

Bryce L. Shriver
Vice President – Nuclear Site Operations

Susquehanna Steam Electric Station
P.O. Box 467, Berwick, PA 18603
Tel. 570.542.3120 Fax 570.542.1477
blshriver@papl.com



APR 26 2000

U.S. Nuclear Regulatory Commission
Attn: Document Control Desk
Mail Station P1-137
Washington, DC 20555

SUSQUEHANNA STEAM ELECTRIC STATION
LICENSEE EVENT REPORT 50-387/00-004-00
PLA - 5191 FILE R41-2

Docket No. 50-387
License No. NPF-14

Attached is Licensee Event Report 50-387/00-004-00. This event was determined reportable per 10CFR50.73(a)(2)(iv) in that an unplanned actuation of an Engineered Safety Feature occurred when the Reactor Water Cleanup System primary containment isolation valve isolation logic actuated due to a high differential flow signal while draining a portion of the RWCU system.

Bryce L. Shriver
Vice President – Nuclear Site Operations

Attachment

cc: Mr. H. J. Miller
Regional Administrator
U. S. Nuclear Regulatory Commission
475 Allendale Road
King of Prussia, PA 19406

Mr. S. L. Hansell
Sr. Resident Inspector
U.S. Nuclear Regulatory Commission
P. O. Box 35
Berwick, PA 18603-0035

NRC FORM 366 (6-1998)				U.S. NUCLEAR REGULATORY COMMISSION				APPROVED BY OMB NO. 3150-0104 EXPIRES 06/30/2001 <small>ESTIMATED BURDEN PER RESPONSE TO COMPLY WITH THIS MANDATORY INFORMATION COLLECTION REQUEST: 50.0 HRS. REPORTED LESSONS LEARNED ARE INCORPORATED INTO THE LICENSING PROCESS AND FED BACK TO INDUSTRY. FORWARD COMMENTS REGARDING BURDEN ESTIMATE TO THE INFORMATION AND RECORDS MANAGEMENT BRANCH (T-6 F33), U.S. NUCLEAR REGULATORY COMMISSION, WASHINGTON, DC 20555-0001, AND TO THE PAPERWORK REDUCTION PROJECT (3150-0104), OFFICE OF MANAGEMENT AND BUDGET, WASHINGTON, DC 20503.</small>				
LICENSEE EVENT REPORT (LER) (See reverse for required number of digits/characters for each block)												
FACILITY NAME (1) Susquehanna Steam Electric Station - Unit 1						DOCKET NUMBER (2) 05000387		PAGE (3) 1 OF 5				
TITLE (4) Actuation of Reactor Water Cleanup High Differential Flow Isolation Logic During RWCU System Draining												
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 NAME	DOCKET NUMBER		
03	27	00	00	-- 004	-- 00	04	26	00	FACILITY NAME	DOCKET NUMBER		
										05000		
										05000		
OPERATING MODE (9)		5		THIS REPORT IS SUBMITTED PURSUANT TO THE REQUIREMENTS OF 10 CFR §: (Check one or more) (11)								
POWER LEVEL (10)		0		20.2201(b)		20.2203(a)(2)(v)		50.73(a)(2)(i)		50.73(a)(2)(viii)		
				20.2203(a)(1)		20.2203(a)(3)(i)		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)		X	50.73(a)(2)(iv)			
				20.2203(a)(2)(iii)		50.36(c)(1)			50.73(a)(2)(v)			
				20.2203(a)(2)(iv)		50.36(c)(2)			50.73(a)(2)(vii)			
									OTHER			
									Specify in Abstract below or in NRC Form 366A			
LICENSEE CONTACT FOR THIS LER (12)												
NAME Joseph J. Meter - Senior Engineer, Licensing								TELEPHONE NUMBER (Include Area Code) 570 / 542-1873				
COMPLETE ONE LINE FOR EACH COMPONENT FAILURE DESCRIBED IN THIS REPORT (13)												
CAUSE	SYSTEM	COMPONENT	MANUFACTURER	REPORTABLE TO EPIX								
A	CE											
SUPPLEMENTAL REPORT EXPECTED (14)								EXPECTED SUBMISSION DATE (15)		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) <p>On March 27, 2000, at 1734 hours, with Unit 1 in Condition 5 (Refueling) at 0 percent power for the Unit 1 Eleventh Refueling and Inspection Outage, an Engineered Safety Feature (ESF) actuation occurred when the Reactor Water Cleanup (RWCU) System's isolation logic actuated for its inboard and outboard primary containment isolation valves. The isolation logic actuated due to a valid high differential flow signal that was generated when water was inadvertently drained from the reactor vessel to the RWCU Filter Demineralizer Backwash Receiving Tank (BWRT) during system draining. The Unit 1 reactor vessel cavity was flooded and cross-tied to the Unit 1 and Unit 2 Spent Fuel Storage Pools. The event allowed approximately 1,100 gallons of water to flow from this reservoir into the BWRT. The inboard and outboard primary containment isolation valves did not move from the open to the closed position during the event because the high flow and high differential flow isolation actuation logic for the valves had been bypassed in accordance with procedure. The event was terminated by closing isolation valves to the RWCU filter demineralizer. The event had an insignificant impact on nuclear safety and did not compromise public health or safety. The cause of the event was attributed to less than adequate drain procedure use by Operations personnel. The event was reviewed with applicable Operations personnel, emphasizing the importance of procedure adherence. There were also several causal factors associated with this event and other corrective actions, which include reviewing other drain procedures for adequacy and establishing a policy to verify system isolation boundaries for all system draining just prior to work.</p>												

LICENSEE EVENT REPORT (LER)
TEXT CONTINUATION

FACILITY NAME (1)	DOCKET	LER NUMBER (6)			PAGE (3)
		YEAR	SEQUENTIAL NUMBER	REVISION NUMBER	
Susquehanna Steam Electric Station - Unit 1	05000				2 OF 5
	387	00	-- 004 --	00	

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

EVENT DESCRIPTION

On March 27, 2000, at 1734 hours, with Unit 1 in Condition 5 (Refueling) at 0 percent power for the Unit 1 Eleventh Refueling and Inspection Outage, an Engineered Safety Feature (ESF) actuation occurred when the Reactor Water Cleanup (RWCU, EIS Code: CE) System's isolation logic actuated for its inboard and outboard primary containment isolation valves, HV-144F001 and HV-144F004 respectively. The isolation logic actuated due to a valid high differential flow signal that was generated when water was inadvertently drained from the reactor vessel to the RWCU Filter Demineralizer Back-wash Receiving Tank (BWRT, EIS Code: KH) during RWCU system draining. The Unit 1 reactor vessel cavity was flooded and cross-tied to the Unit 1 and Unit 2 Spent Fuel Storage Pools (EIS Code: D). These volumes, when tied together, store approximately 1.5 million gallons of water. The event allowed approximately 1,100 gallons of water to flow from this reservoir into the BWRT. Primary containment isolation valves HV-144F001 and HV-144F004 did not move from the open to the closed position for the high differential flow signal because the high flow and high differential flow isolation actuation logic for the valves had been bypassed per procedure direction. The event was terminated when isolation valves for the RWCU filter demineralizer were closed. Evolutions leading to this event were as follows:

On March 25, 2000, preparations were in progress to drain the RWCU system for outage related work. In addition to draining the RWCU system, Operators (licensed, utility) were also coordinating several As Low As Reasonably Achievable (ALARA) flushes of the RWCU system including a flush of the HV-144F001 and HV-144F004 valves and a local leak rate test on the HV-144F001 and HV-144F004 valves. These valves were left in the open position during system shutdown in anticipation of the upcoming flush. One RWCU ALARA flush was completed on March 25, 2000, but the flush of the HV-144F001 and HV-144F004 valves was deferred and the valves remained in the open position as allowed by the system operating procedure.

On March 26, 2000, Operators (licensed, utility) prepared to drain the suction portion of the RWCU system using part of a Drain Recommendation procedure, section 3.1 of DR-161-002. Some of the steps in section 3.1 were completed, but the entire section was not completed in anticipation that a local leak rate test may be performed on the HV-144F001 and HV-144F004 valves. Included in the steps that were completed were steps to bypass the high flow and high differential flow isolation signals to the HV-144F001 and HV-144F004 valves. Included in the steps that were not completed were steps to close the bottom head drain bypass valve 144F103 and the RWCU recirculation pump suction valves 144F043A and 43B which would have isolated the outboard portion of the system from the reactor vessel. These valves would need to remain open if the local leak rate test would be performed.

On March 27, 2000, Operations personnel (licensed; utility) decided not to complete section 3.1 of DR-161-002 procedure, so that the local leak rate test of the HV-144F001 and HV-144F004 valves could be performed. Operations personnel continued with the scheduled draining of the filter demineralizer portion of the RWCU system using section 3.2 of DR-161-002.

In section 3.2 of DR-161-002, jumpers are installed to open RWCU filter demineralizer inlet, outlet, and vent valves to drain the demineralizer. On March 27, 2000, at 1730 hours, after the jumpers were installed by Electricians (non-licensed), a drain path was created from the reactor vessel through the bottom head drain

LICENSEE EVENT REPORT (LER)
TEXT CONTINUATION

FACILITY NAME (1)	DOCKET	LER NUMBER (6)			PAGE (3)
		YEAR	SEQUENTIAL NUMBER	REVISION NUMBER	
Susquehanna Steam Electric Station - Unit 1	05000				3 OF 5
	387	00	-- 004 --	00	

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

bypass valve, the primary containment isolation valves, the RWCU recirculation pump suction valves and the RWCU filter demineralizer inlet, outlet, and vent valves to the BWRT. A BWRT high water level alarm was received on a local panel. RWCU high differential flow alarms were received in the Unit 1 Control Room at 1734 hours. Operations personnel verified that the level in the BWRT was increasing, and directed the Electricians to remove the jumpers. The jumpers were removed, the RWCU filter demineralizer inlet, outlet and vent valves closed, and the event was terminated at 1738 hours. The BWRT tank indicated level was 40 percent full prior to draining water from the reactor vessel. The BWRT tank indicated level was 87 percent full after the event was terminated. This change in BWRT level corresponds to approximately 1100 gallons of water that was transferred from the reactor vessel to the BWRT.

CAUSE OF EVENT

The root cause for the event was less than adequate procedure use by Operations personnel. Drain recommendation (DR-161-002) section 3.1 was not performed in its entirety during the draining of RWCU system. If section 3.1 of the procedure had been performed in its entirety prior to implementing section 3.2, the RWCU system would have been isolated from the reactor vessel.

Causal factors included:

- Section 3.2 of DR-161-002 did not contain adequate prerequisites to stand-alone and isolate the portion of the RWCU system to be drained from the reactor vessel.
- Operations personnel that released the work did not properly evaluate and coordinate the RWCU drain evolution and LLRT testing.

REPORTABILITY/ANALYSIS

The event has been determined to be reportable per 10CFR50.73(a)(2)(iv). The RWCU System primary containment isolation valve isolation logic actuated when a valid high differential flow signal was generated during draining of the RWCU system and the logic actuation was not part of a completely preplanned sequence. The RWCU System primary containment isolation valves, HV-144F001 and HV-144F004, did not move from the open to the closed position for the high differential flow signal because the high flow and high differential flow isolation actuation logic for the valves had been bypassed.

At the time of this event, the Unit 1 Reactor was in mode 5 with the reactor head off. The reactor vessel cavity was flooded and cross-tied to the Unit 1 and Unit 2 Spent Fuel Storage Pools. These volumes, when tied together, store approximately 1.5 million gallons of water. The drain down event allowed approximately 1,100 gallons of water to flow from this reservoir into the RWCU Filter Demineralizer Backwash Receiving Tank (BWRT). The inventory loss of 1100 gallons corresponds to less than 1 inch of level reduction in the reactor vessel cavity and spent fuel storage pools in the cross-tied configuration.

LICENSEE EVENT REPORT (LER)
TEXT CONTINUATION

FACILITY NAME (1)	DOCKET	LER NUMBER (6)			PAGE (3)
		YEAR	SEQUENTIAL NUMBER	REVISION NUMBER	
Susquehanna Steam Electric Station - Unit 1	05000				4 OF 5
	387	00	-- 004 --	00	

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

This event had an insignificant impact on nuclear safety. The draining of water from the Reactor Vessel to the RWCU Filter Demineralizer Back Wash Receiving Tank was minimal (approximately 1100 gallons) and was terminated well before any compromise to the margin of nuclear safety existed. Therefore, this event did not represent a compromise of public health or safety.

In accordance with the guidance provided in NUREG-1022 Revision 1 section 5.1.1, the required submission date for this report was determined to be April 26, 2000.

CORRECTIVE ACTIONS

Corrective actions that have been completed are:

- The event was terminated when Operations personnel verified that level in the BRWT was increasing, and directed Electricians to remove the jumpers that were installed to open RWCU filter demineralizer inlet, outlet, and vent valves. The jumpers were removed and that action isolated the flow path from the reactor vessel to the BWRT.
- A stand-down was held by Operations Supervisor - Nuclear with the Operations personnel involved in the event to review the event and emphasize the importance of procedure adherence and the need to ensure activities are performed safely and accurately.
- The event was discussed during Operations shift meetings and a required reading document for the event was issued to applicable Operations personnel.
- A review of the remaining drain recommendation procedures to be used during the Unit 1 Eleventh Refueling and Inspection Outage was performed to ensure each procedure subsection adequately establishes system isolation boundaries.
- The draining pre-evolution briefing process was strengthened to include a review of system status for a clear understanding of system isolation points before draining.
- A policy was established to verify system isolation boundaries for all system draining and flushes just prior to releasing work.

Corrective actions that will be completed are:

- A review of remaining drain recommendation procedures will be performed to ensure each procedure subsection adequately establishes system isolation boundaries.

LICENSEE EVENT REPORT (LER)
TEXT CONTINUATION

FACILITY NAME (1)	DOCKET	LER NUMBER (6)			PAGE (3)
		YEAR	SEQUENTIAL NUMBER	REVISION NUMBER	
Susquehanna Steam Electric Station - Unit 1	05000				5 OF 5
	387	00	-- 004	-- 00	

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

ADDITIONAL INFORMATION

Previous Similar Events: LER 91-009-00, Docket No. 387/License No. NPF-14
LER 92-003-00, Docket No. 387/License No. NPF-14

Failed Component Identification: None