, * F	REGULATORY	DOC INFORM	UME ATION	DISTRIBUTION SYSTE	M (RIDS)	STEM	
ACCESSIO FACIL:5 AUTH.N METER,J STANLEY RECIP.	N NBR:9306150200 0-368 Susquehanna S AME AUTHOR A .J. Pennsylva ,H.G. Pennsylva NAME RECIPIEN	DOC.D Steam E AFFILIA Inia Po Inia Po IT AFFI	ATE: 9 lectri TION wer & wer & LIATIO	93/06/09 NOTARIZED Le Station, Unit 2, Light Co. Light Co. DN	9: NO Pennsylva	DOCKET # a 05000388	R
SUBJECT	: LER 90-007-01:on	900705	,prima	ary power supply to	RPS A pou	ver	I
	distribution pane assembly (EPA) br	el lost eakers	whrn tripp	one electrical pro ped.EPA logic cards	reviewed	æ	D
	RPS power supply	will b	e rede	esigned.W/930609 lt /	r. 1 /		S
DISTRIB TITLE:	UTION CODE: IE22T 50.73/50.9 Licensee	COPIES Event	RECEI Repoi	IVED:LTR (ENCL) t (LER), Incident	Rpt, etc.	<u></u>	1
NOTES:							A
	RECIPIENT ID CODE/NAME PD1-2 LA CLARK,R	COPIE LTTR 1 1	S ENCL 1 1	RECIPIENT ID CODE/NAME PD1-2 PD	. COPIES LTTR ENO l l	CL	D D
INTERNAL:	ACNW AEOD/DOA AEOD/ROAB/DSP NRR/DE/EMEB NRR/DRCH/HICB NRR/DRCH/HICB NRR/DRSS/PRPB NRR/DSSA/SRXB RES/DSIR/EIB	2 1 1 1 2 1 1	2 1 2 1 1 2 1 1 2 1 2	ACRS AEOD/DSP/TPAB NRR/DE/EELB NRR/DRCH/HHFB NRR/DRCH/HOLB NRR/DRPW/OEAB NRR/DSSA/SPLB REG FILE 02 RGN1 FILE 01	2 2 1 1 1 1 1 1 1 1 1 1 1 1 1 1		S
EXTERNAL:	EG&G BRYCE,J.H NRC PDR NSIC POORE,W.	2 1 1	2 1 1	L ST LOBBY WARD NSIC MURPHY,G.A NUDOCS FULL TXT	1 1 1 1 1 1		R I

NOTE TO ALL "RIDS" RECIPIENTS:

₹

PLEASE HELP US TO REDUCE WASTE! CONTACT THE DOCUMENT CONTROL DESK, ROOM P1-37 (EXT. 504-2065) TO ELIMINATE YOUR NAME FROM DISTRIBUTION LISTS FOR DOCUMENTS YOU DON'T NEED!

FULL TEXT CONVERSION REQUIRED TOTAL NUMBER OF COPIES REQUIRED: LTTR 32 ENCL 32

ro4

D

S

1

Α

D

D

S



Pennsylvania Power & Light Company

Two North Ninth Street • Allentown, PA 18101 • 215 / 770-5151

June 9, 1993

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

SUSQUEHANNA STEAM ELECTRIC STATION LICENSEE EVENT REPORT 90-007-01 FILE R41-2 PLAS - 566

Docket No. 50-388 License No. NPF-22

Attached is Licensee Event Report 90-007-01 which is an update to LER 90-007-00. The event was determined reportable per 10CFR50.73(a)(2)(iv) in that unplanned actuations of Engineered Safety Features occurred due to the loss of the primary power supply to the Division 1 Reactor Protection System power distribution panel when one Electrical Protection Assembly breaker tripped.

H.G. Stanley VP - Nuclear Operations

JJM/mjm

cc: Mr. T. T. Martin Regional Administrator, Region I U.S. Nuclear Regulatory Commission 475 Allendale Road King of Prussia, PA 19406

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

140010 9306150200 930609 PDR ADDCK 05000388 S PDR

	<u> </u>														
NRC FO (6-89)	MRC FORM 366 U.S. NUCLEAR REGULATORY COMMISSION APPROVED OMB NO. 3150-0104 (6-89) EXPIRES: 4/30/92														
	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 (P530), U.S. NUCLEAR REGULATORY COMMISSION, WASHINGTON, DC 2055, AND TO THE PAPERWORK REDUCTION PROJECT (3150 0104), OFFICE OF MANAGEMENT AND BUDGET, WASHINGTON, DC 20503.														
FACILITY NAME (1) DOCKET NUMBER (2) PAGE (3)										3ε (3) ΓΩ, 5					
Susquehanna Steam Electric Station - Unit 2 0 5 0 0 0 3 8 1 0F 0 5 TITLE (4)															
ESF Actuations Due to RPS EPA Breaker Spurious Trip EVENT DATE (5) LER NUMBER (6) REPORT DATE (2) OTHER FACILITIES INVOLVED (8)															
MONTH DAY YEAR YEAR WEAR (6) REPORT DATE (7) OTHER FACILITIES INVOL								DOCKE	T NUMBER	(S)					
								0 5 0 0				0	<u> .</u> ,		
07	0 5	9 0 9 0		01	06	09	93					0 5	61010	101	
	RATING		PORT IS SUBMITTE	D PURSUANT	TO THE R	LOUIREM	ENTS OF 1	0 CFR §: (Check of	ne or more d	of the following) (1	1) .			
POWE	R	20	.402(b)).405(a){1}(i)		50,36(c	.c) :)(1)		<u> </u>	50,73 50,73	3(6)(2)(iv) 3(6)(2){v)		┝ ;	73.71(0) 73.71(c)		
LEVE (10)	<u> </u>	0 0 20	.405(a){1}{ii}		50.35(c)(2)			50,73	3(s){2){vii}	•	OTHER (Specify in Abstract			
		20	.405(a)(1)(iii)		50,73(a))(2)(i)			60.73	3(*)(2)(viii)(/	43		366A)	/ # XL, 1111	C rom
			.405(a)(1)(iv) 1405(a)(1)(v)	⊢	60,73(a 50,73(a)(2)(ii))(2)(iii)			60,73 50,73	3(s)(2)(viii)(E ta)(2)(x)	1}				
				l	LICENSEE	CONTACT	FOR THIS	LER (12)				l			
NAME											AREA CODE	TELEPH	ONE NUME	ER	
		J. 1	I. Meter -	Power]	Produ	ction	Engi	neer			7, 1, 7	51	4, 2, -	, 1 , 8	8,7,3
			COMPLETE	ONE LINE FOR	EACH CO	DMPONEN	T FAILURE	DESCRIBI	ED IN T	HIS REPOR	T (13)			<u> </u>	
CAUSE	SYSTEM	COMPONENT	MANUFAC- TURER	REPORTABLE			CAUSE	SYSTEM	CON	PONENT	MANUFAC- TURER	REPC TO	NPRDS		
в	JIC	2 5 1 1	G 0 8 0	Y						1 1					
	SUPPLEMENTAL REPORT EXPECTED (14) EXPECTED MONTH DAY YEAR								YEAR						
YE	YES (If yes, complete EXPECTED SUBMISSION DATE) X NO DATE 1 1														
ABSTRAC	T (Limit t	0 1400 speces, I.e., 1	approximetely fifteen	single-space typ	ewritten lin	res) (16)	• •				•			<u></u>	I I
n ar	imar	3 on Ju. V power	supply f	90, W1 [.] to the		ne U Rea	nit d ctor	pera	tin	g at	100% pc	wer	, the	3	
ai di	stri	bution j	panel was	s lost	whe	níon	e of	its	Ele	ctric	al Prot	ect	ion	ver	
As	semb	ly (EPA)) breaker	cs trij	pped	• T	his i	Inter	rup	tion	caused	the	Read	ctor	
wa sv	ter stem	Cleanup	system,	and va	ario	us o' a +h	ther	Prim	ary	Cont	ainment	Is	olati	lon	
	ntro	l Room J	Emergency	v Outs	e and ide /	Air	e sca Suppl	v Sv	Ga	s Tre m to	auto in	Sys iti	tem a	עמ יר ע	1
, pl	ant	systems	and comp	onent	s fui	ncti	oned	prop	erl	y and	l as exp	ect	ed ir	אב. ו	Ł
response to the event. No reactor parameters were affected and no															
Emergency Core Cooling Systems were actuated. The EPA breaker was reset															
operation of the unit continued without interruption. The cause of this															
EPA breaker trip as well as others at the Station have been investigated.															
In general, the majority of the EPA breaker trips have been linked to a failure/anomaly of an electrical subcomponent on the EDA lectric															
Logic cards have undergone subcomponent lifetime upgrades and other RPS															
power supply components have been cleaned, inspected and optimized. The															
long term action is to modify the RPS power supply systems such that the															
forced cooling to the EPA cards will be provided.															
		-	•					F = 0 1	200	~ •					

•

-

NRC FORM 366A (6:39)	U.S.	NUCLEAR REGULATORY COMMISSION	APPROVED OMB NO.3	150-0104				
	LICENSEE EVENT REPORT TEXT CONTINUATION	(LER)	EXPIRES: 4/30/9 ESTIMATED BURDEN PER RESPONSE INFORMATION COLLECTION REQUES COMMENTS REGARDING BURDEN ESTI AND REPORTS MANAGEMENT BRANC REGULATORY COMMISSION, WASHING THE PAPERWORK REDUCTION PROJE OF MANAGEMENT AND BUDGET, WASH	2 TO COMPLY WTH THIS T: 500 HRS, FORWARD MATE TO THE RECORDS H (P-530), U.S, NUCLEAR TON, DC 20555, AND TO CT (3150-0104), OFFICE HINGTON, DC 20503,				
FACILITY NAME (1)		DOCKET NUMBER (2)	LER NUMBER (6)	PAGE (3)				
			YEAR SEQUENTIAL REVISIO					
onit 2 Susquehanna !	Steam Electric Station	0 15 10 10 10 13 18 18	910 - 01017 - 011	0 12 OF 01 5				
TEXT (If more space is requ	ired, use edditional NRC Form 366A's) (17)							
DESC	RIPTION OF EVENT	.*						
At 1 the (RPS when 2CB- Prim and syst majc	633 on July 5, 1990 with primary power supply to ; EIIS Code: JC) power one of its Electrical S003A-C, tripped. This ary Containment Isolatis automatic system initia ems functioned as design or actuations were as for	th the Unit opera the "A" Reactor distribution pa Protection Assem s power interrup on System (EIIS ations. RPS as w aned in response ollows:	ting at 100% power Protection System nel 2Y201A was loo bly (EPA) breakers tion resulted in Code: JM) actuat ell as other plant to the event. The	r, m st s, ions t e				
. 1)) Reactor Building HVAC (EIIS Code: VA) Zones II and III Isolated.							
2)	2) Reactor Water Cleanup System (EIIS Code: CE) inboard isolation valve closed.							
3)	3) Cooling water isolation values to the Reactor Recirc Pumps closed (EIIS Code: CC).							
4)	4) "A" Standby Gas Treatment System (EIIS Code: BH) auto initiated.							
5)	"A" Control Room Emerg Code: BH) auto initia	ency Outside Air ted.	Supply System (E)	IIS				
The rese rest inte	EPA breaker was reset a t by 1646, and all affe ored. Full power opera rruption. •	t 1640, all isola cted systems were tions of the Unit	ation signals were e subsequently t continued withou	e it				
CAUS	E OF EVENT							
The trip logic under these breal inter	loss of power to the "A of the downstream prim c cards monitor RPS pow rvoltage, and underfreg conditions exist or w kers are in series and crupt power to the dist	" RPS bus was due ary power supply er for conditions uency and trip th hen the logic can the trip of eithe ribution panel.	e to an unexpected EPA breaker. The s of overvoltage, ne EPA breakers wh rd fails. EPA er breaker will	l 2 EPA len				
The c Stati	cause of this EPA break on have been investiga	er trip as well a ted. In general,	as others at the the majority of	the				

EPA breaker trips at the station have been linked to a failure/anomaly of an electrical subcomponent on the EPA logic

-

NRC FORM SEGA	U.S. NUCLEAR REGULATORY COMMISSION	APPROVED OMB NO. 3150-0104 EXPIRES: 4/30/92						
LICENSEE EVENT REPOR TEXT CONTINUATIO	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 (3160-0104), OFFICE OF MANAGEMENT AND BUDGET, WASHINGTON, DC 20503.							
FACILITY NAME (1)	DOCKET NUMBER (2)	LER NUMBER (6)	PAGE (3)					
Unit 2 Susquehanna Steam Electric Station	0 5 0 0 0 3 8 8	YEAR SEQUENTIAL REVISION NUMBER 9 0 - 0 0 7 - 0 1	0 3 0F 0 5					
TEXT If more space is required, use additional NRC Form 300A's) (17) card. A subcomponent failure such as a capacitor or a transistor would cause the logic card to fail and subsequently trip the EPA breaker. Contributing factors to subcomponent failures were increasing								

subcomponent age and higher than optimum temperature of the subcomponent environment. As a subcomponent life increases, particularly capacitors, the EPA cards with subcomponents become less reliable and eventually fails. This "aging" process was found to be applicable when the EPA logic card was both in service and in storage. The higher the temperature a subcomponent is subjected to, the shorter its reliable life becomes. In May of 1991 a task team was formed to address the reliability of the RPS power supply systems at the Station. Prior to the task team being formed and reaching its conclusions, logic cards that experienced a trip were not examined on a subcomponent basis. Failed logic cards were typically returned to the manufacturer for analysis. The manufacturer would then replace the subcomponent(s) that failed. The card would then be returned and either put into service or stored for future use. In both instances the logic cards contained both new and used The temperature of the EPA logic card environment subcomponents. was found to be greater than optimum. The ambient room temperature were EPA cards are located was near 90 degrees F. In addition the EPA cards were mounted in a sealed junction box which further increased subcomponent temperature.

CORRECTIVE ACTIONS

As described above, in May of 1991 a task team was formed to address the reliability of the RPS power supply systems at the Station. Two main objectives were established. The first objective was short term and was to reduce the number of spurious RPS power supply trips by enhancing and better maintaining the components in the present systems. The second was long term and was to reduce spurious RPS power supply trips and increase reliability via the modification process.

In the short term, EPA logic cards were reviewed on an individual basis and subcomponents lifetime upgrades were performed so that each card could be reasonably expected not to fail within a five year lifetime. The junction boxes that house the EPA logic cards were equipped with ventilation louvers thereby reducing the ambient temperatures for the logic card subcomponents. Other short term actions included cleaning, inspecting and optimizing performance of RPS power supply components such as motor-

NRC FORM 586A (6,29)	U.S. NUCLEAR REGULATORY COMMISSION	APPROVED OMB NO. 3150-0104 EXPIRES: 4/30/92					
LICENSEE EVENT REPO TEXT CONTINUATIO	RT (LER) DN	ESTIMATED BURDEN PER RESPONSE TO COMPLY WTH 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.					
FACILITY NAME (1)	DOCKET NUMBER (2)	LER NUMBER (6) PAGE (3)					
Unit 2 Susquebanna Steam Electric Station	0 15 10 10 10 13 18 8	910 - 01017 - 011 0 4 OF 015					
TEXT (If more space is required, use additional NRC Form 366A's) (17)							
generator sets, regulati panels.	ing transformers, re	elays and connection					
The long term corrective supply modification that reliability. After extendesigned for the RPS pow power supply will utiliz in lieu of the existing enclosures will be prove	e action was to deve reduced spurious d ensive analysis, mod ver supply systems. ze an improved vers: models and forced o ided.	elop an RPS power trips and increased difications have been The redesigned RPS ion of EPA logic cards cooling to the EPA					
<u>REPORTABILITY/ANALYSIS</u>							
This event was determine 10CFR50.73(a)(2)(iv) in Safety Features (ESF) oc	This event was determined to be reportable under 10CFR50.73(a)(2)(iv) in that unplanned actuations of Engineered Safety Features (ESF) occurred when the RPS EPA breaker tripped. Since all ESF systems and components functioned properly and per design, there were no safety consequences or compromises to the health or safety of the public.						
Since all ESF systems ar design, there were no sa health or safety of the							
Had this event occurred refueling, the safety si the fact that shutdown o Even under these condition minimal since the plant safely handle this type	with the Unit in co ignificance would ha cooling could have b ions the safety sign is more than adequa of event.	old shutdown or ave been greater due to been temporarily lost. nificance would be ately designed to					
In accordance with the c 1 items 14.1 and 14.10, report was 8-6-90. No 1 expected.	guidance provided in the original submis further updates to f	n NUREG 1022 Supplement ssion date for this this report are					
ADDITIONAL INFORMATION							
Failed Component Informa	ation:						
Component - EPA Logic Ca	ard	,					
Model - 147D8652 G001 &	G003						
Manufacturer - General H	Electric						
A review of past License identified twelve other in ESF actuations.	ee Event Reports (L) events where EPA bi	ERs) for the station reakers trips resulted					

.

NRC FORM 366A U.S. 1	NUCLEAR REGULATORY COMMISSION	APPROVED OMB NO. 3150-0104 EXPIRES: 4/30/92					
LICENSEE EVENT REPORT (TEXT CONTINUATION	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 (P530), 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)	DOCKET NUMBER (2)	LER NUMBER (6)	PAGE (3)				
Unit 2 Successionana Steam Flectric Station	0 15 10 10 10 13 18 18	YEAR SEQUENTIAL REVISION NUMBER 910 - 01017 - 011	0 15 OF 01 5:				
TEXT (If more space is required, use additional NRC Form 366A's) (17)							
UNIT 1 (Docket No. 50-387/	License No. NPF-	-14)					
LER 92-007 I	ER 87-024						
	ER 86-029						
	ER 86-023						
LER 91-004 I LER 90-005	ER 83-172						
UNIT 2 (Docket No. 50-388/	Licensee No. NPF	`-22)					
LER 91-008 LER 91-007 LER 88-005							