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SUBJECT: LER 92-013-00:on 920818,Emergency Switchgear Room Cooling Sys declared inoperable due to low flow.Evaluating possible solutions to obtain chilled water sys flow rates in future. W/920917 ltr.

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TITLE: 50.73/50.9 Licensee Event Report (LER), Incident Rpt, etc.

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September 17, 1992

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

SUSQUEHANNA STEAM ELECTRIC STATION
LICENSEE EVENT REPORT 92-013-00
FILE R41-2
PLAS - 535

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

Attached is Licensee Event Report 92-013-00. This report is being made pursuant to 10CFR50.73(a)(2)(v)(A) in that the Emergency Switchgear Cooling system was declared inoperable when it was discovered that the 'A' train had less than adequate cooling water flow with the 'B' train already out of service for scheduled maintenance. This constituted a condition that alone could have prevented the fulfillment of the safety function of a system necessary to shutdown the reactor and maintain it in a safe shutdown condition. This condition has been corrected.

H.G. Stanley
Superintendent of Plant - Susquehanna

HL/mjm

cc: Mr. T. T. Martin
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NRC FORM 366 (6-89)

U.S. NUCLEAR REGULATORY COMMISSION

APPROVED OMB NO. 3150-0104
EXPIRES: 4/30/92

ESTIMATED BURDEN PER RESPONSE TO COMPLY WTH 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.

LICENSEE EVENT REPORT (LER)

FACILITY NAME (1)	DOCKET NUMBER (2)	PAGE (3)
Susquehanna Steam Electric Station - Unit 1	0 5 0 0 0 3 8 7	1 OF 0 5

TITLE (4)

Emergency Switchgear Cooling Inop - Could Prevent Fulfillment of Safety Function

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)
0 8	1 8	9 2	9 2	0 1 3	0 0	0 9	1 7	9 2	SSES - Unit 2	0 5 0 0 0 3 8 8
										0 5 0 0 0

OPERATING MODE (9)	1	THIS REPORT IS SUBMITTED PURSUANT TO THE REQUIREMENTS OF 10 CFR §: (Check one or more of the following) (11)			
POWER LEVEL (10)	1 0 0	20.402(b)	20.405(c)	50.73(a)(2)(iv)	73.71(b)
		20.406(a)(1)(i)	50.36(c)(1)	X 50.73(a)(2)(v)	73.71(c)
		20.405(a)(1)(ii)	50.36(c)(2)	50.73(a)(2)(vii)	OTHER (Specify in Abstract below and in Text, NRC Form 366A)
		20.405(a)(1)(iii)	50.73(a)(2)(i)	50.73(a)(2)(viii)(A)	
		20.406(a)(1)(iv)	50.73(a)(2)(ii)	50.73(a)(2)(viii)(B)	
		20.406(a)(1)(v)	50.73(a)(2)(iii)	50.73(a)(2)(x)	

LICENSEE CONTACT FOR THIS LER (12)

NAME	TELEPHONE NUMBER
	AREA CODE
Harrison Lloyd, Jr. - Power Production Engineer	7 1 7 5 4 2 - 3 9 1 7

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

CAUSE	SYSTEM	COMPONENT	MANUFAC-TURER	REPORTABLE TO NPRDS		CAUSE	SYSTEM	COMPONENT	MANUFAC-TURER	REPORTABLE TO NPRDS	

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 fifteen single-space typewritten lines) (16)

On August 18, 1992, with both Units 1 & 2 at full power, the 'A' Emergency Switchgear Room Cooling System (ESRC) was declared inoperable due to low cooling water flow. The 'B' ESRC was out of service for maintenance and was promptly returned to service in order to restore ESRC. The system flow elements had been removed in 1982 by A/E design documents due to inadequate system flow but not all of the design documents were updated. A Non-conformance report was generated to document this discrepancy with a disposition to re-install the flow elements. In July, 1991, the System Engineer attempted to verify system flow and discovered the flow elements had been removed. PP&L Engineering determined it proper to measure system flow and evaluate design flow calculations. The evaluation resulted in a new design flow of 29 gpm. The 'A' ESRC flow element was re-installed but during review of work documents to install the 'B', it was determined that no post-maintenance flow testing had been performed on the 'A'. A flow test revealed system flow to be less than design required flow. With both loops inoperable, this was determined to be reportable per 10CFR50.73(a)(2)(V)(A) as a condition that alone could have prevented the fulfillment of the safety function of the system. Primary causes identified for this event were the use of the NCR process versus the design change process for the flow element restoration and limited experience and training for the involved System Engineer with regards to specifying retest requirements. This event will be reviewed with Systems Engineering personnel with emphasis on the Engineers role in specifying retest requirements, operability determinations, and on the use of NCRs versus modification for work activities.

DESCRIPTION OF EVENT

On August 18, 1992, with Unit 1 in Condition 1 at 100% power and Unit 2 in Condition 1 at 96% power, the 'A' Emergency Switchgear Room Cooling System was declared inoperable when it was determined that a flow orifice, installed in the 'A' Control Structure Chilled Water System on July 23, 1992, would not allow sufficient flow to meet the design cooling flow rate. The 'B' Control Structure Chilled Water System had been taken out of service for scheduled maintenance on August 18, 1992. With both sub-systems unavailable, the condition could have prevented the fulfillment of the safety function of a system needed to shutdown the reactor and maintain it in a safe shutdown condition. PP&L's interpretation of support systems required for Emergency Switchgear operability includes Emergency Cooling system operability. Therefore, our administrative Technical Specification LCO action statement was entered at 1440 hours. The required NRC notification was completed per 10CFR50.72(b)(2)(iii)(A) via the ENS. The normal (non-emergency) cooling water supply to the Emergency Switchgear Room coolers is the Reactor Building Chilled Water System which remained in operation throughout this event. Following determination of the degraded flow condition in the 'A' sub-system, the 'B' Control Structure Chilled Water system was promptly returned to service and the administrative LCO was cleared at 1620 hours.

BACKGROUND

In June of 1982, Bechtel Startup Field Request SFR 2923 was issued stating that the original Control Structure chilled water design flow of 49 GPM ± 5% to the Emergency Switchgear Room Cooling (ESRC) system could not be achieved. A flow rate of approximately 30 GPM could be obtained. In an attempt to increase system flow, SFR 2923 recommended deletion of flow elements FE-11192A/B. To document the removal of the flow elements, SFR 2923 initiated changes to the design drawings. However, not all design documents were captured for update.

In July of 1991, Operations requested the System Engineer investigate the need for the locked valves on the Control Structure Chilled Water System. The locked valves were associated with the flow balance for the system. During this review, the System Engineer determined a system flow balance to be appropriate. The attempted flow balance led to the discovery that the flow elements had been removed. Design change documents were generated for those not originally captured by SFR 2923.

Realizing the potential for a low flow condition within the Control Structure chilled water line to the ESRC existed, NPE and System Engineering met to discuss the problem. The following actions were planned:

1) Measure system flow without the flow elements installed using a non-intrusive measuring device from an outside vendor.

2) Evaluate the chilled water design flow calculation to determine if a lower value could be accepted.

The measured chilled water flow of the "A" ESRC was 34 GPM. The flow rate for the "B" ESRC was 28.5 GPM. NPE determined within calculation M-CSC-007 that these values were acceptable to satisfy the design basis of the system. Also within this calculation, NPE changed the design flow for the Control Structure chilled water to the ESRC to 29 GPM ± 5%, based on maintaining < 104°F. in the Emergency Switchgear Rooms for Equipment qualification purposes.

Desiring to conveniently measure flow through the subject chilled water lines in the future, it was decided to re-install the flow elements. The decision was made to install the flow elements within the Non-Conformance Report process. The basis for this decision was to resolve the discrepancy between the as-built condition of the plant (flow elements removed) and the design documents (flow elements shown installed).

In November, 1991, NCR 91-0344 was issued to address this discrepancy. The disposition to the NCR corrected the drawing discrepancy and specified the re-installation of the flow elements. Simultaneously, separate work authorizations (WA's) were issued to install the replacement orifices and to measure the system flow following the installation of the flow elements. There was no cross-reference between these WA's or any link requiring the performance of a flow test prior to declaring the system operable.

On July 23, 1992, flow element FE-11192A was installed in the "A" Control Structure chilled water line to the "A" ESRC. No flow testing was performed. The work was completed and the "A" ESRC was declared operable.

On August 18, 1992, flow element FE-11192B was scheduled to be installed within the "B" Control Structure chilled water line to the "B" ESRC. Prior to releasing the "B" work, Unit Coordination questioned the system engineer regarding operability testing following the installation of FE-11192B. The system engineer

noted the same work was just performed on the "A" system without proper operability testing. Unit Coordination and the system engineer agreed flow data should immediately be obtained for the "A" chilled water line to the "A" ESRC. The data indicated a flow of 26 GPM, which was less than the design flow rate of 29 GPM. The "A" ESRC was declared inoperable and the LCO Action Statements were entered. The "B" Control Structure Chiller was promptly returned to service, and the LCO Action Statement was exited.

Two days after the event, it was discovered the flow orifice installed for FE-11192A was improperly installed which introduced an error into the flow measurement; however, the full extent of that error is not known. NCR 91-0344 was redispositioned to remove the flow element and revise the applicable drawings to reflect this. The flow orifice for FE-11192A was removed.

CAUSE OF EVENT

An Event Review Team was formed to perform a root cause analysis. The event was analyzed utilizing the Cause and Effect analysis technique. There were two key root causes identified.

(1) The decision to reinstall the flow orifices under the NCR disposition was incorrect. SFR 2923 had changed the plant design to eliminate the flow orifices. The fact that design drawings had not been changed to reflect this design change did not allow us to reverse the design change without a Design Change Package.

(2) Although the system engineer had identified the required flow testing he failed to tie this testing to OPERABILITY due primarily to limited experience and training dealing with specifying retest requirements for OPERABILITY.

REPORTABILITY/ANALYSIS

This event was determined to be reportable per 10CFR50.73(a)(2)(v)(A) as a condition that alone could have prevented the fulfillment of the safety function of systems needed to shutdown the reactor and maintain it is a safe shutdown condition.

There were no safety consequences as a result of this event. The normal cooling water supply to the Emergency Switchgear Room Coolers is the Reactor Building Chilled Water System which remained in operation throughout this event.

In order to understand the significance of this event to the design of the plant, Nuclear Engineering was requested to analyze the impact of the less-than-design chilled water flow. A preliminary revision to calculation M-RAF-024 indicates a chilled water flow of 26 GPM would result in an increase in switchgear room temperatures following a design basis accident to ≤ 110°F. This is an increase of 6°F over the 104°F Equipment Qualification limit. Engineering concluded the switchgear is capable of operating at temperatures of 120°F. Knowing these conditions, the "A" ESRC could have remained operable, nonetheless, the LCO actions taken were safe and conservative.

This event would not have been more significant at any other initial operating condition.

In accordance with guidance provided in NUREG 1022, Supplement 1, item 14.1; the required submission date for this report was determined to be 9/17/92.

CORRECTIVE ACTION

NCR 91-0344 was redispositioned to update design documents to reflect the flow orifice removal. The flow orifice was removed from the 'A' chilled water system. PP&L is evaluating two possible solutions to obtain chilled water system flow rates in the future.

1) Modification to install a flow orifice in the chiller water lines.

2) Preparation of a Test procedure to periodically check system flow with controls within the procedure to install and remove the flow orifice.

This event will be reviewed with Systems Engineering personnel with emphasis on:

1) The system engineer's role in specifying retest requirements for Modifications, WA's and NCR dispositions. These retest requirements must consider its impact to system OPERABILITY.

2) Addressing the immediate determination of OPERABILITY when faced with a discrepancy or nonconformance with reference to NCR Generic Letter 91-18.

3) Use of "Repair" or "Use-as-is" dispositions to NCR's and the need for a design change in certain situations.