

LICENSEE EVENT REPORT (LER)

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

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.

FACILITY NAME (1)

Susquehanna Steam Electric Station - Unit 2

DOCKET NUMBER (2)

05000388

PAGE (3)

1 OF 4

TITLE (4)

Core Spray Quarter Flow Surveillance Did Not Meet Acceptance Criteria

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
10	14	98	98	-- 011	-- 00	11	13	98	FACILITY NAME	DOCKET NUMBER
										05000
										05000

OPERATING MODE (9) 1

POWER LEVEL (10) 100

THIS REPORT IS SUBMITTED PURSUANT TO THE REQUIREMENTS OF 10 CFR §: (Check one or more) (11)

20.2201(b)	20.2203(a)(2)(v)	X	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)		50.73(a)(2)(iv)	OTHER
20.2203(a)(2)(iii)	50.36(c)(1)		50.73(a)(2)(v)	Specify in Abstract below or in NRC Form 366A
20.2203(a)(2)(iv)	50.36(c)(2)		50.73(a)(2)(vii)	

LICENSEE CONTACT FOR THIS LER (12)

NAME

Stephen J. Ellis - Senior Engineer, Licensing

TELEPHONE NUMBER (Include Area Code)

717 / 542-3537

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

CAUSE	SYSTEM	COMPONENT	MANUFACTURER	REPORTABLE TO EPIX	CAUSE	SYSTEM	COMPONENT	MANUFACTURER	REPORTABLE TO EPIX

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)

On October 14, 1998, with Unit 2 in Mode 1 (Power Operation) at 100% power, it was determined that the Susquehanna SES Unit 2 Core Spray quarterly flow surveillance inappropriately used a 7 psig correction factor in the calculation of core spray loop pressure. The correction factor was incorporated into the procedure to account for the difference in elevation between the pressure transmitter and the loop discharge header. The correction factor is already incorporated into the calibration of the equipment, and therefore, does not need to be added by procedural steps. The addition of the 7 psig is non-conservative, and on at least 2 occasions, the recorded values of flow and pressure before applying the correction factor, did not meet the surveillance acceptance criteria. These events are reportable per 10CFR50.73(a)(2)(i)(B), in that the appropriate limited condition for operation (LCO) ACTION was not taken within the allowed outage time. Since correction factor was added to the surveillance in 1986, an exact root cause is difficult to determine, however, it appears that an inadequate technical review was performed. Significant process improvements have been made since 1986 which would act to prevent a similar error from occurring today. These events have been reviewed and determined to have no safety consequence and minimal safety significance, in that acceptable results were obtained both before the subject surveillances, and after. The safety and welfare of the public was not compromised. The following corrective actions have been, or are scheduled for completion: the subject surveillances have been revised to remove the correction factor; the Residual Heat Removal flow surveillances have been reviewed for a similar condition with none identified; site engineering shall review this event; a review of emergency core cooling, containment, and reactivity control surveillances for similar errors will be performed.



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

EVENT DESCRIPTION

On October 15, 1998, with Unit 2 in Mode 1 (Power Operation) at 100% power, it was determined that the Unit 2 Core Spray (EIS Code: BM) quarterly flow surveillance had been inadequately performed on at least two occasions in the past. During the recent NRC Core Spray System Engineering Inspection, the Core Spray Quarterly Flow Surveillances were reviewed and evaluated by the PP&L support team. The PP&L inspection support team identified that there was a difference between the Unit 1 & 2 acceptance criteria.

The Unit 2 surveillances require that a 7 psig correction factor be added to the discharge pressure indication read in the Control Room. This correction factor was to compensate for the elevation difference between the discharge pressure transmitter and the core spray loop discharge header piping. The pressure indication is calibrated with this correction factor already accounted for, therefore, adding the 7 psig to the indication results in a non-conservative pressure indication. The net result was that the Core Spray pump acceptable pressure was 7 psig too low. The surveillance for the present quarter indicated that the flow and pressure recorded were sufficient to meet the acceptance criteria of the surveillance without the added 7 psig, thus, there was no immediate action needed to address a non-conforming condition.

Data was reviewed from previous Unit 2 Core Spray Pump Flow surveillances to determine if the surveillance had historically met the acceptance criteria without the 7 psig added to the observed results. The review identified that on at least 2 occasions the data recorded (without the additional 7 psig) did not meet the Technical Specifications acceptance criteria for the surveillance, (once for the performance of 4/16/98 and for the performance of 7/18/95). Since there was no valid surveillance for the equipment for some time period longer than is allowed by Technical Specifications, these events have been determined to be reportable in accordance with 10CFR50.73(a)(2)(i)(B).

CAUSE OF EVENT

A review of the surveillance history shows the 7 psig correction factor was added to the procedure in revision 3 of the original surveillance. This revision was approved on 9/4/86 and was in response to a procedure comment. The 7 psig correction factor was in every revision of the surveillance since that time. The basis for the comment was not documented. The individuals involved, the "reviewer" and "resolver", are no longer employed at the station, and as such, the reason for the change can not be resurrected. Neither party used the corrective action process to address the fact that the acceptance criteria was believed to be incorrect.

The instrumentation maintenance department reviewed the historical calibration records for the Core Spray Discharge Header Pressure Indication and concluded that the instrument has always been calibrated with an elevation correction factor.

Since the change to the procedures occurred over twelve years ago, and the individuals involved with the change are no longer employed at the station, it is difficult to determine the exact root cause of this event, however, it appears that an inadequate technical review of the change was performed.

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REPORTABILITY/ANALYSIS

On at least 2 occasions the Core Spray quarterly flow surveillance did not achieve the required flow and pressure to meet the acceptance criteria. For those periods, once the surveillance frequency extension interval (25% grace) was exceeded, the applicable Limited Condition for Operation (LCO) ACTION should have been entered. In this case, the Technical Specification ACTION for the loss of one loop of Core Spray required that loop to be restored to operable status within 7 days, or be in at least hot shutdown within the next 12 hours, and in cold shutdown within the following 24 hours. The guidance of NUREG indicates that a missed surveillance condition is reportable if the time period that the equipment is out of service exceeds the surveillance frequency, plus the grace interval, plus the allowed outage time of the applicable ACTION statement. For this event that time period was exceeded, and the event is reportable per 10CFR50.73(a)(2)(i)(B).

A review of inservice test (IST) data, which is independent of the 7 psig correction factor, indicates the discharge header pressure has routinely been greater than 282 psig. This data also shows that the mean discharge pressure of each pump, for about 70 tests, including the two periods in question, is greater than 282 psig. Therefore, there is no reason to believe that the pump's performance had degraded when discharge header pressure, as recorded in these isolated cases, was less than 282 psig. Rather, the inconsistencies are attributed due to inaccuracies of reading the flow and pressure indicators, or the differences in throttle valve position. It is believed that the throttle valves could have been adjusted to achieve acceptable values if the correct criteria had been in the procedure. A random review of a subset of surveillances concluded that the majority of the surveillance tests would have passed the acceptance criteria with the erroneous 7 psig correction factor removed.

For the times that the surveillance test discharge pressure indications were below 282 psig, it is probable that the discharge valve could have been adjusted to obtain acceptable results. However, even if this were not true, the consequences of slightly low discharge pressure is minimal. Per the Final Safety Analysis Report (FSAR), Section 6.3.1.2.2, the purpose of the Core Spray System is to provide inventory make-up and spray cooling during a large break loss of coolant accident (LOCA) in which the core is calculated to uncover. When assisted by the Automatic Depressurization System (ADS), Core Spray also provides protection for small break LOCAs. In both of these cases, Reactor Pressure Vessel (RPV) pressures would rapidly decrease. The worse case is that the discharge pressure could have been 7 psig below required pressure. The three year review performed by PP&L Engineering, resulted in two instances where the recorded pressure was 2 - 3 psig below the required value. During a Large Break LOCA or ADS initiation, RPV pressure decreases on the order of 25 psig per second. The additional time to reduce RPV pressure a few more psig would be insignificant. This slight delay in Core Spray injection would not cause fuel clad temperatures to rise appreciably. Also, this condition would not have prevented the other ECCS systems, Residual Heat Removal (RHR), ADS, High Pressure Coolant Injection (HPCI) and Reactor Core Isolation Cooling (RCIC) from providing makeup to the RPV. These systems all have some margin to design, and could make up for the extremely small shortfall from Core Spray.

Based on the above discussion, the safety and welfare of the public was not compromised, since there was no safety consequence to the events described and the safety significance was minimal.

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CORRECTIVE ACTIONS

Two significant process improvements have been put into place since this change was made in 1986. The threshold for documenting conditions adverse to quality has been lowered. In this case, the values used in the Technical Specification acceptance criteria were changed based on a comment during procedure review. A change to the acceptance criteria would, in today's process, be captured and investigated in the corrective action program at Susquehanna SES. The other significant change deals with the procedural review process. In 1986, the procedure review process required three signatures, the preparer, his supervisor, and the manager. Since then, the process has evolved to require a detailed technical review of the procedure change to be performed. This is documented by signature on the procedure by the technical reviewer. A detailed technical review would have determined that the change was incorrect.

The following corrective actions have been completed:

- The Core Spray Quarterly Flow Surveillances have been revised to remove the 7 psig correction factor.
- The RHR system pump flow surveillances have been reviewed to determine if a similar condition existed. The review concluded that a local pressure indication is used and no elevation correction factor is needed.

The following actions are scheduled to be completed:

- Review this event with Site Engineering and Operations procedure staff personnel.
- Review all Emergency Core Cooling System (ECCS), Containment and Reactivity Control surveillances with potential for instrument correction factor errors, to determine if similar errors were made in other systems.

ADDITIONAL INFORMATION

Past Similar Events: There are a number of past Licensee Event Reports (LERs) that document missed or incomplete surveillances. None of the LERs deal with the inappropriate use of an Instrument elevation correction factor.

Failed Component: None



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