

Northern States Power Company

414 Nicollet Mall Minneapolis, Minnesota 55401-1927 Telephone (612) 330-5500

June 20, 1989

10 CFR Part 50 Section 50.73

Director of Nuclear Reactor Regulation U S Nuclear Regulatory Commission Attn: Document Control Desk Washington, DC 20555

> PRAIRIE ISLAND NUCLEAR GENERATING PLANT Docket Nos. 50-282 License Nos. DPR-42 50-306 DPR-60

Automatic Start of an Auxiliary Feedwater Pump Due to Failure of an Undervoltage Sensor

The Licensee Event Report for this occurrence is attached.

This event was reported via the Emergency Notification System in acordance with 10 CFR Part 50, Section 50.72, on May 22, 1989. Please contact us if you require additional information related to this event.

Muica Mock

Thomas M Parker Manager - Nuclear Support Services

c: Regional Administrator - Region III, NRC NRR Project Manager, NRC Senior Resident Inspector, NRC MPCA Attn: Dr J W Ferman

Attachment

IFIC I

8906281056 890 PDR ADOCK

NAC, For (9-83)	U.S. NUCLEAR REQUILATORY COMMINISSION APTROVED ONE NO 3150-0104 LICENSEE EVENT REPORT (LER) EXPIRES 8/31/85																				
RACILITY											DOCKET NUMBER	(2)		FAC	12 (3)						
- AUILIII	reading 11	PRA	IRTE	TSLAND NUC	TEAR CI	ENERA	TINC	PLANT	UNTT	1	0 15 10 10	1012	812	1 OF	0.14						
TITLE IA	ometi	c St	art o	f an Auxil	iary F	andua	tor I	ump D	ine to	Failure	of an Un	deruo	1+20	Sen	or						
EVI	INT DATE	(5)	FACILITIES INVO	TIES INVOLVED (8)																	
MONTH	INTH DAY YEAR YEAR SEDUENTIAL REVENON MONTH DAY YEAR FACILITY NAME												DOCKET NUMBER(S)								
											a second of second division in the second second	0 5	514001								
0 5	2 2	89	89	005	00	06	2 1	89	o cra E vi		of the following 13	0 15	0 1 0	101	1_1_						
OPE	RATING		THIS REI	PORT IS BUBMITTE	PURBUANT	TO THE R	EQUIREM	ENTE OF 1	V V	60 73(a)(2)(iv)	or the ronowing) (1	73	.71(b)								
		IN	20.	402(6)		80.36(c) (1)			60.73(a)(2)(v)		73	.71(c)								
LEVE		01.0	20	406(p)(1)(H)		50.36(c	(2)		-	50.73(a)(2)(vii)		01	THER ISA	ecity in Ab	C. Form						
	montration		20	406 (a) (7) (iii)		50.734)(2)(1)			50.73(a)(2)(viii)((A)	36	SA)	n CRAI, MR	C P prin						
			20	406 (a) (1) (iv)		80.73(a)(2)(4)			50.73(a)(2)(vill)	(86.)										
			20	406 (a) (1) (v)		50.734)(2)(16)			50.73(a)(2)(x)		1									
					1	ICENSEE	CONTACT	FOR THIS	LER (12)	and a sub-state of a sub-state of the sub-		TELEPHO	NE NUM	BER							
NAME											AREA CODE	T									
A	rne A	Hun	stad,	Staff Eng	gineer						61112	318	18 t-	1111	12 11						
				COMPLETE	ONE LINE FOR	EACH C	OMPONEN	TFAILURI	DESCRIBE	ED IN THIS REPOI	RT (13)										
CAUSE	SYSTEM	STEM COMPONENT MANUFAC REPORTAE						CAUSE	SYSTEM	COMPONENT	TURER	TO N	PRDS								
X	ĘС	x ₁ x		M141515	Y							_									
	1	1	11						1												
	de maner de service de s	An one was an an about the second	educ. 2005200000	SUPPLEME	NTAL REPORT	EXPECT	ED (14)				EXPECT	ED	MONTH	A DAY	YEAR						
YE	s lit yore, s	ompiete l	XPECTED	SUBMISSION DATE		2	NO X				SUBMISS DATE (1	10N 15)									
ABSTRA	On wit ind (MD. Ope nor to res the pum Inv had tran 2N4 DC ins	May h the icat: AFW) ratio mal. 4160 ulteo No. p at fai nsfer 927 tallo	22, 1 e DC ion o pump ons p How V bus d in 12 M 0219 gation led to trans rvolt ed on	989, both control po f an autom were rece ersonnel f ever, the 12 had tr a momentar DAFW pump . This wa n by plant o the de-e the alterr istor insi age sensor May 25, 1	units w ower to hatic si eived in found th Automat cansfer: cy loss to star is a nor c electric hate sou de the c was of 989.	were nons tart n the hat t tic B red t of D rt. SF ricia ed co urce. DC u otain	at 10 afegu of No cont he DO us Tr c its C cor Contr actu ins fo inditi Fun indervied fr	00%. lards o. 12 crol r C cont cansfe s alten trol col roc lation ound t con, w ther voltag	At 02 4160V motor coom. rol p r Swi rnate power oom op a of E that t hich inves ge sen te man	16 alarms buses 17 driven a Local in ower to 4 tch (ABT) source. to 41600 erators s SF equips he ABT D0 in turn of tigation sor had f ufactures	s indicat l and 12 auxiliary nvestigat 4160V bus) for DC This tr V Bus 12 stopped N ment. C undervo caused th found th failed. r, tested	ing t and feed ion b 11 w contr ansfe which o. 12 ltage e ABT at a A rep and	roub wate y as ol p r cau MDA sen to Moto lace	le r ower sed FW sor rola ment							

in.

LICENSEE EVENT REPORT (LER) TEXT CONTINUATION

U.S. NUCLEAR REGULATORY COMMISSION

to-

APPROVED DM8 NO. 3150-0104 EXPIRES 8/31/85

FACILITY NAME (1)	DOCKET NUMBER (2)	LER NUMBER (6)	F 408 (3)
		YEAR BEQUENTIAL AEVISION NUMBER NUMBER	
PRAIRIE ISLAND NUCLEAR GEN PLT UNIT	0 5 0 0 0 2 8 2	8 9 - 0 10 15 - 0 1 0	0 2 0 0 0 4
TEXT / M many space is required use addets of ALBC Form 2056 (1) (17)			

EVENT DESCRIPTION

NAC Form 366A

On May 22, 1989, both units were at 100%. At 0216 alarms (EIIS Identifier ANN) indicating trouble with the DC control power to nonsafeguards 4160V buses 11 and 12 (EIIS System Identifier ĒC) and indication of an automatic start of No. 12 motor driven auxiliary feedwater pump (EIIS Identifier P) were received in the control room. Local investigation by Operations personnel found that the DC control power to 4160V bus 11 was normal. However, the Automatic Bus Transfer Switch (ABT) for DC control power to 4160V bus 12 had transferred to its alternate source. Control room operators stopped No. 12 motor driven auxiliary feedwater pump at 0219.

The only loads on 4160V Buses 11 and 12 are the reactor coolant pumps and the main feedwater pumps. No. 12 motor driven auxiliary feedwater pump is designed to automatically start on the loss of both Unit 1 main feedwater pumps (both main feedwater pump breakers open). Operators confirmed through the use of electrical prints that a momentary loss of DC control power to 4160V Bus 12 would cause the No. 12 motor driven auxiliary feedwater pump to start. A work request was prepared by the control room operators at 0240 to initiate an investigation into why the 4160V Bus 12 ABT had transferred to its alternate source.

This was a non-ESF actuation of ESF equipment.

CAUSE OF THE EVENT

On a loss of the normal DC control power supply (DC panel 11), the ABT DC undervoltage sensor will de-energize, and if power is available from the alternate source (DC panel 21), the ABT will break its contact with the normal source and transfer to the alternate source.

The normal and alternate DC power sources were stable throughout the event. Investigation by plant electricians found that the ABT DC undervoltage sensor had failed to the de-energized condition, which in turn caused the ABT to transfer to the alternate source. Further investigation found that a Motorola 2N4927 transistor inside the DC undervoltage sensor had failed. The DC undervoltage sensor is continuously energized, and failure of the transistor after 15 years of service is not considered abnormal. LICENSEE EVENT REPORT (LER) TEXT CONTINUATION

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

1 ...

EXPIRES 8/31/85

FACILITY NAME (1)							DOCKET NUMBER (2)								Cred Holester	LER NUMBER (S)										PAGE (3)				
																*6	AR		960	JEN	TIAL ER		NUI	ISION MOER					In the second seco	
PRAIRIE	ISLAND	NUCLEAR	GEN	PLT	UNIT	1	0	15	10	10	0 0)	21	81	2	81	9		0	0	15	_	0	10	9	3	OF	0	14	
TEXT (If more space is required, use edditional NRC Form 366A 's) (17)								-	radoveza	andress	councile root		te quine refer	and a read of						herewas				or fe man result	Accessed				deserves	

ANALYSIS OF THE EVENT

NRC Form 366A

The purpose of the ABT's for 4160V Buses 11 and 12 is to ensure that DC control power is always available to the reactor coolant pump breakers. The ABT responded as designed to the momentary loss of normal DC control power voltage and transferred to the alternate DC control power source. The interruption in control power to 4160V Bus 12 was less than a second. The momentary loss of DC control power caused the auxiliary feedwater system circuitry to respond, as designed, to a sensed loss of both main feedwater pumps and to start No. 12 motor driven auxiliary feedwater pump. No. 12 motor driven auxiliary feedwater the control room operators determined that main feedwater flow was normal.

Since both the 4160V Bus 12 ABT and the auxiliary feedwater system responded as designed during this event and because all plant safeguards equipment remained available for service throughout this event, there was no effect on the health and safety of the public.

Since this event resulted in an unplanned automatic start of an engineered safeguards component, the No. 12 motor driven auxiliary feedwater pump, it is reportable pursuant to 10 GFR50.73(a)(2)(iv).

CORRECTIVE ACTION

The cause of the automatic transfer of 4160V Bus 12 DC control power to the alternate source was investigated by the plant electricians. The investigation found that a transistor in the ABT DC undervoltage sensor had failed causing the DC undervoltage sensor to fail in the de-energized condition.

A replacement DC undervoltage sensor was shipped from the manufacturer on May 23, 1989. The replacement was bench tested and installed in the ABT on May 24, 1989. To prevent an automatic start of No. 12 motor driven auxiliary feedwater pump during the restoration of the 4160 V Bus 12 DC control power to the normal source, control room operators placed the pump control switch in the shutdown-auto position. In the shutdown-auto position, the automatic start of the motor driven auxiliary feedwater pump on loss of both main feedwater pumps is bypassed. After the 4160V Bus 12 ABT had been transferred back to the normal source, the control room operators placed No. 12 motor driven auxiliary feedwater pump on loss of both main feedwater pumps is bypassed. After the 4160V Bus 12 ABT had been transferred back to the normal source, the control room operators placed No. 12 motor driven auxiliary feedwater pump control switch back in the auto position.

Replacement transistors have been obtained for the ABT DC undervoltage sensor that failed. Plant electricians will repair and test the faulty DC undervoltage sensor and will then return it to plant spares.

NRC Form 3865

LICENSEE EVENT REPORT (LER) TEXT CONTINUATION

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

tra.

																						5×1	PIRE	5 8/3	185				
FACILITY NAME (1)							DOCKET NUMBER (2)									LER NUMBER (6)									PAGE (3)				ACC SHOWING T
																480	A		510	UNE	TIAL	_	NUI	ISION MBER				Colores With	a quarter and a
PRAIRIE	ISLAND	NUCLEAR	GEN	PLT	UNIT	1	0	15	0	10	10	1	21	81	2	81	9	-	0	10	15	-	0	10	0	4	OF	0	14
TEXT III more space	Is required use	Additional NRC For	- 3/95.4 's	11171	constants in a star of the second	Log Specific Street		altercones	aktorican	othores	-	-		azzeda		france scooles		decen 400 400			abacence	alecereze	-				Arcenarda	******	discus of

FAILURE DATA

The ABT is a model RMT 1002AE manufactured by Russelectric of Hingham, MA. The failed DC undervoltage sensor within the ABT was a UB 200 UV sensor with a part number of CR-001-R79. The failed transistor is a Motorola 2N4927.

PREVIOUS SIMILAR EVENTS

There have been other automatic starts of auxiliary feedwater pumps, but this was the first failure of an ABF component at Prairie Island.