography. It was believed that placing the switch in "Reset" blocked all signals to the high alarm actuation relays for R-15. The investigation into this event determined that this assumption was in error.

The R-15 radiation monitor consists of a detector (a gieger-muller (GM) tube), signal conditioning circuitry, control room indication, and actuation circuitry. Voltage pulses are generated when radiation strikes the GM tube. The voltage pulses are sent through the signal conditioning circuitry and then to the control room indicator and the actuation circuitry. The control room indicator reads out in counts per minutes (CPM).

As the radiation field increases, the time between each voltage pulse decreases. When the voltage pulses come too close together the signal conditioning circuitry is unable to distinguish one voltage pulse from another and the detector is said to be at or approaching saturation. Under saturated conditions, the indicated radiation level would be lower than the actual radiation level; i.e., non-conservative bistable actuation and control room indication.

To compensate for this, the R-15 monitor generates an additional signal which is added to the signal conditioning circuitry pulse count as the detector approaches saturation. Placing the "Operation Selector" switch to "Reset" does not block this added signal from a saturated detector. Therefore when the detector for R-15 was exposed to the 7 R/hr field and became saturated, R-15 alarmed high and closed the valves.

LICENSEE EVENT REPORT (LER) TEXT CONTINUATION

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		YEAR	SEQUENTIAL NUMBER	REVISION NUMBER		
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TEXT (If more space is required, use additional NRC Form 308A's) (17)

Personnel involved in the preplanning believed that positioning the "Operation Selector" switch to "Reset" would block all of the R-15 actuation signals. They were led to believe this by past operating practices and existing operating procedures that address steam generator tube leakage. The procedures direct the operators to clear high alarms on R-15 by placing the selector switch to "Reset". It has subsequently been determined that placing the switch to "Reset" will only clear the alarmed condition if the detector is not saturated.

Valves BT-32A and BT-32B did not close because the radiation signal was only present for approximately 3 seconds and with the switch in "Reset" the high radiation signal was not locked in. Since the valves have a stroke time of 6 seconds, a high radiation signal of at least 6 seconds would have been required to close these valves. Therefore the valves operated as designed.

Analysis of Event

This event is being reported in accordance with 10 CFR 50.73(a)(2)(iv) as an actuation of the steam generator blowdown isolation valves and the steam generator blowdown sample isolation valves. These valves are ESF because they are required to close on the start of an auxiliary feedwater pump to ensure adequate secondary heat sink.

Since the valves functioned as designed and all secondary radiation levels were normal, this event had no impact on the health and safety of the public.

Corrective Actions

To prevent this event from recurring, a temporary change request has been approved which will allow installation of temporary jumpers during radiography. The jumpers will block all signals to the actuation relays for R-15.

Operations will review and revise their procedures as necessary to ensure they accurately reflect the design of R-15.

This report will be included in the required reading for the Operators, the Instrument and Control Technicians, and the Shift Technical Advisors.

Additional Information

Equipment Failures: None.

Similar Events: None.