

REGULATORY INFORMATION DISTRIBUTION SYSTEM (RIDS)

ACCESSION NBR: 9410190162 DOC. DATE: 94/10/12 NOTARIZED: NO DOCKET #
 FACIL: 50-387 Susquehanna Steam Electric Station, Unit 1, Pennsylvania 05000387
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 RECIP. NAME RECIPIENT AFFILIATION

SUBJECT: LER 94-015-00: on 940912, design basis LOCA could cause plant to be outside of design basis. Caused by is not known at this time. Revised applicable operations procedures to check control room panels. W/941012 ltr.

DISTRIBUTION CODE: IE22T COPIES RECEIVED: LTR 1 ENCL 1 SIZE: 7
 TITLE: 50.73/50.9 Licensee Event Report (LER), Incident Rpt, etc.

NOTES:

05000387

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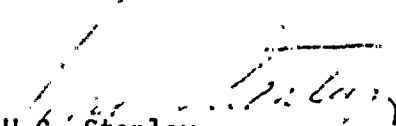
October 12, 1994

U.S. Nuclear Regulatory Commission
Document Control Desk
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SUSQUEHANNA STEAM ELECTRIC STATION
LICENSEE EVENT REPORT 94-015-00
FILE R41-2
PLAS - 616

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

Attached is Licensee Event Report 94-015-00. This report is being made pursuant to 10CFR50.73(a)(2)(ii)(B), in that postulated failures of control loops for the Standby Gas Treatment System and the Reactor Building recirculation fan damper actuators could cause the plant to be outside of its design basis. This condition is applicable to both Units.


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VP - Nuclear Operations

JJM/mjm

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LICENSEE EVENT REPORT (LER)

ESTIMATED BURDEN PER RESPONSE TO COMPLY WITH 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.

FACILITY NAME (1) **Susquehanna Steam Electric Station - Unit 1** DOCKET NUMBER (2) **0 5 0 0 0 3 8 7** PAGE (3) **1 OF 0 6**

TITLE (4) **Postulated Failures of SGTS Components Are Outside of Design Basis**

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	9	1 2 9 4	9 4	0 1 5	0 0	1 0 1 2 9 4			Susquehanna - Unit 2	0 5 0 0 0 3 8 8
										0 5 0 0 0 1 1 1

OPERATING MODE (8) **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(e)	50.73(a)(2)(iv)	73.71(b)
	20.406(a)(1)(i)	50.38(c)(1)	50.73(a)(2)(v)	73.71(c)
	20.406(a)(1)(ii)	50.38(c)(2)	50.73(a)(2)(vii)	OTHER (Specify in Abstract - below and in Text, NRC Form 368A)
	20.406(a)(1)(iii)	50.73(a)(2)(i)	50.73(a)(2)(viii)(A)	
	20.406(a)(1)(iv)	X 50.73(a)(2)(ii)	50.73(a)(2)(vii)(B)	
	20.406(a)(1)(v)	50.73(a)(2)(iii)	50.73(a)(2)(ix)	

LICENSEE CONTACT FOR THIS LER (12)

NAME **Joseph J. Meter - Power Production Engineer** TELEPHONE NUMBER **7 1 7 5 4 1 2 1 - 1 1 8 1 7 1 3**

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)

YES (If yes, complete EXPECTED SUBMISSION DATE) NO

EXPECTED SUBMISSION DATE (15) **1 1 3 0 9 4**

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

On September 12, 1994, at 1640 hours with Unit 1 and Unit 2 in Condition 1 at 100% power, it was concluded that either of two postulated single failure event types in conjunction with a design basis Loss Of Coolant Accident (LOCA) could cause the plant to be outside of its design basis. The postulated single failure event types are associated with the Standby Gas Treatment System and the Reactor Building recirculation system. The first event type would result in either the Division I or Division II outside air supply damper of the SGTS being in the open position during a "draw-down" of secondary containment. This would result in doses that are within the 10 CFR 100 and 10 CFR 50 G.D.C. 19 limits but exceed the design limits described in the station's Final Safety Analysis Report. The second postulated event type involves either Reactor Building recirculation fan damper being in the open position while its respective recirculation fan is not operating. Again, the doses for this case are within 10 CFR 100 and 10 CFR 50 G.D.C. 19 limits but exceed the design limits. The events are distinct and separate events. Although these event types are considered credible, the probability of any event is low and must be in existence at the time of a design basis accident in order to exceed the design basis doses. The design of the two damper types in question is the original plant design and has not been modified. The cause for why these single failure events were not included in the original plant design basis is not known at this time. Required periodic testing (existing and newly added) of both systems would reveal any of the above failures should they occur. This reduces the chance of such failures being present should a design basis accident occur.

LICENSEE EVENT REPORT (LER)
TEXT CONTINUATION

ESTIMATED BURDEN PER RESPONSE TO COMPLY WITH 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.

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		YEAR	SEQUENTIAL NUMBER	REVISION NUMBER			
		9 4	- 0 1 5	- 0 0	0 2	OF	0 6

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

DESCRIPTION OF EVENT

On September 12, 1994, at 1640 hours with Unit 1 and Unit 2 in Condition 1 (Power Operation) at 100% power, it was concluded that either of two postulated single failure event types in conjunction with a design basis Loss Of Coolant Accident (LOCA) could cause the plant to be outside of its design basis. The postulated event types are associated with the Standby Gas Treatment System (SGTS, EIIS Code: BH) and the Reactor Building recirculation system (EIIS Code: VA) (see figure 1).

The SGTS is designed to exhaust sufficient filtered air from the reactor building to maintain a negative pressure of about 0.25 in. wg in the affected volumes following Secondary Containment (EIIS Code: VA) isolation due to a Loss Of Coolant Accident (LOCA) design basis accident along with any postulated single failure. The SGTS is also designed to filter the exhausted air to remove radioactive particulates and iodine to limit the offsite dose to a calculated design basis of 154.7 rem for a two hour thyroid dose at the site boundary and 3.58 rem for a two hour whole body dose at the site boundary. These results are based on a TACT5 analysis of SGTS design parameters. The same analysis of SGTS design operation results in 16.1 rem to the thyroid, 0.59 rem to the whole body and 18.2 rem beta-skin for thirty day control room doses. In order to limit post accident doses to these values, upon initiation of the SGTS the outside air supply damper needs to remain closed so that the system can "draw-down" secondary containment within a three minute time period. After this initial "draw-down" period the outside air damper then opens to allow proper system control.

The first event type involves two postulated failure events which are 1) the failure of the SGTS outside air damper pressure differential transmitter in the low position and 2) failure of its controller in the high position. Either of these failures would result in either the Division I (FD-07551A2) or Division II (FD-07551B2) outside air supply damper of the SGTS being in the open position during a "draw-down" of secondary containment. The resulting draw-down time would then be 18 minutes. Results of a TACT5 analysis of this increased draw-down time show an approximate two hour site boundary dose to the thyroid of 192 rem and an approximate two hour site boundary dose to the whole body of 4 rem. The same analysis gives approximately 16.28 rem to the thyroid, 0.59 rem to the whole body and 18.24 rem beta-skin for thirty day control room doses. The analysis results in increased doses due to the increased unfiltered leakage that is assumed to occur for the 18 minutes it takes to draw-down secondary containment. These doses are within the 10 CFR 100 limits of 300 rem two hour thyroid dose at the site boundary and 25 rem, two hour whole body at the site boundary. They are also within the 10CFR50 G.D.C. 19 limits of 30 rem to the thyroid, 5 rem to the whole body, and 75 rem beta to the skin for thirty day control room doses, but exceed the design limits described in the station's Final Safety Analysis Report (FSAR).

LICENSEE EVENT REPORT (LER)
TEXT CONTINUATION

ESTIMATED BURDEN PER RESPONSE TO COMPLY WITH 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.

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TEXT (If more space is required, use additional NRC Form 368A's) (17)

A design feature of the Reactor Building recirculation system is to mix the atmosphere in the reactor building to obtain a lesser and more uniform concentration of radioactivity following a design basis LOCA. This mixing of air within the entire Reactor Building is an important factor in maintaining the design basis dose limits because it also provides a hold-up time to allow for radioactive decay prior to its filtration and discharge through the SGTS.

The second postulated event type involves a conductor-to conductor short within the circuitry for either Reactor Building recirculation fan damper (HD-07545A or HD-0745B) causing either to be in the open position while its respective recirculation fan is not operating. If this failure were to cause either recirculation fan damper to open while its respective recirculation fan was not operating (i.e. the standby fan), this would result in the air not being mixed properly throughout the Reactor Building and essentially short cycle the air within the recirculation fan plenum (as indicated by dashed line on figure 1). This decreased mixing would then result in a TACT5 calculated 2 hour thyroid dose of approximately 231 rem at the site boundary and a two hour whole body dose of approximately 17.4 rem at the site boundary. The corresponding thirty day control room doses are approximately 18.6 rem to the thyroid, 1.3 rem to the whole body and 34 rem beta-skin. Again, these doses are within 10 CFR 100 and 10 CFR 50 G.D.C. 19 limits but exceed the limits shown in the FSAR.

These previously unanalyzed single failure event types were discovered by Engineers (utility, non licensed) while resolving an Engineering Deficiency Report (EDR). On 9/12/94 analysis of the conditions described in the EDR was finalized. A reportability evaluation for the conditions described above showed that these events were reportable per 10CFR50.72(b)(1)(ii)(B) as being conditions that are outside the design basis of the plant.

The above described single failure event types are distinct and separate events. Although these events are considered credible, the probability of any event type is low and must be in existence at the time of a design basis accident in order to exceed the design basis doses. Required periodic testing of both systems already in place at the time of the event would reveal any of the above failures should they occur. This reduces the chance of such failures being present should a design basis accident occur.

CAUSE OF EVENT

The above described events involve dampers failing to the open position. The design of all the dampers in question is that the damper position is controlled by a damper actuator and the actuator is controlled via an electrical control circuit. The postulated causes for the failures are different in each case. The premature opening of either outside air supply damper (FD-07551A2 or B2) could be caused by two distinct events. Failure of its associated pressure differential transmitter in its control circuit to the low position would cause the dampers' control circuit to send a full open

LICENSEE EVENT REPORT (LER)
TEXT CONTINUATION

ESTIMATED BURDEN PER RESPONSE TO COMPLY WITH THIS INFORMATION COLLECTION REQUEST: 500 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.

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TEXT (If more space is required, use additional NRC Form 365A's) (17)

signal to the outside air damper. Likewise if the controller associated with the outside air supply damper were to fail high, the result would be to send a full open signal to the damper. For either of the recirculation fan dampers (HD-07545A or B) the postulated failure mode is a conductor-to-conductor short in a control circuit cable. This type of failure would result in a damper opening while its respective recirculation fan is idle.

The two damper types in question are classified as "fail-closed" because they are normally closed and fail closed on the loss of power. This is the original plant design and has not been modified. The cause for why these fail open events were not included in the original plant design basis is not known at this time.

REPORTABILITY / ANALYSIS

This event was determined to be reportable per 10CFR50.73(a)(2)(ii)(B) in that several postulated failures of dampers in the SGTS and Reactor Building recirculation system in conjunction with a design basis LOCA would cause the plant to be outside its design basis. All of the above described single failure events are distinct and separate events. Although these events are considered credible, the probability of any event is low and must be in existence at the time of a design basis accident in order to exceed the design basis doses. Additionally the required periodic testing of the SGTS, which would reveal any of the above failures should they occur, have not identified any of these conditions. Should any of the postulated events occur concurrent with a design basis accident, the result would be doses higher than those described in the FSAR but still within 10 CFR 100 and 10 CFR50 G.D.C. 19 limits. The doses presented within this Licensee Event Report are based on a Pennsylvania Power and Light reviewed and approved analysis using an NRC developed (TACT V) calculation methodology that represents the station prior to the 50 megawatt (electrical) uprate for Unit 2.

CORRECTIVE ACTIONS

Short term actions for the above conditions included revising applicable Operations procedures to: 1) check control room panels once per shift to verify that the Reactor Building recirculation fan dampers are not open, 2) check the outside air supply damper controller once per shift to verify the controller output has not failed high, 3) check the outside air supply dampers during the monthly surveillance test of the SGTS trains to ensure the dampers do not open until required. These actions further lessen the likelihood of the failures being present should a design basis event occur. An evaluation of what longer term actions are needed is ongoing and will be provided in an update to this report.



LICENSEE EVENT REPORT (LER)
TEXT CONTINUATION

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ADDITIONAL INFORMATION

Failed Component Identification:

Not Applicable

Past Similar Events:

A review of past Licensee Event Reports (LERs) for the station identified one event where SGTS was outside of its design basis.

Unit 1 LER 83-152-01

"FSAR post LOCA Assumptions did not agree with actual draw down times."

LICENSEE EVENT REPORT (LER)
TEXT CONTINUATION

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Unit 1
Susquehanna Steam Electric Station

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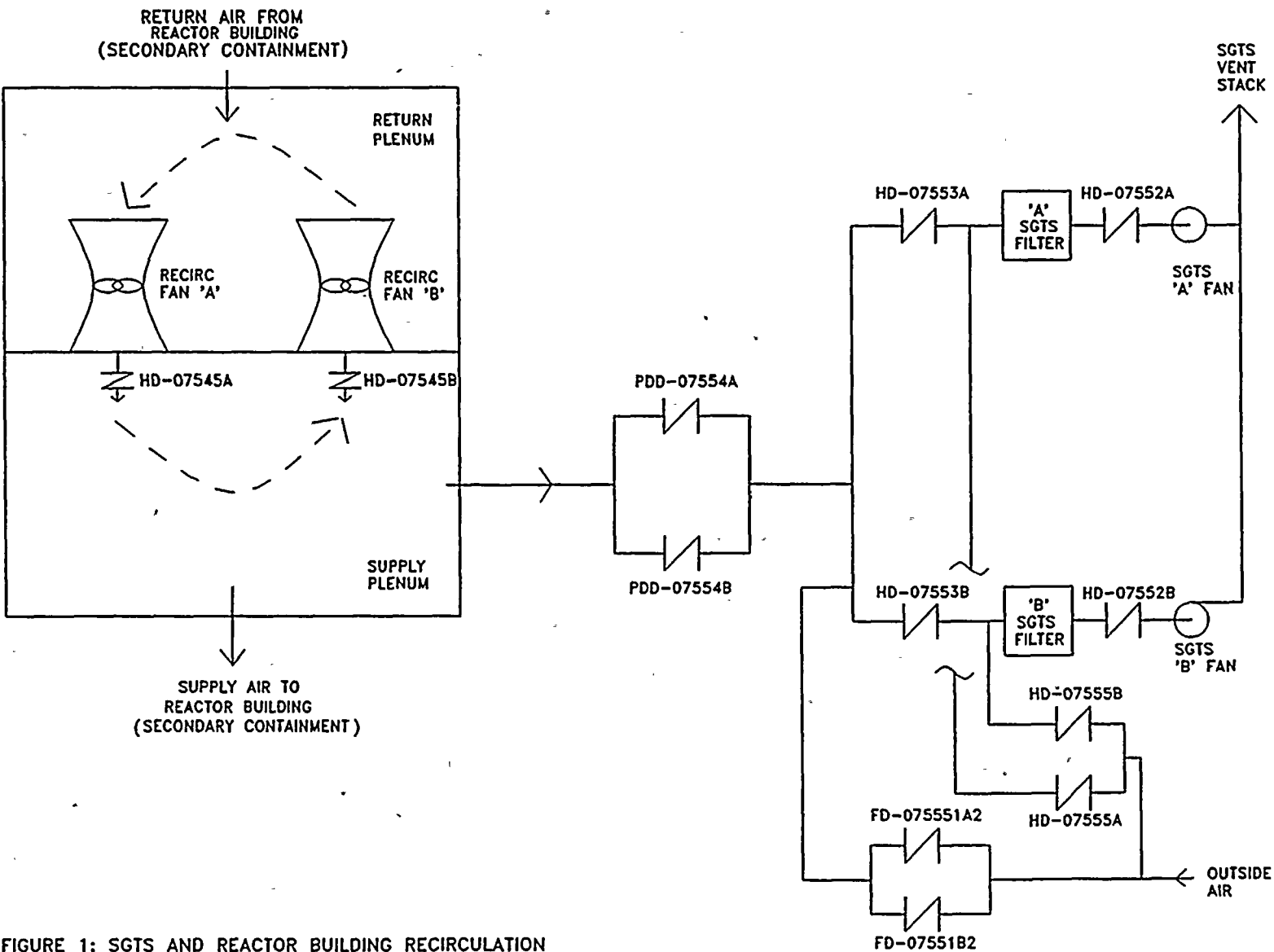


FIGURE 1: SGTS AND REACTOR BUILDING RECIRCULATION

NOTE: SKETCH NOT TO SCALE AND NOT ALL SYSTEM COMPONENTS INCLUDED