GPU NUCLEAR

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April 25, 1997
6730-97-2124

U. S. Nuclear Regulatory Commission
Attention: Document Control Desk
Washington, DC 20555

Dear Sir:

Subject: Oyster Creek Nuclear Generating Station
Docket No. 50-219
Licensee Event Report 97-004: Reactor Water Cleanup Valve May Not Operate During a Line Break Due to Personnel Error

Enclosed is Licensee Event Report (LER) 97-004. Due to an oversight, GPU Nuclear requested a two week extension to file this LER. NRC, Region I, granted the request on April 10, 1997. The event described herein did not impact the health and safety of the public.

If any additional information or assistance is required, please contact Mr. Paul Czaya, Regulatory Affairs Engineer, at 609-971-4139.

Very truly yours,

for Michael B. Roche
Vice President and Director
Oyster Creek

020058

IE22

MBR/PFC/gl

Attachment

cc: Administrator, Region I
NRC Project Manager
NRC Sr. Resident Inspector

NRC FORM 366 (4-95) U.S. NUCLEAR REGULATORY COMMISSION

LICENSEE EVENT REPORT (LER)

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TITLE (4)

Reactor Water Cleanup Valve May Not Operate During a Line Break Due to Personnel Error

EVENT DATE (5)			LER NUMBER (6)			REPORT DATE (7)			OTHER FACILITIES INVOLVED (8)	
Month	Day	Year	Year	Sequential Number	Revision	Month	Day	Year	Facility Name	Docket Number
03	12	97	97 --	004 --	00	4	25	97	FACILITY NAME	DOCKET NUMBER

		THIS REPORT IS SUBMITTED PURSUANT TO THE REQUIREMENTS OF 10 CFR §: (Check one or more) (11)							
OPERATING MODE (9)	Run		20.2201(b)		20.2203(a)(2)(v)		50.73(a)(2)(i)		50.73(a)(2)(viii)
POWER LEVEL (10)	100%		20.2203(a)(1)		20.2203(a)(3)(i)	X	50.73(a)(2)(ii)		50.73(a)(2)(x)
			20.2203(a)(2)(i)		20.2203(a)(3)(ii)		50.73(a)(2)(iii)		73.71
			20.2203(a)(2)(ii)		20.2203(a)(4)		50.73(a)(2)(iv)		OTHER
			20.2203(a)(2)(iii)		50.36©(1)		50.73(a)(2)(v)		Specify in Abstract below or in NRC Form 366A
			20.2203(a)(2)(iv)		50.36©(2)		50.73(a)(2)(vii)		

LICENSEE CONTACT FOR THIS LER (12)

NAME	TELEPHONE NUMBER (Include Area Code)
Thomas Carroll, Jr., Engineering Assistant Sr. III	609-971-4462

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

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

During a detailed review of motor operated valves for periodic verification in response to Generic Letter 96-05, it was discovered that reactor water cleanup valve V-16-2 was being used to fill and vent the cleanup system while the reactor is at power and operating pressure. If V-16-2 is open and the downstream pipe were to break, V-16-2 would be required to close against normal reactor operating pressure.

Delta pressure (delta p) calculations for V-16-2 did not address this event. Therefore, the valve was not set up to close against reactor pressure of 1020 psig. This oversight is attributed to personnel error in that the prior review missed the use of valve V-16-2 during power operation.

V-16-2 was declared inoperable and deactivated in the closed position to prevent it from being opened with reactor pressure greater than 125 psig. All engineers will be informed of this event and the importance of design verification through required reading of this LER.

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

DATE OF DISCOVERY

The condition described herein was identified on March 12, 1997.

IDENTIFICATION OF OCCURRENCE

During a detailed review of motor operated valves for periodic verification in response to Generic Letter 96-05, (Periodic Verification of Design-Basis Capability of Safety Related Valves), it was discovered that reactor water cleanup (RWCU) system (EIIS-CE) valve V-16-2 (EIIS-ISV) is used to fill and vent the RWCU system while the reactor is at rated temperature and pressure. This valve usage was not considered during the initial Generic Letter 89-10 review.

V-16-2 is an outboard containment isolation valve for the RWCU supply line that supplies a flow path to the cleanup auxiliary pump. The cleanup auxiliary pump is used to supply cleanup system flow when reactor pressure is less than 125 psig. The original evaluation assumed that V-16-2 would not be opened with V-16-1 (EIIC-ISV) also open and the reactor at rated temperature and pressure. V-16-1 is the inboard containment isolation valve for the RWCU supply line.

CONDITIONS PRIOR TO DISCOVERY

The reactor was at 100% power with RWCU isolated. System pressures and temperatures were normal for full power operation. The procedure to use V-16-2 to fill the RWCU system has existed since April 1989.

DESCRIPTION OF OCCURRENCE

Prior to April 1989, the RWCU system was filled and vented during power operation by opening containment isolation valve V-16-14 (EIIC-ISV). Maintenance history for V-16-14 showed valve seat damage that was believed to be caused by throttling the valve to fill and vent the system during power operation. In 1989, a RWCU system modification was installed that allowed filling and venting the system through a one inch line downstream of V-16-2. Initial review of Generic Letter 89-10 delta p calculations did not identify use of V-16-2 to fill and vent the RWCU system during power operation.

APPARENT CAUSE OF OCCURRENCE

The apparent cause of this occurrence was incomplete review of RWCU system operating procedure 303 (Reactor Cleanup Demineralizer System), due to personnel error. The section of the procedure used to fill and vent the system with reactor pressure greater than 125 psig was not reviewed with the appropriate level of detail.

ANALYSIS OF OCCURRENCE AND SAFETY ASSESSMENT

Valve V-16-2, when opened to fill and vent the RWCU system while the reactor is at full power, would not have been able to close against full reactor pressure of 1020 psig. The probability of a unisolable RWCU line break with V-16-2 open at rated reactor pressure is low as follows:

1. The only time that V-16-2 was opened with the inboard isolation valve (V-16-1) also open at rated temperature and pressure was to fill and vent the system. This occurs once every quarter after stroke time testing, and when recovering from a cleanup system trip.

2. The length of time that V-16-2 was open during each filling and venting evolution was typically about fifteen minutes.

3. Although the design basis event assumes V-16-1 fails to close, it is able to close during worse case accident conditions.

The consequences of a RWCU line break with a single failure of V-16-1 and the inability of V-16-2 to close against rated reactor pressure is discussed below:

A RWCU line break with V-16-2 open is an unanalyzed condition since the valve cannot close against full reactor pressure. As a result, operators would be unsuccessful in any attempts to close the valve with reactor pressure above 125 psig. A qualitative evaluation of the line break is provided below.

If feedwater is lost in combination with the cleanup line break, the drop in reactor water level will cause several automatic initiations.

- Lo level: Reactor SCRAM
- Lo^2 level: Core Spray System start, Main Steam Isolation Valve closure, RWCU System isolation, Recirculation Pump trip, Isolation Condenser System initiation
- Lo^3 level: Reactor Building Closed Cooling Water isolation, Automatic Depressurization System level input (timer does not start since high drywell pressure signal is not present)

The Lo^2 reactor water level condition will initiate a cleanup system isolation signal to close the valves. However, V-16-1 is assumed fail open and V-16-2 will start to close, but will stall since its torque switch is not set for full reactor pressure. As a result, reactor water level will continue to drop toward the top of active fuel (TAF). The operator will respond to this event in accordance with emergency operating procedures (EOP) which will direct the operator to attempt to close the valve, emergency depressurize the reactor (0 inches TAF) and inject with core spray. Once the reactor is depressurized, valve V-16-2 is believed to be able to be closed by the control room operator and reactor water level can be restored and maintained within the normal operating range. The environmental condition and off site release associated with this event is within existing cleanup line break evaluations. The core spray system will either automatically initiate or be manually initiated as directed by the EOPs to protect against core damage and the isolation condensers will remove reactor decay heat. The automatic safety system actuations are sufficient to provide a safe response with the operator emergency depressurizing the reactor and isolating the break following depressurization. In addition, it is reasonable to expect a rapid operator response to this event given the reactor water level initiations when feedwater is not available. For this postulated line break event, consequences are believed not to exceed those previously evaluated.

With feedwater available, reactor water level remains above the scram setpoint and all actions are manual operator actions. This condition is similar to that previously evaluated in response to General Electric Service Information Letter (SIL) 604. The primary difference is that the operator will not be able to isolate the break until the reactor vessel is depressurized. Break flow rate does not decrease until the operator manually scrams the reactor and attempts to reduce pressure via the main steam system. The inability to isolate the break upon detection will result in a more severe reactor building environment and off site release condition than that evaluated for SIL 604.

With feedwater available there is no threat of core damage since the fuel remains submerged. Reactor decay heat is removed via the main steam system (or the isolation condenser system). However, containment isolation is in question since the environmental impact on the motor and power supply for V-16-2 is unknown. As a result, it is not known whether the valve will remain functional once the reactor is depressurized. Since the top of active fuel is approximately 7 feet above the cleanup system penetration, feedwater will need to be continuously supplied to maintain fuel submergence.

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

CORRECTIVE ACTIONS

Immediate corrective action was as follows:

1. V-16-2 was declared inoperable and deactivated in the closed position to prevent it from being opened with reactor pressure greater than 125 psig.

2. Procedure 303 was temporarily changed to allow filling and venting the system by using V-16-14.

3. A review of Generic Letter 89-10 valve delta p operating conditions was performed to determine if there were any similar incorrect assumptions. None were found.

Other corrective actions will include:

1. Revise Generic Letter 89-10 affected delta p and thrust calculations, as needed

2. Set up V-16-2 such that it will close under a high energy line break condition at rated temperature and pressure.

3. System engineers will perform a detailed review of Generic Letter 89-10 valve delta p conditions.

4. Revise the Oyster Creek Generic Letter 89-10, Supplement 3, response to include V-16-2 as a high energy blowdown valve.

5. Inform all engineers of this event and the importance of design verification through required reading of this LER.

SIMILAR EVENTS

LER 96-015: Reactor Water Cleanup Valves May Not Operate During Line Break Due to a Non-Conservative Analysis