James A. FitzPatrick Nuclear Power Plant P.O. Box 41 Lycoming, New York 13093 315 342-3840



William Fernandez II **Resident Manager**

January 25, 1991 JAFP-91-0071

United States Nuclear Regulatory Commission Document Control Desk Mail Station P1-137 Washington, D.C. 20555

SUBJECT: DOCKET NO. 50-333 LICENSEE EVENT REPORT: 90-025-01 Service Water Check Valves

Dear Sir:

This revised Licensee Event Report is submitted in accordance with 10 CFR 50.73 "Other" as a voluntary report.

This revision reports the failure of two additional creck valves to close on December 26th under test conditions similar to those originally reported in this LER for three other service water check valves.

Questions concerning this report may be addressed to Mr. Hamilton Fish at (315) 349-6013.

Very truly yours,

WILLTAM FERNANDEZ

WF:HCF:lar

23.4

co: USNRC, Region I USNRC Resident Inspector INPO Records Center American Nuclear Insurers

Cent NO P229764417 E22

(0-63)				LIC	ENSEE EVE	NT RE	PORT	(LER)	U.S. N	JCLEAR MPROVI	HEQULA? ED DIME MI 6/31/86	041Y COM 0. 3142-40	977984CH
FACILITY MAN	RE (1)		Line sour a tracké directión an source maite		nan san an sa an	And the second second	With the second second second		DOCKET NUMBER	(22)		1 14	8¥ (S
JA	MES	A. FIT	ZPATRICK NUC	LEAR PO	WER PLANT				0 18 10 10	1013	13 13	1 0	F 0 17
TITLE IAL F	ve S	ervia	ce Water to	Emerge	ncy Servic	e Wat	er Sw	ing Check	Valves	Fail	to C	lose	Aninakan
Dı	iring	Test	ing Due	Corros:	ion and Si	lt Ac	cumul	ation in	Hinge				
EVENY D	ATE ISI	_	LER MURRENDO	NR	REPORT DAT	1 (7)		OTHER	ACILITIES INYO	LVED B	19	The second s	antonica a successione
MONTH DA	YEA	A YEA	A NUMBER	REVIEDON REVIEDON	MONTH DAY	YEAR		FACILITY NA	198	DOCK	T NUMBER	RISC	THEAT
							-			018	1010	101	1.1
it. ht	1.1	1.1	-		aliste	414							
1 1 1	5 9	0 9	0 0 2 5		0 2 5	211			THE R. P. LEWIS CO., LANSING MICH.	0 15	1010	101	11
OPERATIO		N THE	NEPORT & BURNITTE	D PURBUANT 1	THE REGULAEME	NTS OF 10	CPA : (0	Cheolt ans ar mare i	of the Astronomy (1	1)			
			20.49296)	-	\$0.406(e)			60.73%:(2)(hr)		1	3.71 (b)		
ENCLOSURE IN			86.48890a2(1)469		80.29(a)(1)		-	80.73m1(2)(*)		1	3.77 ieł		
LEVEL	1.0.	() prosesses						#50 PR4+12814-81				Carlo States	
LEVEL	101	0	80.49884s3(1)(00)		80.38(a)(2)		-	Be. 7 898 FL87 (VS)		A	THER SA	Taur Mil	C Sam
LEV9L (10)	1101	0	98.4999463(1)(00) 	_	89.28441(2) 80.73441(2)(1)		_	90.73%)(2)(viii)(N		77HER (30 eknu and k KSA)	rolly in Au Twet, NH	C Form
LEVEL (10)	1101		80.4000453(1)00) 		00.386a)(2) 00.736a)(2)(1) 00.736a)(2)(8)			90.73ka(2)(v6)(4)	A) B)	Vol	77MER (30 elow and h 185A) untar	reny in Au Thet, NH	c Parm
LEVEL	1101		80.4006637(1)007 		90,394a)(2) 90,734a)(2)(1) 90,734a)(2)(8) 90,734a)(2)(8)			90.734a)(2)(46)(90.734a)(2)(46)(90.734a)(2)(46)(90.734a)(2)(a)	AJ B	Vol	77HER (30 NORA) Untar	ooffy in Ad 1 Twee, AH Y	c Form
	11 ⁰ 1		90.4556463(1)593 		90.394a322 90.796a322(1) 90.796a322(6) 90.796a323(6) 90.796a322(6) 90.796a322(6) 90.796a322(6)	FOR THIS	LER (12)	90.734a)(2)(v6) 90.734a)(2)(v6)(90.734a)(2)(v6)(90.734a)(2)(s)	AJ BJ	Vo1	WINER (30 NOTAL AND A NOTAL	reny in Au 1 Taxt, Aik Y	S Form
	1,0,		80.409665511300 		90.394a322 90.734a322(1) 90.734a322(6) 90.734a323(6) 90.734a323(6) *5246888 CONTACT	FOR THIS	LEA (12)	90.734a3(2)(va) 90.734a3(2)(va) 90.734a3(2)(va) 90.734a3(2)(x)		Vol	NTHER (Sp even and h HSLA) HITTET ONE NUMB	seny in Ad 1 Taxt, NH Y	C Form
LEVEL (190)	llto	n c.	10.40066311400 -> 40066311400 10.40066311601 10.40066311601 10.40066311601		90.394a322 90.734a3221 90.734a3221(8) 90.734a3221(8) 90.734a323(8) *52468.8 CONTACT	FOR THIS		90,736)(2)(40) 90,736)(2)(40)(90,736)(2)(40)(90,736)(2)(40)(90,736)(2)(4)(90,736)(2)(2)(2)(2)(2)(2)(2)(2)(2)(2)(2)(2)(2)	AJ EJ AREA CODE	Vol	THER (20 NOT AND A STATE	seny in Au 1 Taxt, NH Y	C Form
Ham:	llto	n c.	10.40066511300 Элеконики 11.00066511300 11.00066511300 Fish		90.384a322 90.736a323(1) 90.736a323(6) 90.736a323(6) 90.736a323(6) 90.736a323(6) 90.736a323(6) 90.236688 90.2007 ACT	FOR THIS	L&A (12)	90,7361(2)(%) 90,7361(2)(%)(90,7361(2)(%)(90,7361(2)(%)(90,7361(2)(%)	ANEA CODE 3 1 5	Vo1	NTHER CONSISTENT AND	y sam	1 ¹ 13
Ham:	ll ⁰ l	n c.	20.200666411300 	DOM LING NOA	90.384a322 90.734a323(8) 90.734a323(8) 90.734a323(8) 90.734a323(8) 90.734a323(8) 90.734a323(8) 90.734a323(8) 90.284a323(8) 90.284a323(8) 90.284a323(8) 90.284a323(8) 90.284a323(8) 90.284a323(8) 90.294a32(8) 90.294a32(8) 90.294a32(8) 90.294a32(8) 90.294a32(8) 90.294a32(8) 90.294a32(8) 90.294a32(8) 90.294a32(8) 90.294a32(8) 90.294a32(8) 90.294(8	FOR THIS FAILURE	LER ITE	0.7961(2)(%) 0.7561(2)(%) 0.7561(2)(%) 0.7561(2)(%) 0.7561(2)(%) 0.7561(2)(%) 0.10 THB REPOR	AMEA CODE 3 1 5 7 (130	Vol TELEPH	Intar	οτηγ τη Αλ Τακτ. Απ γ 1.6.Ω	11 13
LEVEL Tref LAME Ham: CAUSE EVETE	Llto	n C.	90.499666411980 - "9666411989) 	DIM LING N.A.	90.384a322 90.734a3021(1) 90.734a3021(8) 90.734a3021(8) *C2N6888 CONTACT	FAILURE CAUSE	LEA 112) DEBCRIES 2V 87 EM	D. 7943 (23144) (0.7344) (23144) (0.7344) (23144) (0.7344) (2314) (0.7344) (23144) (0.7344) (0.7444) (0.7344) (0.74	AREA CODE 3 1 5 7 (13) MANUPAC TURER	Vol 3 4	THER GENERAL AND A CONTRACT CO	eenry in Au 1 Tart, Ain γ 388 1 6 ρ	11 13
LEVEL Tref LAME Ham: CAUSE EVETE X K_C		n C.	20.49966541180 - 796541480) - 409663411641 20.655663411841 Fish Ссиссиина иллирас типен V 10.1815	DIM LING N.A.	90.384a322 90.734a3021(8) 90.734a3021(8) 90.734a3021(8) *C2N6888 CONTACT	PAILURE CAUSE	LER (12) DEBCRIBE	0.796)(2)(%) 0.756)(2)(%)((0.756)(2)(%)((0.756)(2)(%)(0.776)(2)(%)(0.776)(2)(%)(0.776)(2)(%)(0.1%)(7)(8) REPOR COMPONENT	AREA CODE 3 1 5 7 (13) MANUPAC TURER	Vol 34	THER (Jan How and H HORA) UNITAT	eenty in Au Thert, An y 16 ρ	11 13
LEVEL Iten Ham: CAUSE EVETE X K_C		n C.	20.40066411200 • Эментново • 400666411001 98.400666411001 BR.400666411001 Fish Ссисч.ете малирас V_1C_18_5	COM LONG N.A.	90.384a122 90.734a1221(8) 90.734a1221(8) 90.734a1221(8) *C2H6888 CONTACT EACH COMPONENT	PAILURE CAUBE	LER ITZ	0.7961(2)(%) 0.7961(2)(%) 0.7961(2)(%)()()()()()()()()()()()()()()()()()	APIEA CODE 3 1 15 T (13) MANUPAC TURER	Vol	THER (Jan How and H HORA UNITAT ONE NUMB I 9 1	contry in Au 1 Tart, An γ 1 6 ρ	11 13
LEVEL (19) LAME Ham: CAUSE SYSTE X K_C		n C.	20.40066411200 • Текантика) • 400666111001 20.400666111001 RE.400666111001 Fish Сокса, вте Малирас типея У 40-18-15	COM LING K.A. HEROR TABLE TO REPORT	90.384a122 90.734a1221(8) 90.734a1221(8) 90.734a1221(8) 90.734a1221(8) *C2N6888 CONTACT EACH COMPONENT	PAILURE CAUBE	LER ITZ	0.7361(2)(%) 0.7361(2)(%)(%)(0.7361(2)(%)(%)(%)(%)(%)(%)(%)(%)(%)(%)(%)(%)(%)	AJ EJ AREA CODE 3 1 5 T (13) MANUPAC TURER	Vol	THER (Jan How and H HORA) UNITAT ONE NUMB ONE NUMB I 9 [eenry in Au 1 There, Ann γ 1 6 ρ	
LEVEL (19)		о п С. Фолент	20.499666411200 • 79664114091 • 4006661411491 = 4006661411491 = 5 4006661411491 = 5 4006661411491 = 5 4006661411491 = 5 400666141120 = 5 40066614120 = 5 400666140 = 5 4006666140 = 5 4006666140 = 5 40066666 = 5 4006666 = 5 40066666 = 5 400666666 = 5 40066666 = 5 40066666 = 5 40066666 = 5 4006666666 = 5 4006666666 = 5 400666666666 = 5 400666666666666 = 5 40066666666666 = 5 40066666666666 = 5 4006666666666666666666666666666666666	COM LONG N.A. MEROR TAS LC TO REFORE Y	90.3844/22 90.7344/22(8) 90.7344/22(8) 90.7344/23(8) 90.7344/23(8) 92.N688 CONTACT EACH COMPONENT EACH COMPONENT EXPECTED (14)	FOR THIS FAILURE CAUSE	LER (12) DEBCR 165	0.7963(23(46) 0.7363(23)(46)(0.7363(2	AN EA CODE 3 1 5 T (130 MANUPAC TURER	Vol 3 4	THER (Jan How and H 1994) UNITAT ONE NUMB	comy in Au 1 Taxt, Ain γ base <u>16</u> ρ 30 30 30 30 30 30 30 30 30 30	11 13
LEVEL (19)		о с. Фолент	20.400665411300 - "Феблиная) - 4006654113041 - 4006654113041 	DIM LING N.R. HERORYASLE TO REALE Y	90.384a322 90.734a3221(1) 90.734a3221(8) 90.734a322(8) 90.734a322(8) 90.734a322(8) 90.734a32(8) 90.734a32(8) 90.734a32(8) 90.734a32(8) 90.734a32(8) 90.734a32(8) 90.734a32(8) 90.734a32(8) 90.734a32(8) 90.734a32(8) 90.734a32(8) 90.734a32(8) 90.734a32(8) 90.734a32(8) 90.734a32(8) 90.734(8)	FOR THIS FAILURE CAUSE	LER (12) DEBCRIES EVITEM		AN EN CODE AREA CODE 3 1 5 T (13) MANUPAC TURER I I I EXPECTS SUBMISSIO	Vol 3 4	THER (Jan Content of the second secon	comy in Au 1 Tart, Ain γ 1 Tart, Ain γ μ Δαγ	1 1 3

odated Voluntary Report - Previous Report Date 12/17/90

EIIS Codes are in []

On 11/15/90 and 12/25/90 the plant was operating at 100% power. During a scheduled ASME Section XI in-service test program surveillance test, three 3-inch swing check valves failed to close on 11/15/90. Two additional valves failed on 12/26/90. Following the initial tests, four of the five valves closed when tapped with a tool handle. The valves surply service water (SWS) [KG] to nine area ventination unit coolers located in spaces containing safety-related elec cal switchgear and emergency core cooling system equipment. The . Jes are intended to close upon loss of service water pressure to provent diversion of the emergency service water (ESW) [EI] supply away from the coolers. On 11/16/90 and 12/27/90 carbon steel valve internals were replaced with stainless steel components to avoid corrosion problems which contributed to the sticking condition. The as-found stuck open valve condition would not be expected to result in conditions adverse to safety in the event of an FSAR postulated accident. This is a voluntary report.

Related LERs: 88-055, 88-009, and 90-012.

LICENSEE EVENT REPORT (LER) TEXT CONTINUATION

U.S. NUCLEAR REGULATORY COMMISSION APPROVED ONE NO 3150-0104

EXPIRES 8/31/85

JAMES A. FITZPATRICK		X	TAR	824	DUENTIA	1	MEVIER			WHERE AND		-
		in the second	and the second s		YUMBER	10.00	NUMBE	R				
NUCLEAR POWER PLANT						T		٦.				
0 5 0 0	0 3 3	3 9	10	0	2 5		011	0	12	OF	0	7

EIIS Codes are in []

Updated Voluntary Report - Previous Report Date 12/17/90

Description

HEC Form 386A

The plant was operating at full power on November 15, 1990 and December 26, 1990. As a part of an accelerated ASME Section XI in-service testing program (IST), a regularly scheduled monthly surveillance test (ST), "Emergency Service Water Check Valve Test" (ST-8R), was being conducted. Three 3-inch swing check valves did not close when reverse flow conditions were simulated on 11/15/90. One 3-inch and one 4-inch valve did not close on 12/26/90.

The ST acceptance criteria require that the valves close when: 1) service water flow through the valve is isolated, and 2) the upstream side of the valve is vented to the atmosphere, and 3) the downstream side of the valve is pressurized by emergency service water (ESW) [BI] flow.

During normal operation service water (SWS) [KG] flows through each of the check valves to supply unit coolers. The unit coolers remove heat from four rooms containing safety-related electrical switchgear and cable and emergency core cooling system equipment. Check valve 46SWS-67B failed to close after two tests at 1045. With the valve isolated from both SWS and ESW, the valve bonnet was tapped with a wrench handle. The valve then closed promptly when reverse flow was initiated for the retest. The other two valves (46SWS-67A and 46SWS-69) were tested with similar results, initially failing at 1200 and 1245 respectively and then closing during the retest after they had been tapped with the wrench handle while they were isolated in the test configuration. Similar results (except that 46SWS-60A did not close) were observed on 12/26/90 when valves 46SWS-68 and 46SWS-60A were tested and initially failed at 2105 and 2130 respectively.

Following notification of each valve failure, the shift supervisor directed closure of the appropriate manual isolation gate valves upstream of check valves in the service water system (SWS) [KG] supply to the affected unit cooler. Cooling water was then supplied to the unit coolers from the emergency service water (ESW) [BI] system.

The day following the failures November 15th, the unit cooler for the west electric bay was removed from service at 0640 to facilitate inspection and repair of valve 46SWS-67A. This placed the plant in a Limiting Condition for Operation (LCO). The internals were replaced with stainless steel components. The valve was retested and closed satisfactorily. The unit cooler was restored to service at 1500 ending the LCO. At 1720 the unit coolers for the east electric bay and the east cable tunnel (which includes cooling for one emergency diesel generator (EDG) [EK] switchgear room) were removed from service

NRC Form 366A		U.S NUCLEAR RE	GULATORY COMMISSION
LICENSE	E EVENT REPORT (LER) TEXT CONTI	NUATION APPROVED EXPIRES 8/	OMB NO 3180-0104 31/85
FACILITY NAME (1)	DOCKET NUMBER (2)	LER A. WEER (6)	PAGE (3)
LANCE A DITTDAYDION		SECULENT AL DEVICE	Contraction of the local division of the loc

									- 11-			ee.		1 141							e		
JAMES A. FITZPATRICK									E	YEAR	T	SEO	UENT	AL R		NUM	BION						1
NUCLEAR POWER FLANT	0	15	10	0	10	13	13	13	9	10		0	121	5		01	1	0	13	OF	0	17	
	-	A	heren	-			ada a second		k		educion (Acres	Animal		human		-	-	And the second	hances		distant of	ŝ

to facilitate inspection or repair of valves 46SWS-67B and 46SWS-69. This placed the plant in an LCO. The internals of these two valves were replaced with stainless steel components. The valves were retested and closed satisfactory. The unit coolers were returned to service ending the LCO at 2107.

The day following the valve failures of December 26, 1990, the unit cooler for the west cable tunnel was removed from service at 0950 to facilitate inspection and repair of valve 46SWS-68. This placed the plant in a 24-hour LCO in accordance with Technical Specification Section 3.5. The hinge pin and swing arm were replaced with stainless steel components. The disc and attachment bolt were replaced with carbon steel due to the unavailability of stainless steel parts.

At 1050 the ten unit coolers located in both the east and west crescent areas were removed from service to facilitate inspection and repair of 4-inch header swing check valve 465WS-60A. This is also an 24-hour LCO in accordance with Technical Specification Sections 3.11.B and 3.5. The internals of this valve were replaced with stainless steel components.

At 1615 the west cable tunnel cooler was returned to service and postwork testing of valve 46SWS-68 was completed satisfactorily. The post-work testing of 46SWS-60A was completed satisfactorily. The ten east and west crescent area unit coolers were returned to service ending the LCOs at 1950.

Cause

The event was caused by the failure of the swing check valve discs to fully close under test conditions. The failure of the discs to swing closed was the result of excessive friction in the hinge pin mechanism of the valve. Opening the valves for inspection revealed the valve parts to be coated with mud, sand, and corrosion products. The hinge pin and hanger arm had a distinct gritty feel to them when they were hand-operated. Therefore, the excess fiction is attributed to the build-up of corrosion products and abrasive mud and sand between the hinge pin and hanger arm. Because accumulations of mud and sand had been cleaned from the service water pump suction bays only four months prior to this event, the sand and mud accumulation in the valves is viewed as an unavoidable result of the naturally occurring storms which cause turbulence and entrainment of sand and silt in the lake water which is the source of the service water. The corrosion between the carbon steel metal hinge and stainless steel hinge pin is an oxidation reaction resulting from the oxygen content and 360 micro mho conductivity of the lake water. The volume of service water flow, coupled with the return of the water to the lake, precludes treatment of the water to reduce the oxygen content or conductivity. The pH of the water is in the 7 to 9 range and is not viewed as a contributing factor to the corrosion.

NRC form 366A (9-83)	LICENSEE EVENT REPORT (LER) TEXT CONTINU	US NUCLEAR REI JATION APPROVED C EXPIRES 8/3	GULATORY COMMISSION DMB NO. 3150-0104 11/85
FACILITY NAME (1)	DOCKET NUMBER 12	LER NUMBER (6)	PADE (3)

	PURCHET NOMBEN (2)	LER NUMBER (6)	PAGE (3)
JAMES A. FITZPATRICK		YEAR SEQUENTIAL NEVISION NUMBER NUMBER	
NUCLEAR POWER PLANT	0 15 10 10 10 13 13 13	910 - 01215 - 011	014 05 017
			U GI OI U

As reported in LER-90-012, each of these five valves had previously been found stuck in a partially open position during inspection during the spring 1990 outage. They have closed satisfactorily during each of the four monthly surveillance tests prior to 11/15/90 and three times at two week intervals prior to this event on 12/26/90.

Analysis

This event is voluntarily reported under the provisions of 10CFR50.73 as being related to our previous voluntary report, LER-90-012, which involved similar conditions with the same valves. Available ESW flow to some coolers could have been less than the values assumed in the FSAR.

Four values of this event supply cooling water to three area unit coolers. These heat exchangers provide area ventilation cooling for portions of the 4 KV, 120 VAC, 600 VAC switchgear [EA, EB, EC, ED], the reactor protection syst m (RPS), and uninterruptible power supply (UPS) [EF] located in the west electric bay (Safety Division 1), the east electric bay (Safety Division 2), and the east and west cable tunnels (Safety Divisions 1 and 2) including both EDG [EK] switchgear rooms.

The coolers are designed to remove the normal heat load, which is approximately 50% greater than the post-accident heat load for the electric bays and 350% to 450% greater than the post-accident heat load for the cable tunnel and associated EDG switchgear room. The cooler design approximates counterflow air to water heat exchange.

Flow diagrams showing the SWS and ESW supply to each heat exchangers are attached as Figures 1 through 4. The tube side of each heat exchanger is normally provided with service water from a 3-inch line that branches off the SWS main header. Teeing into this line, just downstream of the 3-inch swing check valves (which failed to close in this event), are two 2-inch ESW supply lines. One of these supply lines is normally valved-in and is considered safety-related. The other line is normally valved-out and is not safety-related.

The crescent area unit cooler heat exchangers provide cooling for portions of the emergency core cooling system (ECCS) [BJ, BM, BN, BO] equipment located in the reactor building west crescent (Safety Division 1) (see Figure 5).

The coolers are arranged in a bank of five (5) and are designed such that four (4) of the five (5) are sufficient to remove the design basis heat loca.

Each cooler approximates a counterflow air to water heat exchanger. The tubce of each heat exchanger are normally provided with service water through a 6-inch header that tees off in two 4-inch headers

NRC Form 366A	y y A A A A A Million Route of A thread 2 A. Miles constructed by the Annual A state of Annual An	Constant and the second s	AND A RETAIL OF THE OTHER AND ADDRESS AND A PARTY COMPANY AND	U.S. NUCLEAR REC	ULATORY COMMISSION
	LICENSEE EVENT REPOR	T (LER) TEXT CO	NTINUATION	APPROVED O EXPIRES 8/3	MB NO 3150-0104 1/85
FACILITY NAME (1)		DOCKET NUMBER (2)	LER NU	WBER (6)	PAGE (3)

	100				- 18. L						1.61	A.NU	MBER	(6)						AGE (30	
JAMES A. FITZPATRICK									YEA	A PA		SEQU	MBE	AL		REVIE	ION BER	ann an ce				
NUCLEAR POWER PLANT				1.6	10				0.											0.5		
	14	0	10	10	0	3	3	3	17	V.	-	0	4	0	-	0	13	V	2	Or	0	1
EVT IN more anyone is see thank one additional bills? From Set al. 1917						-	-															

(1 per division). The 4-inch header contains the 4-inch swing check valve (46SWS-60A) which initially failed to close under test conditions. Downstream of this valve the header has five tee connections into 2-1/2-inch supply lines to each cooler. The ESW supply also ties into the same header downstream of the failed check valve. Upon initiation of the ESW, the service water check valve 46SWS-60A is designed to close to prevent diversion of ESW from the unit coolers.

The swing check valves in the SWS were operable in the open position and supplied adequate cooling water flow to the electric bay, cable tunnel area ventilation unit coolers and west crescent area coolers. However, it is possible that they may not have closed on reverse flow. If the service water pressure had failed, operators could have manually initiated the ESW system, which would then have injected into these coolers. The SWS swing check valves would then have been required to close to maintain full ESW flow through the unit coolers by preventing ESW flow diversion into the normal SWS. The ESW is not designed to have sufficient pumping capacity to supply both the ESW and SWS systems. Therefore, the ability of the ESW system to remove heat from the components it is designed to supply could have been reduced for a period of time usual the SWS supply lines to the unit coolers could have been isolated by closing local manual valves. These isolation valves (for the four SWS check valves supplying the electric bays) are in an accessible portion of the turbine building. The isolation valve for the west crescent area check valve is located in the reactor building. Accessibility could be hindered by a post LOCA environment. Normal operator walk-through monitoring of the spaces cooled by these systems following transfer to the ESW supply would identify any significant flow diversion (due to stuck open check valves) prior to the ambient air temperature exceeding equipment design temperature limits.

It was demonstrated during the surveillance test that a simple tap of a wrench of the valve bonnet was sufficient to result in closure of four of the five valves. An event of sufficient magnitude to shear a 3-inch supply line would probably have been of sufficient force to loosen the valve hinge mechanism and permit valve closure.

The more probable event is loss of SWS pressure due to SWS pump power supply failure. The inherent flow resistance of the SWS system would have resulted in a flow diversion less than that which would have resulted from a pipe break. Because the design heat removal capacity of the coolers for normal operation provides a margin of approximately 50% above the post-accident heat load for the electric bays and at least 350% for the east cable tunnel, the remaining ESW flow to these coolers may have been able to provide sufficient heat removal capacity to avoid a degradation of the safety functions of the equipment located in these spaces.

NRC Form 395A	analas a serenciamente e para e es as festas conservator a serenciamente e recentario e a serenciamente e a se	e in the distribution of the production of the second	U.S. NUCLEAR REQU	LATORY COMMISSION
LICENSEE	EVENT REPORT (LER) TEXT CON	TINUATION	APPROVED OM EXPIRES 8/31/	8 NO 3160-0104 85
FACILITY NAME (1)	DOCKET NUMBER (2)	LER NU	MBER (6)	PAGE (3)
IAMES A. FITZPATRICK	이번 관계에 한 것이라.	YEAR SEOL	MEER NUMBER	

0 5 0 0 0 3 3 3 9 0 - 0 2 5 - 0 1 0 6 OF 0 :

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

In contrast to the reduced heat loads during FSAR events in the electric bays and cable tunnels, the crescent area heat loads resulting from events postulated in the FSAR are on the order of five times the heat load present during normal operation. Thus the excess capacity of the electric bay and cable tunnel unit coolers is not present in the crescent area coolers. The available design margin provides for adequate heat removal capacity with four of the five unit coolers in operation. However, this margin is degraded by the flow limiting characteristics of the system piping and location within the ESW system, and by the degraded thermal performance of the unit coolers which was measured at 65 to 75 percent (for the 4 worst of 5 coolers) of the design value two weeks before this event.

Comparison of the measured (12/90) heat removal performance of the four unit coolers with the minimum heat removal required by a revised (1989) engineering calculation of crescent area heat loads during FSAR events, shows a positive margin of 25 percent. However, this assumes availability of design ESW flow. While ultrasonic measurements (12/90) indicate that design ESW flow is currently available, there was no excess flow capacity margin. Thus diversion of ESW flow due to the failure of check valve 46SWS-60A to close during some FSAR postulated events would offset at least a portion of the current 25% margin in heat removal capacity. A determination of the rate of the ESW flow diversion due to failure of the check valve in the open position would require an experimental flow measurement test or performance of a computer modeled engineering analysis. There was, therefore, a possibility of a temperature increase rate in the west crescent area in excess of that assumed in the FSAR conditions, if the crescent area service water supply check valve had stuck open during accident conditions. Based on a generalized engineering evaluation, the impact (due to reduction of west crescent cooling capacity) on the east crescent area temperatures would not be expected to impact operation of the core spray, low pressure coolant injection, and high pressure coolant injection systems that are located there.

The ability to manually isolate any of the check valves which failed would have mitigated the consequences of any event and ensured continued and adequate cooling capacity to the electric bays, cable tunnel, and crescent area. Accordingly, the failure of these five valves to close under test conditions would most probably not have had a significant adverse impact on plant safety in the event of the accident postulated in the FSAR.

Corrective Action

1. The valve internals for four valves were replaced with stainless steel components. Due to a lack of additional stainless steel parts only the hinge and swing arm were replaced with stainless

	LICENSEE EVENT REPOR	RT (LER) TEXT CONTINU	JATION	APPROVED (EXPIRES 8/	GULATOR DMB NO 3 31/85	Y COM	104			
ACILITY NAME	(1)	DOCKET NUMBER (2)	LER NUMBER (6)	P	AGE (3	3)			
JAMES	A. FITZPATRICK		YEAR BEQUENTIA	REVISION NUMBER		TT	T			
NUCLEA	R POWER PLANT	0 15 10 10 10 13 13 13	910 01215	011	017	OF	01			
EXT /// more apos	in in naquired, une additional NRC Form 3084(a) (17)	1-1-1-1-1-1-1-1-1-	12101 101212	1.1914	1-1-		-			
	steel on valve 46SWS-68. increase the service int reducing corrosion betwe clearances which allow e	It is anticipa erval for the hi en these compone ntry of foreign	ted that the nge pin and nts and redu material.	is will hanger ucing	arn	h by	Y			
2.	In November 1990, the fr increased from once each eight SWS to ESW swing c the open position by ser inspection frequency was of degraded check valve	equency of surve month to once e heck valves whic vice water flow. able to provide performance.	illance test very two wee h are normal This acce earlier ide	ting wa eks for lly hel lerated entific	the d in atic	on				
3.	These check valves will appropriate design durin	be replaced with g the 1991 Refue	valves hav ling Outage	ing a m	ore					
Addi	tional Information									
Fail	ed Component Data									
Name Desci Func	: ription: tion:	Service Wa Swing Chec Prevent em diversion water syst	ter Check Va k Valve ergency serv to the norma em in the ev	alves vice wa al serv vent of	ter vice Vicw	,				
Plant Manu Press Size Mater NPRD IEEE	t Component Identificatio facturer: l: sure Rating: : rial: 5 Vendor Code: 5 Component Code: Component Code:	n: 46SWS-60A, Velan Valv F-10-0114B 150 psig 3-Inch and Carbon Ste V085 VALVE V	ter pressure 67A, 67B, 6 e Corporatio -2T and B12 4-Inch el	e. 58, and on -0114B-	1 69 •2T					
Simi	lar Events									
LERs isola	88-005, 88-009, and 90-0 ation swing check valves able due to accumulation	12 reported simi in the service w of sediment and	lar events : ater flow pa corrosion of	in whic ath wer f valve	h ES e no par	w ts.				



67UC-16A

Figure 1 to LER 90-025-01 Docket No. 50-33

w



67UC-16B

Figure 2 to LER 90- 025-01 Docket No. 50-333



67E-11

Figure 3 to LER 90-025-01 Docket No. 50-33

20



67E-14

Figure 4 to LER 90-025-01 Docket No. 50-333

CRESCENT UNIT COOLERS



Figure 5 to LER 90-025-01 Docket No. 50-333