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NRC FORM 366 U.S. NUCLEAR REGULATORY COMMISSION					APPROVED BY OMB NO. 3150-0104 EXPIRES 04/30/98											
(4-96)	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 REDARDING 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 20603.							
FACILITY P	AME	(1)			· <u>····</u> ····					DOCKET N	UMBER (2)			P/	GENE (3)	
Browns	Fer	ry Ur	nit 2		<u></u>					-	050			1	OF 6	
Rod	Blc	ock	Mon	itor	Inoperabl	.e Duri	ng Co	ntro	l Ro	d Mor	vemen	it				
EVE	NT D	ATE (5)		LER NUMBER (6)	REPO	RT DA	TE (7)	[. 0	THER FACILIT	IES INVO	LVED (8	3)	
MONTH	DA	AY	YEAR	YEAR	SEQUENTIAL NUMBER	REVISION NUMBER	MONTH	DAY	YEAR	FACILITY				DOCKET	"	
08	16		1998	1998	002	00	09	15	1998	FACIUTY	NAME			DOCKET	OCKET NUMBER	
OPER/	ATIN	G		THIS REP	ORT IS SUBMITT	ED PURSU	ANT TO TH	IE REO	UIREMEN	TS OF	10 CFR	S: (Check on	e or more) (11)		
MOD	E (9)		1	20.2	201(b)		20.2203	3(a)(2)(v)	X	50.73(a)(2)(i)		50.73(a)(2)(viii)		
POV	VER			20.2	203(a)(1)		20.2203	B(a)(3)(i) 		50.73(a)(2)(ii)		50.73(a)(2)(x)		
LEVE	110	2	100	20.2			20.220				50.730	a)(2)(iii) 			IFR	
				20.2	203(a)(2)(iii)		50.36(c)	(1)			50.73	a)(2)(v)		Specify	In Abstract	
				2012	202(0)(2)(iu)		50 36(0)	1(2)		_	50 734	a)(2)(vii)		below or in NRC Form 366A		
				20.2	205(8/(2)(10)	LICENSEE	CONTACT	EOR 1	THIS LEB	(12)						
NAME										TEL	EPHONE N	UMBER (Include A	rea Code)	·····		
A. T. F	Roge	ers, S	Senior	Licensi	ing Project Ma	anager						(256)	729-2	977		
				CON	IPLETE ONE LINE	FOR EACH	COMPON	ENT FA	ILURE DE	SCRIBE	D IN THI	S REPORT (1	3)			
CAUSE	:	SYS.	тем	COMPON	IENT MANUFACTU	JRER REPOR	TABLE TO		, CAU	SE	SYSTEM	COMPONENT	MANUFA	FACTURER REPORTABLE TO NPRDS		
													,			
				SUPPLE	MENTAL REPORT	EXPECTED	(14)				EXP	ECTED	MONTH	DAY	YEAR	
YES	es, c	omple	te EXP	ECTED S	UBMISSION DAT	E).)		DA	TE (15)				
ABSTRA	Du Du Op coi Teo init	(Limit peration ntrol chnic tiatec	to 140 the we ons p rod w cal Sp d corre	00 spaces eekly su ersonne hich sho ecificati ective m	, i.e., approximat rveillance proc I observed bot ould not have c on (TS) Limitin aintenance.	ely 15 singl cedure to o h channel caused this ng Conditio	e-spaced t exercise is of the i s condition on for Op	ypewri fully v Rod B on. O peratic	tten lines withdraw lock Mo peration on (LCO) (16) /n cont onitor S ns pers) for th	roi rods system onnel e e RBM	on August (RBMS) by Intered the S being inc	16, 199 passed appropr perable	98, Uni for a iate and	12	
	Tro on por spo (N Be RE col inc	ouble ly un tentic ecify UMA caus SMS nditic opera	eshoot der a omete the a .C) Po ce this in Oct on pro	ing on the specific or. Englin djustme wer Ran conditio tober, 19 hibited her hibited her	he RBMS iden set of circums neers at Gener nts necessary nge Neutron M on could have 997, TVA is rep by the plant's T ompletion of ap	tified that stances, d ral Electric in the new onitoring existed ur porting this fechnical s	the syste ue to lack Nuclean vly install System (ader limit s event p Specifica required a	em fai k of ac r Ener led Nu PRNM ed cir oursua itions action	led to o djustme gy (GEI uclear M MS) and cumstan nt to 10 based c s.	perate nt of a NE) fai leasure RBMS RBMS CFR 5	correct previou led to p ement A S. nce the 50.73(a channe	ly for selec usly uniden properly doc analysis and installation)(2)(i)(B), a els of the R	ted cont tified cument a d Contro n of the s any op BMS be	and and ols current ceratio ing	s, - n or	
	98(PDF S	292	2004 ADOC	1 980 K 050	9915 100260 PDR								•			

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NRC FORM 3	366A		U.S. NUCLEAR REGULATORY	COMMISSION						
(4-96)	LICENS	EE EVENT REPORT (LEI	R)							
	FACILITY NAME (1)	DOCKET	LER NUMBER (6)	PAGENE (3						
			YEAR SEQUENTIAL REVISION	2 OF 6						
Browns Fer	ry Unit 2	05000260	1998 002 00							
EXT (If mor	e space is required, use additional copies of NR	C Form 366A) (17)								
I. PL	ANT CONDITIONS									
At sh	the time of the event, Units 2 and 3 wer utdown and defueled.	e in Mode 1 at 100 and 87 per	rcent power respectively. Unit	1 was						
II. DE	SCRIPTION OF EVENT		•							
Α.	Event:		•							
	On August 16,1998, during the weekly performance of Unit 2 Surveillance Requirement (SR) 3.1. Control Rod Drive (CRD) [AA] Exercise for Fully Withdrawn Control Rods, the operator noticed the RBMS channels were bypassed following selection of a non-edge control rod. This condition sho have caused either channel to bypass. The surveillance procedure was stopped and the appropr LCO was entered for both RBMS channels being inoperable. Unit 3 does not have this type of R design and it was verified that the current Unit 3 RBMS does not exhibit the problem.									
	Interim corrective actions were establis exercising continued on August 17, 199 potentiometer was not properly adjuster post-maintenance testing verified that t	hed in order for the RBMS to 6 98. Troubleshooting and corre d. On August 21, 1998, poten he RBMS was operating satist	operate properly and control ro ctive maintenance revealed th tiometer adjustments were ma factorily.	od nat a ade and						
	Because this condition could have exis RBMS in October, 1997, TVA is reportin or condition prohibited by the plant's Te inoperable without completion of applic	ted under limited circumstance ng this event pursuant to 10 C chnical Specifications based o able required actions.	es since the installation of the FR 50.73(a)(2)(i)(B), as any o on both channels of the RBMS	current peration being						
в.	Inoperable Structures, Components	s, or Systems that Contribut	ed to the Event:							
	None.									
C.	Dates and Approximate Times of Ma									
	October, 1997	NUMAC PRNMS and R outage.	BMS installed during Unit 2 re	efueling .						
	August 16, 1998 1029 hours CDT	Operations personnel d entered a TS LCO	eclared the RBMS inoperable	and						
	August 17, 1998 1813 hours CDT	 Administrative measure RBMS problem and cor 	es incorporated to compensate ntrol rod exercising continued.	e for the						

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PC FORM 2	66A		U.S. NUCLEAR REGULATORY C	OMMISSION
ас гоям З 1-95)	DOA			
	LICENSEE EVEN	T REPORT (LEI	R).	
	TEXT CON	TINUATION		
	FACILITY NAME (1)	DOCKET	LER NUMBER (6)	PAGENE (
		•	YEAR SEQUENTIAL REVISION	3 OF 6
rowns Fer	nvllnit 2	05000260	1998 002 00	
			<u> </u>	
EXT (If more	e space is required, use additional copies of NRC Form 366A	/ (17)		
D.	Other Systems or Secondary Functions Affect	ed:		
	<u></u>			
	None.			
F	Method of Discovery:			
L.	memod of Discovery.			
	During performance of weekly control rod exercis	e, Operations perso	onnel observed the RBMS not	
	functioning properly.			
F.	Operator Actions:			
•		ta a successful anten	ad the energy into TC I CO for t	ha
	The operators noticed the RBMS was not function RBMS being inonerable, and initiated corrective r	ning properly, enter	TS LCO was met by placing bot	ne h
	channels of the RBMS in trip.	namenance. The		•••
			· · · · ·	
⁻ G.	Safety System Response:			
	None			
III. CA	USE OF THE EVENT			
Α.	Immediate Cause:			
7.0	, ,			
	The RBMS automatically bypassed during a certain	in sequence of cont	rol rod selection and failed to in	itiate
	a null sequence to adjust RBMS setpoints when re	equired.	•	
В.	Root Cause:			
2.	<u></u>			
	GENE failed to properly include in its non-propriet	ary documentation	sent to purchasers of its NUMA	C
	PRNMS and RBMS the information necessary to e	ensure that Reactor	Manual Control System (RMC)	5) and d
	RBMS signal conditioning interface circuit potentic			
С.	Contributing Factors:			
,				
	None.		, ' '	
IV. AN	IALYSIS OF THE EVENT		b.	
<i></i>				
			·	46.0
Th	e RBMS is provided to prevent control rod withdraw	wai when reactor po I rod block at certa	in setnoints By initiating a cont	
roc	t withdrawal block, the system will prevent local fue	el damage as a res	ult of a single rod withdrawal err	ror
un	der the worst permitted condition of RBM bypass.	The RBMS has two	o channels, each of which uses i	input
sig	nals from a number of Local Power Range Monitor	r (LPRM) channels.	A trip signal from either RBMS	S
ch	annel can initiate a rod block. One RBMS channel	may be bypassed	without loss of function. The Reasonable to the Reas	BMS IS
au	tomatically bypassed if a peripheral control rod is s		The I PRM signals used denen	J de on

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NRC FORM 366A (4-95)		U.S.	NUCLEAR REG	ULATORY	COMMISSION			
LICENSEE EVEI TEXT CON	NT REPORT (LE	R)						
FACILITY NAME (1)	DOCKET		LER NUMBER (6)	PAGENE (3)			
		YEAR	SEQUENTIAL NUMBER	REVISION	4 OF 6			
Browns Ferry Unit 2	05000260	1998	002	00				
EXT (If more space is required, use additional copies of NRC Form 366.	<i>A)</i> (17)							
the control rod selected for withdrawal or insertion. The control rod selected for withdrawal or insertion. The to reinitialize each RBMS channel and calculate the that will adjust the average to 100%. Thereafter, und LPRM average to obtain the RBMS signal value. The setpoints.	average of the relat il another rod is sele a RBMS signal valu	ed LPRM ected, the le is com	d, a full sequ detectors an gain factor is pared to the f	id a gain f s applied RBMS trip	factor to the			
On August 16,1998, during the weekly performance of 2-SR-3.1.3.2, CRD Exercise for Fully Withdrawn Control Rods, the operator noticed that both RBMS channels were bypassed following selection of a non-edge control rod which should not have caused a bypass condition. Operations personnel immediately stopped the CRD exercise, entered the appropriate TS LCO and initiated corrective maintenance. The TS LCO was met by placing both channels of the RBMS in trip.								
Site Engineering and Instrument Maintenance person assistance from GENE personnel. Further investiga null sequence upon selection of a control rod in the s signal conditioning circuit potentiometer adjustment. make the necessary potentiometer adjustment. TVA and completed the potentiometer adjustment on Aug RBMS was functioning properly.	nnel commenced tro tion revealed that th same RBMS rod gro GENE provided TV personnel impleme just 21, 1998. Post-	oubleshoo e system up. The /A persor ented the maintena	oting activities was not initia problem was nnel with instr instructions in nce testing v	s with ating a RE traced to ructions to n a work o rerified tha	BMS a order at the			
TVA replaced the existing Average Power Range Mo the Unit 2 Cycle 9 refueling outage. The potentiome personnel involved in preparation and approval of the installation. Therefore, the PMT scope did not include Specifically, the PMT scope did not include selecting that the null sequence initiation signal was being pro was simulated by performing a wire lift and reland. sequence but did not account for the actual RMCS n smaller than the pulse width generated from a wire lif set to detect 7 millisecond pulses from the RMCS will range. Consequently, not all RMCS null initiation pulse prevented	onitor (APRM) and R ter (R77) adjustmen e modification PMT de testing of this part control rods within perly generated. Ins This resulted in satis ull initiate signal pul ft and reland. The F nich typically produc lses were being dete s than 4 millisecond	BMS with t was not package t of the R the same stead, the factory of se width R77 poter es pulses ected. Th s to ensu	h a NUMAC F i dentified by at the site du BMS internal RBMS rod g RMCS null i peration of th which is cons thiometer was in the 4 to 8 he R77 potent re that all suc	PRNMS d GENE to uring the s I circuitry. proup to en initiate sig te RBMS siderably s found to milliseco tiometer v ch signals	luring system nsure nal null be nd was are			

The null sequence functions to reinitialize the setpoints applied for a rod block. The RBMS null sequence can be initiated from two sources. Selecting a control rod generates a unique rod group contact closure which is scanned by the RBMS and results in a null sequence being performed. Also, a null sequence can be initiated through the RMCS and RBMS signal conditioning circuit upon control rod selection. Therefore, selecting a control rod in a different control rod group would initially cause the null sequence to be performed via the unique control rod group selection logic path. Selecting a control rod within the same group does not result in a change in the unique control rod group contact which is closed thus leaving only the RMCS and RBMS signal conditional in certain circumstances because of the potentiometer setting. This resulted in erroneous RBMS setpoints being applied only during certain control rod manipulations.

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IRC FORM	366A		U.S. NUCLEAR REGULATORY	COMMISSION
4-95)	LICENSEE EVEN	IT REPORT (LE	R)	i.
	TEXT CON	TINUATION		
		DOCKET	LER NUMBER (6)	PAGENE (3
		,	YEAR SEQUENTIAL REVISION	FOFE
		05000260		50-0
Browns Fe	erry Unit 2	05000280	1998 002 00	
EXT (If mo	ore space is required, use additional copies of NRC Form 366A	17)		
		2		
V. A	SSESSMENT OF THE SAFETY CONSEQUENCES			
Ti Se M at po rc D or at	he RBMS is designed to limit control rod withdrawal etpoint during control rod manipulations. It serves to linimum Critical Power Ratio (MCPR) Safety Limit v utomatically bypassing only during a unique set of co ower ascension, the system performed satisfactorily ods were being selected in a sequential pattern row b ecalculate the rod block signal when a rod adjacent t uring this unique pattern of control rod selection, the ut. Therefore, no significant changes in power would t no time was a safety limit exceeded while the RBM	if localized neutron b block further contri- iolation. Troublesh onditions. During n . However, during f by row. Therefore, o the selected rod v e control rod is typic d occur during this IS was not operable	a flux exceeds a predetermined rol rod withdrawal to preclude a ooting revealed that the system formal control rod withdrawals f the control rod exercise, the co the null sequence was failing to was in the same RBMS rod gro cally moved a single notch eithe set of circumstances. Furtherm e.	n was for ntrol o up. er in or nore,
Ti oj is R 11 B S(he RBMS is not considered a safety system but is a perator to prevent a single operator error or equipme a local power control system and is not used to con eport, analysis has shown that even with multiple op 0 CFR 20 dose event is not credible. ased on the above, and considering that the RBMS et of circumstances, it is concluded that there is no a	n operational system ent malfunction from itrol bulk power. As perator errors concu would have failed t adverse impact on s	m for the purpose of backing up n causing fuel damage. The R s stated in the Final Safety Ana urrent with equipment malfunction o operate only during a very lin safety as a result of this event.	o the BMS lysis ions a nited
VI. C	ORRECTIVE ACTIONS			
Α	. Immediate Corrective Actions:			
	Operations implemented an administrative contro setpoint calculation when required and did not im control rod.	ol to ensure the RBI properly bypass the	MS performed a null sequence RBMS function for any applic	able
в	. Corrective Action to Prevent Recurrence:	F		
	TVA will review the resolution to the GENE intern potential for future events of this nature have bee	al Corrective Action en addressed. ¹	n Report to assess whether the	
·	TVA will review PRNMS and RBMS design docur verify that all potential analog adjustments have I revision of vendor documents. ¹	nents including a v been identified and	isual inspection of the system t assist GENE in documentatior	o I and
•	TVA will implement the necessary procedural con analog adjustments. ¹	ntrols to periodically	verify proper PRNMS and RB	MS
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NRC FORM 3	66A		U.S.	NUCLEAR REG	ULATORY	COMMISSION				
LICENSEE EVENT REPORT (LER)										
	FACILITY NAME (1)	DOCKET	L YEAR	ER NUMBER (6 SEQUENTIAL	REVISION	PAGENE (3)				
Browne For	ny Unit 2	05000260	1998	OO2	00	00F0				
EXT (If more	e space is required, use additional copies of NRC Form 366A)	(17)								
VII.	ADDITIONAL INFORMATION									
А.	Failed Components:									
	None.									
в.	Previous Similar Events:									
	LER 296/97005 was similar in that it identified a condition prohibited by the plant's Technical Specifications reported under 10 CFR 50.73(a)(2)(i)(B). The root cause was that the Operations crew lacked a questioning attitude regarding an inoperable primary containment isolation valve. No corrective actions in the previous LER would have prevented the occurrence of the condition described in this report.									
	No other LERs have been issued which involve a involve a failure to enter an LCO.									
	LER 260/96006 was similar in that the General Electric provided BFN with non-conservative inform regarding the Safety Limit Minimum Critical Power Ratio (SLMCPR). The root cause of the event error in the application of the methodology used to determine SLMCPR. This condition was report under 10 CFR 50.73(a)(2)(v) as any event or condition that alone could have prevented the fulfiller the safety function of the structures or systems required to mitigate the consequences of an accide corrective actions in the previous LER would have prevented the occurrence of the condition describes this report.									
1	No other LERs have been issued which involve ver	ndor supplied info	rmation.		•					
VIII.	COMMITMENTS				•					
No	ne									
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