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LEVINE, J.M. Arizona Public Service Co. (formerly Arizona Nuclear Power RECTP.NAME RECTPIENT AFFILIATION	
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SUBJECT: LER 88-016-03:on 880514, reactor trip following earlier than	, I
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TITLE: 50.73/50.9 Licensee Event Report (LER), Incident Rpt, etc.

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	REG FILE 02	ī	ī	RES/DSIR/EIB	1	1
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EXTERNAL:	EG&G STUART, V.A	4	4	L ST LOBBY WARD	1	1
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PALO VERDE NUCLEAR GENERATING STÂTION P O BOX 52034 • PHOENIX, ARIZONA 85072-2034

 192-00666-JML/TRB/DAJ May 25, 1990

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

Dear Sirs:

Subject: Palo Verde Nuclear Generating Station (PVNGS) Unit 1 Docket No. STN 50-528 (License No. NPF-41) Licensee Event Report 1-88-016-03 File: 90-020-404

Attached please find Supplement No. 3 to Licensee Event Report (LER) No. 1-88-016-00 prepared and submitted pursuant to 10CFR50.73. As discussed with Mr. J. B. Martin, this supplement is being provided to update the results of APS' investigations and to provide a current status of the corrective actions. In accordance with 10CFR50.73(d), we are forwarding a copy of the LER to the Regional Administrator of the Region V office.

If you have any questions, please contact Mr. Thomas R. Bradish, Compliance Manager at (602) 393-2521.

Very truly yours,

JML/TRB/DAJ/tlg

Attachment

cc:

(all w/attachment)

- J. B. Martin
- A. C. Gehr

W. F. Conway

- D. H. Coe
 - T. L. Chan
 - J. R. Newman
 - INPO Records Center

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NRC FORM 366 (6-89)	C FORM 366 U.S. NUCLEAR REGULATORY COMMISSION APPROVED OMB NO. 3150-0104																	
	LICENSEE EVENT REPORT (LER) LICENSEE EVENT REPORT (LER) AUXION COLLECTION REQUEST: 50.0 HRS. FORM COMMENTS REGARDING BURDEN ESTIMATE TO THE REC AND REPORTS MANAGEMENT BRANCH (P-530), U.S. NUC REGULATORY COMMISSION, WASHINGTON, CC 20555, AI							TH THIS RWARD ECORDS UCLEAR AND TO										
													OF MANAC	RWORK REDUCT	TION PROJ DGET, WAS	ECT (3)	150-0104), N, DC 205	OFFICE
FACILITY NAME	(1)		• •	1									l°.	OCKET NUMBER	(2)		PA	GE (3)
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EVENT DAT	E (5)		ل معتقد ا	ER NUMBER	6) 1.3521 e	EVISION	RE	PORT DA	TE (7	"			OTHER F	ACILITIES INVO	LVED (8)			
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YES (11 yes,	complete E	XPECTE	ed sub	MISSION DAT	E/			X NO						DATE (1	5)			
Assimate the second second and the second se																		
There have been no previous similar events reported pursuant to 10CFR50.73.					l													
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NRC Form 366 (6	89)					-												

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NRC FORM 366A	U.S. /	UCLEAR REGULATORY COMMISSION	APPROVED OMB NO. 3150 0104				
10-43) *		(50)	EXPIRES: 4/30/92				
	LICENSEE EVENT REPORT (LER)	INFORMATION COLLECTION REQUEST: SOO HRS. FORWARD COMMENTS REGARDING BURDEN ESTIMATE TO THE RECORDS				
	TEXT CONTINUATION		AND REPORTS MANAGEMENT BRANCH (P-330), U.S. NUCLEAR REGULATORY COMMISSION, WASHINGTON, OC 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)				
			VEAR WINDER NUMBER				
Palo Verde U	Jnit 1 .	0 5 0 0 0 5 2 8	8 8 - 0 1 6 - 0 3 0 2 OF 2 1				
TEXT (If more space is required, use a	dditional NRC Form 366A'sJ (17)						
This is a	supplement to LER 1-88.	016-02.					
I. DESC	RIPTION OF WHAT OCCURRE	ED:					
Α.	Initial Conditions:						
	On May 14, 1988, Palo normal operating temp in progress following occurred approximatel	o Verde Unit 1 was a perature and pressur a trip from 91 per y 38.5 hours earlie	in Mode 3 (HOT STANDBY) at re. A reactor startup was rcent power which had er.				
В.	Reportable Event Desc Times of Major Occurr	cription (Including cences):	Dates and Approximate				
	Event Classification:	3					
•	Automatic actuation of prohibited by the pla	Automatic actuation of the Reactor Protection System. Condition prohibited by the plant's Technical Specifications.					
·	On May 14, 1988, Palo Verde Unit 1 was in Mode 3 (HOT STANDBY) conducting a reactor (AC)(RC) startup. During the reactor startup, the reactor achieved criticality prior to that calculated by the Estimated Critical Condition (ECC). Since there was a significant discrepancy between the plant response and the ECC, control room supervision (utility, licensed) decided to insert Control Element Assemblies (CEA)(AA) to calculate a new ECC. As the CEA's were being inserted, a reactor trip occurred at approximately 0335 MST on May 14, 1988. The trip was uncomplicated and the plant was immediately stabilized in Mode 3.						
1	The startup began at Shutdown (SD) CEA's b reactor had been shut the trip. The Estima inches withdrawn on H concentration of 1033 The Primary Operator the SD banks and the Withdrawal of the Rea MST.	approximately 0100 panks and the Part 1 down for approxima- ated Critical Rod Pa Regulating (Reg) Gro ppm presuming a s (utility, licensed PLCEA's at approxim gulating Groups bega	MST by withdrawing the Length CEA's (PLCEAs). The tely 38.5 hours prior to osition per the ECC was 90 oup 4 with a boron tartup time of 0000 MST.) completed withdrawal of mately 0159 MST. an at approximately 0304				
r.	The count rate, obtain approximately 300 count inches withdrawn. The 410P-1ZZO3, "Reactor withdrawn in 30 inch	ined from the Start ints per second (cp ne startup was condu Startup", with the increments per ste	up Channels (IG)(XI), was s) when Reg Group 1 was 0 ucted in accordance with regulating CEA's being p 4.3.12. After each				
NRC Form 366A (6-89)			······································				

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NRC FORM 366A	U.S. 1	NUCLEAR REGULATORY COMMISSION	APPROVED OMB NO. 1150	0.0104	
(6-89)			EXPIRES: 4/30/92		
	LICENSEE EVENT REPORT (TEXT CONTINUATION	LER)	INFORMATION COLLECTION REQUEST: 500 HRS, FORMA COMMENTS REGARDING BURDEN ESTIMATE TO THE RECOL AND REPORTS MANAGEMENT BRANCH (P-530), U.S. NUCLE REGULATORY COMMISSION, WASHINGTON, OC 20555, AND THE PAPERWORK REDUCTION PROJECT (31500104), OF OF MANAGEMENT AND BUDGET, WASHINGTON, OC 20503.		
FACILITY NAME (1)		DOCKET NUMBER (2)	LER NUMBER (6)	PAGE (3)	
			YEAR SEQUENTIAL REVISION		
Polo Vordo	Unit 1	0 15 10 10 10 1 512 18		013 05 2 11	
TEXT (If more spece is required, o	UTLL I -			015 012 11	
	 withdrawal increment, rate/power level to s Advisor (STA) (utilit each 30 inch withdraw being withdrawn even level be recorded and reaching 60 inches wi The Primary Operator 4.3.12 of the procedu increments. When Reg Primary Operator (uti count rate and was to the count rate was ap to have doubled twice CEA's. Since critica Supervisor (CRS) (uti Insertion Limits (PDI Specification LCO's 3 enter Mode 2 (STARTUP CEAs in Reg Group 3 m the count rate stable Operator pulled Reg G CEA's were being with were deenergized in a 2000cps. Power level (IG) after observing power channel. Upon reaching 45 inch was still not definit Since the reactor was commenced pulling Reg withdrawal from 45 in taking approximately inch withdrawal, the supercritical and, he inches and 60 inches. actually based on the increasing power level actually brought to a 	a pause was establ tabilize. Addition y, licensed) was re- al. This was start though the procedur plotted with each thdrawn on Reg Grou (utility, licensed) re and withdrew Reg Group 3 was withdn lity, licensed) que Id that it had stat proximately 1277 cp since beginning th lity was imminent, lity, licensed) che Ls) of Specificatio .0.4 and 3.1.3.6 sp with Keff greater must be at least 60 at approximately 1 froup 3 to 45 inches drawn to 60 inches for a supercritical cond drawn to 60 inches for drawn for far pro- drawn far for far pro- drawn fa	ished to allow count hally, the Shift Techn cording count rate af ied when Reg Group 1 w to only requires that 30 inch withdrawal af up 3 and thereafter. complied with section Groups 1 and 2 in 30 tawn to 30 inches, the estioned the STA conce oilized (the STA noted os). Count rate was n he withdrawal of Reg G the Control Room ecked the Power Depend on, 3.1.3.6. Technical becify that in order to than or equal to 1.0 inches withdrawn. Wi 1277 cps, the Primary s withdrawn. While th the startup channels procedure at approxim d on the log power chan the startup channel an g Group 3, the startup ower level had stabili the Primary Operator hes withdrawn. The CE was made in three step complete. After the 1 the reactor was sligh CEA position was betwee use of criticality is positive startup rate a on. Thus, the reactor dition.) bt allow power to except itiated CEA insertions ent power. The CRS th	Aical Ster As power Ster on o inch erning I that hoted froup lent co o, the th ately mnels ad log o rate zed. A os 5 htty end an that co o o the that co o o the that co o o the that co o o the that co o o the that co o o the that co o o the that co o o the that co o o the that co o o the that co o o the that co o o the that co o o the co o o the co o o the co o o co the co o co co co co co co co co	

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NRC FORM 366A	U.S. 1	NUCLEAR REGULATORY COMMISSION	
(639)	LICENSEE EVENT REPORT (TEXT CONTINUATION	APPROVED OMB NO, 3150-0104 EXPIRES: 4/30/92 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, OC 20555, AND TO THE PAPERWORK REDUCTION PROJECT (3150-0104), OFFICE OF MANAGEMENT AND BUDGET, WASHINGTON, OC 20503.	
FACILITY NAME (1)		DOCKET NUMBER (2)	- LER NUMBER (6) PAGE (3)
			YEAR WESEQUENTIAL REVISION
Palo Verde	Unit 1	0 15 10 10 10 15 12 1 9	
TEXT (If more space is required, u	se edditional NRC Form 366A'sI (17)		
C.	 se additional NRC Form 3004(9)(17) conferred with the Sh their was a significat the ECC, they decided and investigate the d insert Reg Group 3 to who then complied. I inches withdrawn for When the CEA's reacher auxiliary trip was ge (CPU) (JC) Channels B Reactor Trip Switchge channels "A" and "D" immediately stabilize Assistant Shift Super Reactor trip and perfinitiated. The reactor was subcr Engineered Safety Fearequired. The Emerge classification was ma During APS's Post Tri the reactor had gone on Group 3. Based up withdrawn, Unit 1 ope Specification 3.0.4 i meeting the condition Status of structures, at the start of the e Not applicable - no sinoperable at the start of the etal component. 	ift Supervisor on w nt discrepancy betw to insert Reg Grou eviations from the 0 inches was given t should be noted t approximately 2 min d approximately 25 nerated by Core Pro and C on high Radia ar (SWGR) operated tripped as expected d in Mode 3. The e visor (utility, lice formance of the appr fitical at the time tures (ESF) actuation critical between 50 on criticality bein frated in a condition in that criticality as of LCO 3.1.3.6. systems, or compon- terent that contribut structures, systems, art of the event while ent or system failur	what action to take. Since ween the plant response and ap 3 to 0 inches withdrawn ECC. The direction to a to the Primary Operator that Reg Group 3 was 60 outes, 39 seconds. inches withdrawn, an otection Calculators (CPC) al Peaking Factors. The as designed, and CPC d. The plant was event was diagnosed by the censed) as an uncomplicated copriate procedure was of the trip. No tons were received or nitiated and no emergency h, it was determined that 0 and 55 inches withdrawn ng achieved below 60 inches on prohibited by Technical was achieved without hents that were inoperable ted to the event: , or components were ich contributed to the re, if known: failures occurred.
Е.	Failure mode, mechani known:	.sm, and effect of e	each failed component, if
,	Not applicable - no c	component failures o	occurred.

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NRC Form 366A (6-89)

		APPROVED OMB NO. 3150-0104			
		EXPIRES: 4/30/92			
CENSEE EVENT REPORT (TEXT CONTINUATION	LER)	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 2055, AND TO THE PAPERWORK REDUCTION PROJECT (3150-0104), OFFICE OF MANAGEMENT AND BUDGET, WASHINGTON, DC 20503.			
	DOCKET NUMBER (2)	LER NUMBER (6) PAGE (3)			
		VEAR WWSER WUMBER			
it 1 .	0 5 0 0 0 5 2 8	8 8 - 0 1 6 - 0 3 0 5 OF 2 1			
onal NRC Form 366A's) (17)	-				
For failures of comp systems or secondary	onents with multip functions that wer	le functions, list of ce also affected:			
Not applicable - no	component failures	occurred.			
For failures that rendered a train of a safety system inoperable, estimated time elapsed from the discovery of the failure until the trains were returned to service:					
Not applicable - no safety system inoper	failures occurred w able.	which rendered a train of a			
Method of discovery of each component or system failure or procedural error:					
There were no compon discussed in Section review process condu	ent or system failu I below were ident cted by APS.	ares involved. The errors ified during the post trip			
Cause of Event:					
The cause of the rea the CPC's. The Auxi Radial Peaking Facto were being inserted conservatively high trip when Group 3 is are not bypassed.	ctor trip was an Au liary Trip resulted rs being generated below 30 inches. I Radial Peaking Fact less than 95 inche	exiliary Trip generated by I from conservatively high as Regulating Group 3 CEA's In general, the cors may result in a reactor es withdrawn and the CPC's			
APS procedures delin reset until Reg. Gro 95 inches. The CPC' withdrawn sufficient below the auxiliary position was approxi- reactor went critica trip buffers had not the CPC's to record APS could have verif the CPC simulator, i inches withdrawn on generated by the CPC though the actual tr re-creation of the e this was the cause o	eate that the CPC t up 3 is withdrawn t s cannot be reset u ly to reduce the in trip setpoint (at t mately 27 inches wi l with Group 3 belo been reset, this r actual trip data. ied the presence of t was later verifie Reg Group 3, an aux 's due to high Radi ip buffers for the vent using the CPC f the reactor trip.	crip buffers are not to be to greater than or equal to inless Reg Group 3 is integrated one-pin peak value the time of this event, that thdrawn). Since the ow 95 inches and the CPC resulted in the inability of If the data was available, If the data was available, If the auxiliary trip. Using that at less than 30 ciliary trip was correctly al Peaking factors. Even event were unavailable, the Simulator verified that			
	LENSEE EVENT REPORT TEXT CONTINUATION TEXT CONTINUATION For failures of comp systems or secondary Not applicable - no For failures that re estimated time elaps trains were returned Not applicable - no safety system inoper Method of discovery procedural error: There were no compon discussed in Section review process condu Cause of Event: The cause of the rea the CPC's. The Auxi Radial Peaking Facto were being inserted conservatively high trip when Group 3 is are not bypassed. APS procedures delin reset until Reg. Gro 95 inches. The CPC' withdrawn sufficient below the auxiliary position was approxi reactor went critica trip buffers had not the CPC's to record APS could have veriff the CPC simulator, i inches withdrawn on generated by the CPC though the actual tr re-creation of the e this was the cause o	TEXT CONTINUATION It 1 0 [5 0 0 0 5 2 8 Outward form 355449(10) For failures of components with multiply systems or secondary functions that were not applicable - no component failures For failures that rendered a train of a estimated time elapsed from the discover trains were returned to service: Not applicable - no failures occurred a safety system inoperable. Method of discovery of each component or procedural error: There were no component or system failed discussed in Section I below were ident review process conducted by APS. Cause of Event: The cause of the reactor trip was an At the CPC's. The Auxiliary Trip resulted Radial Peaking Factors being generated were being inserted below 30 inches. I conservatively high Radial Peaking Factors delineate that the CPC trip when Group 3 is less than 95 inche are not bypassed. APS procedures delineate that the CPC to reset until Reg. Group 3 is withdrawn to 95 inches. The CPC's cannot be reset or withdrawn sufficiently to reduce the ir below the auxiliary trip setpoint (at to position was approximately 27 inches witherawn sufficiently to reduce the ir below the auxiliary trip setpoint (at to position was approximately 27 inches witherawn on Reg Group 3, an augenerated by the CPC's due to high Radithough the actual trip buffers for the re-creation of the event using the CPC this was the cause of the reactor trip.			

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NRC Form 366A (6-89)

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NRC FORM 366A	U.S. /	NUCLEAR REGULATORY COMMISSION	APPROVED OMR NO. 115	
(6-89)	LICENSEE EVENT REPORT (TEXT CONTINUATION	LER)	EXPIRES 4/30/92 EXPIRES: 4/30/92 ESTIMATED BURDEN PER RESPONSE T INFORMATION COLLECTION REQUEST COMMENTS REGARDING BURDEN ESTIM AND REPORTS MANAGEMENT BRANCH REQUATORY COMMISSION, WASHINGT THE PAPERWORK REDUCTION PROJEC OF MANAGEMENT AND BUDGET, WASHI	O COMPLY WTH THIS 500 HRS. FORWARD IATE TO THE RECORDS (#530), U.S. NUCLEAR ON, DC 20555, AND TO T. (3150-0104), OFFICE NGTON, DC 20503.
FACILITY NAME (1)	,	DOCKET NUMBER (2)	LER NUMBER (6)	PAGE (3)
Palo Verde Unit	: 1	0 5 0 0 0 5 2 8	8 8 - 0 1 6 - 0 3	060F21
	The cause of the cond Specifications where limits of LCO 3.1.3.6 personnel (utility, 1 be less conservative reactor startup. It personnel did not act the approach to criti at the time. During personnel correctly p responded to alarms a trips. However, APS conservatism utilized was not in accordance considered to be cogn room supervision (uti concern, APS performe results of this evalu no unusual characteri to this event. Some of the informati personnel was later d The Control room pers to the nonconservative room personnel contai inaccuracy in the com xenon level and (2) a deviation from the pr approach to criticali the projected startup caused a positive rea controls available for the conditions presen determined to be inad Core Data book did no Group 3 below 60 inch plot) was not require reached 60 inches wit	ition prohibited by n the reactor achie has been determined icensed) performand than appropriate for was determined that with the desired of cality based upon to the approach to cri- erformed and follow nd permissives to b Management consider based upon indicat with management ex- itive personnel err lity, licensed). A d a Control Room St ation are provided stics of the work 1 on being utilized b etermined to be ind onnel's use of this re actions. The ECC ned inaccuracies wh puter program which startup procedure ojected startup tin ty, approximately 3 of time. During this activity change). The time integrate as and an inverse ad by procedure to b indrawn. Review investigation being utilized for at System (RCS) (AB of boron concentration of lifference between	y the plant's Technica aved criticality below be to be control room be which was considered or the situation during the control room conservatism in performation availant ticality, the control wed procedures and bypass High Log Power as that the degree of tions of early criticant operations and is that the degree of tions of early criticant appetations and is that the degree of tions of early criticant appetations and is the control Room the part of control as a result of this taff Evaluation. The in Section V. There to calculate the control being utilized by control to calculates transient which allowed a 4 hou ne (At the time of the 3.5 hours had elapsed as time period, Xenon of the information and bom personnel in evaluated to criticality we ased upon the fact that and the control form on, a concern arose the determining boron level in may not have provided ion. Engineering the boronometer and the indicated boron	Al v the ed to ig the cming able l room ality htrol were buted late. ited ontrol (1) an t ur e from decay uating re at the or M p 3 hat vels ed

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NRC FORM 366A (6-89)	U.S. 1	NUCLEAR REGULATORY COMMISSION	APPROVED OMB NO. 315	0.0104
	LICENSEE EVENT REPORT (TEXT CONTINUATION	LER)	EXPIRES: 4/30/92 ESTIMATED BURDEN PER RESPONSE T INFORMATION COLLECTION REQUEST: COMMENTS REGARDING BURDEN ESTIM AND REPORTS MANAGEMENT BARANCH REGULATORY COMMISSION, WASHINGT THE PAPERWORK REDUCTION PROJEC OF MANAGEMENT AND BUDGET, WASHI	O COMPLY WTH THIS 50.0 HRS. FORWARD ATE TO THE RECORDS (P530), U.S. NUCLEAR ON, OC 20555, AND TO T (3150-0104), OFFICE VGTON, DC 20503.
FACILITY NAME (1)		DOCKET NUMBER (2)	LER NUMBER (6)	PAGE (3)
			YEAR SEQUENTIAL REVISION	
Palo Verde	e Unit 1	0 5 0 0 0 5 2 8	8 8 - 0 1 6 - 0 3	0 7 0F 2 1
TEXT (If more space is required	1, use additional NRC Form 366A'sI (17)	· · · · ·		1
	concentration and the result of normal syst concentrations. No s	value obtained by em inaccuracies at system malfunctions	chemical analysis was different boron occurred.	; the
J.	Safety System Respons	e: .		
	Reactor Protection Sy MST on May 14, 1988.	stem Actuation occu	rred at approximately	7 0335
ĸ.	Failed Component Info	rmation:		
	Not applicable - Ther	e were no component:	: failures.	
II. AS	SSESSMENT OF THE SAFETY CO here were no safety consequent. As described above, afety responses necessary unctioned properly. The criticality earlier that onsequences or implication ith the CEA's below the tra- peration in this condition ursuant to ACTION "a" of I imit for less than 10 minut Specification 3.1.3.6 are nutdown margin is maintain otential effects of a CEA evels. The function of the hat the reactor remains sur anticipated operational ary throughout the core life eactor coolant system (RCS ondition occurs at the end onload operating temperature ine break accident and the nalysis of this accident, ontrol the reactivity trans and offsite dose criteria are proximately 120 parts per hutdown margin requirement	NSEQUENCES AND IMPI uences or implication the reactor trippe to place the plant an calculated in the s. As described at ansient PDIL limit is permitted for u LCO 3.1.3.6. The CH ites. It should be the established to en- ned and at the same ejection accident and occurrence. Shutdo ife as a function of S) cold leg temperate i of core life, with are, and is associate the specified shutdo is resulting uncontro- the specified shutdo as determined that r million greater the ts.	JCATIONS OF THIS EVEN ons resulting from the ed as designed and all in a stable condition e ECC had no adverse so pove, Unit 1 was critic of Specification 3.1. up to two (2) hours EA's were below the PI noted that the PDIL 1 have that an adequate time ensure that the are limited to accepta requirement is to ensure a design basis accide own margin requirement f fuel depletion and ture. The most restrict h cold leg temperature ted with a postulated olled RCS cooldown. down margin is require hat the fuel performant analysis of the condi- the boron concentration han necessary to meet	VT: his afety ical 3.6. DIL limits able hre dent ts ictive e at steam In the ed to nce tions on was

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NRC FORM 366A		U.S,	NUCLEAR REGULATORY COMMISSION	APPROVED OMB NO. 3150-0104			
(6-89)		LICENSEE EVENT REPORT	(LER)	EXPIRES: 4/30/92 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 IP-5301, U.S. NUCLEAR REGULATORY COMMISSION, WASHINGTON, DC 20555, AND TO THE PAPERWORK REDUCTION PROJECT (31500104), OFFICE OF MANAGEMENT AND BUDGET, WASHINGTON, DC 20503.			
FACILITY NAME (1)			DOCKET NUMBER (2)	LER NUMBER (6) PAGE (3)			
				YEAR SEQUENTIAL REVISION NUMBER			
Polo Vo	rda IIr						
TEXT (If more space is n	quired, use	edditional NRC Form 366A's) (17)					
111.	CORR	ECTIVE ACTIONS:	1				
	Α.	Immediate	•				
		When control room per criticality had been appropriate actions w it in a safe condition the problems with the	sonnel (utility, li achieved earlier th were taken to shutdo on by inserting Grou ECC could be inves	icensed) noted that nan calculated in the ECC, own the reactor and place up 3 to zero inches until stigated.			
		As described above, to being inserted below the trip, control roo appropriate action to condition.	the reactor trip occ approximately 25 in om personnel (utilit o ensure that the pl	curred as the CEA's were nches withdrawn. Following ty, licensed) took the lant was in a safe			
	Β.	Action to Prevent Rec	currence:				
		Appropriate procedure precautions were implemented to ensure that control room personnel were aware of the possibility of reactor trips when Regulating Group 3 CEA's were less than 95 inches withdrawn and the CPC's were not bypassed.					
		Note: This conservati be required. T procedural prec	ism with the CPC's h The CPC software has cautions are no long	has been determined not to s been revised and the ger necessary.			
		Concerning the cognit wherein non-conservat appropriate disciplin	cive personnel error cive operator perfor nary action and cour	rs described in Section I.I rmance was involved, nseling was taken.			
		Concerning the error	in the ECC, the fol	llowing actions were taken:			
		* The ECC and Rea require that the ECC must be with criticality.	actor Startup proced ne projected time of thin one hour of the	dures were modified to f criticality used for the e actual time of			
		* The computer pr was modified.	cogram which calcula	ates transient xenon levels			
		* RCS boron samp boronometer rea to be operating	les were utilized fo adings until the ins g properly.	or plant startup in lieu of strumentation was verified			
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NRC FORM 366A (6-89)		S. NUCLEAR REGULATORY COMMISSION	APPROVED OMB NO. 3150-0104	
	LICENSEE EVENT REPORT TEXT CONTINUATION	(LER)	EXPIRES: 4/30/92 ESTIMATED BURDEN PER RESPONSE TO COMPLY W INFORMATION COLLECTION REQUEST: 500 HRS. FC COMMENTS REGARDING BURDEN ESTIMATE TO THE R AND REPORTS MANAGEMENT BRANCH (P-530). U.S. N REGULATORY COMMISSION, WASHINGTON, DC 20555, THE FAPERWORK REDUCTION PROJECT (31500104), OF MANAGEMENT AND BUDGET, WASHINGTON, DC 201	TH THIS DRWARD ECORDS UCLEAR AND TO OFFICE 503.
FACILITY NAME (1)		DOCKET NUMBER (2)	LER NUMBER (6) PAGE	(3)
			YEAR WESEQUENTIAL WEREVISION	
Palo Verde	Unit 1	0 5 0 0 0 5 2 8	8 8 - 0 1 6 - 0 3 0 9 0	2 1
TEXT (If more space is required, u	se edditionel NRC Form 366A's) (17)			
	 * Information an plots earlier 	nd direction for star in the startup proce	ting inverse count ratio ess were implemented.	1
	 * An engineering methodology wa appropriate co 	analysis on the exi as performed. Based ontrols were implemer	sting ECC calculation upon this analysis, nted.	1
	Concerning the infor reactor, the follow	mation and methodolo ing corrective action	ogy for starting up the ns were taken:	1
	* The integrated included in th	l CEA worth curves be ne Core Data Book.	elow 60 inches have been	
	* The reactor st information co	cartup procedure was ontained in the Core	revised to include the Data Book.	1
	* A reactor eng be in the Con the appropria	ineer (utility, non-l crol Room (NA) during ce administrative cha	licensed) was required to g reactor startups until anges were completed.	1
	As a result of the (corrective actions v	Control Room Staff Ev vere taken:	valuation, the following	1
	* A review of the event was con- was promulgate communication	ne Control Room commu ducted and guidance of ed. (The results of s are discussed in Se	nnications during this on declaring criticality the review of Control Room ection VI.A.)	
	 Management is: adopt a conset are other that 	sued a letter remind rvative approach when n expected.	ing all plant personnel to n conditions or indications	I
	* A Human Perfo performed by described in a	rmance Evaluation Sys the STA Group. (The Section VI.A.)	stem evaluation was results of the HPES are	
IV. Pre	evious Similar Events:			
The 100 ant Uni (RF LEF des	FRS0.73 involving a re FRS0.73 involving a re FRS0.73 involving a re FL LER 88-011-00 when FF) utilized by the CPC 88-011-00, the conser FL Sign of the CPC softwar	us similar events rep actor trip following However, a similar tr overly conservative resulted in a reactor vative RPF values we e. APS has modified	ported pursuant to a criticality earlier than rip occurred as reported in Radial Peaking factors or trip. As discussed in re part of the original the software.	1

NRC Form 366A (6-89)



NRC FORM 366A	U.S	NUCLEAR REGULATORY COMMISSION	APPROVED OMB NO. 3150-0104					
(6-89)	LICENSEE EVENT REPORT TEXT CONTINUATION	(LER)	EXPIRES: 4/30/92 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)					
	,		YEAR WEATHAL WARER					
D-1- V	and a Hada 1							
TEXT (If more space is r	erge Unit i							
٧.	ADDITIONAL INFORMATION							
	A. The following inform Room Staff Evaluatio	ation was developed n conducted by APS:	as a result of a Control					
	SHIFT SUPERVISOR (Ut	ility, Licensed)						
	The Shift Supervisor intention to maintai response and therefo specifics of the cri the SS concurred wit CEA's be reinserted Supervisor should ha	The Shift Supervisor (SS) was in the "horseshoe" area. It was his intention to maintain a broad perspective on overall plant response and therefore was not directly involved with the specifics of the criticality. When he was consulted by the CRS, the SS concurred with the CRS's recommendation that the Group 3 CEA's be reinserted to 0 inches. APS believes the Shift Supervisor should have been more involved in this evolution.						
	CONTROL ROOM SUPERVI Licensed)	SION/ASSISTANT SHIFT	SUPERVISOR (Utility,					
	The CRS was directin using the correct pr proceeding in a cont discussed the potent due to Xenon decay w Operator indicated h	The CRS was directing the reactor startup activities. The CRS was using the correct procedure for the evolution. The startup was proceeding in a controlled and "unhurried" manner. The CRS had discussed the potential for criticality earlier than anticipated due to Xenon decay with his Primary Operator. The Primary Operator indicated he understood the discussion.						
ć	When Group 3 was at based on the count r very close to 60 ind between the suspecte on Group 3 and the F have taken a more co prior to continuing inches, the CRS reco during the last rod Operator to maintair rated thermal power	30 inches, it was an ate information, the hes. Due to the app d early criticality CC of 90 inches on C nservative approach the startup. When H gnized that the reac withdrawal. He then reactor power less while he consulted of	pparent to the CRS that, e reactor would go critical parent large difference of approximately 60 inches Group 4, the CRS should and reevaluated the ECC Reg Group 3 was at 60 ctor had gone critical n directed the Primary than 1E-03 percent of with the SS.					
	It was the understan actually pulling CEA The CRS, upon recogn Primary Operator, "W This was done in ord criticality. In thi with his communicati what information he reactor, i.e. ,by as also be recognized to	ding of the CRS that is is the one who act dizing that the react that are the indicat ler to prompt the ope s case the CRS should ons to the Primary (wanted with respect that there were no for	t the Reactor Operator tually "calls" criticality. tor was critical, asked the ions of criticality?". erator to "call" ld have been more direct Operator with regard to to the condition of the r critical?" It should ormal guidelines regarding					

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NRC FORM 366A	U.S. I	UCLEAR REGULATORY COMMISSION		
(6-89)			APPROVED OMB NO. 3150 0104 EXPIRES: 4/30/92	
	LICENSEE EVENT REPORT (TEXT CONTINUATION	LER)	ESTIMATED BURDEN PER RESPONSE TO COMPLY INFORMATION COLLECTION REQUEST: SOU HRS. F COMMENTS REGARDING BURDEN ESTIMATE TO THE AND REPORTS MANAGEMENT BRANCH (P-S30), U.S. I REGULATORY COMMISSION, WASHINGTON, DC 20555 THE PAPERWORK REDUCTION PROJECT (31500104) OF MANAGEMENT AND BUDGET, WASHINGTON, DC 20	WTH THIS FORWARD RECORDS NUCLEAR S, AND TO), OFFICE 0503.
FACILITY NAME (1)		DOCKET NUMBER (2)	LER NUMBER (6) PAGE	E (3)
			YEAR WESTER	
Palo Verde	Unit 1 .	0 5 0 0 0 5 2 8	818 - 011 6 - 013 111 0	F 2 1
TEXT III more space is required,	use additional NRC Form 366A'sI (17)	· · · · · · · · · · · · · · · · · · ·		
	who on the Control Ro criticality." APS Ma directed that the evo	oom staff should or anagement believes olution be stopped	must "declare that the CRS should have when it became apparent	İ
	that criticality coul	ld be achieved earl	ier than anticipated.	ł
	Following the Reactor maintain their safety Mode 3.	r Trip, the CRS dir 7 functions and the	ected the Operators to plant was stabilized in	
	Nuclear Operator (NO)) III - PRIMARY OPE	RATOR (Utility, Licensed)	
	The Primary Operator the CRS. He observed where the Log Power (become "active." Bas Operator, he believed 60 inches withdrawn of Primary Operator to is reactor at less than CRS. Before the read data could be taken, Therefore, criticality Control Room logs. Of Control Room logs as The indications prese	was pulling the CE i the power level i Channel could be by sed on the intervie i the reactor to be on Reg Group 3. Ac insert the CEA's in 1E-03 percent powe etor was stabilized it was decided to ty was not formally Criticality should a late entry.	A's under the direction of ncrease above the point passed and the CPC channels w with the Primary critical at approximately tions were taken by the order to maintain the r at the direction of the and the critical point reinsert Group 3. stated nor entered in the have been entered in the	
	subsequent withdrawal The Primary Operator indications, and at 1 conservative action v to continuing the Sta recognized indication the CRS.	Is would be very ne should have shown least questioned, t would have been to artup. The Primary hs of criticality p	ar, if not at, criticality. more concern with these the CRS. A more recalculate the ECC prior Operator should have rior to being "prompted" by	
-	APS believes the Prin evolution when it be achieved earlier than NO III - SECONDARY O	mary Operator shoul came apparent that n anticipated. PERATOR (Utility, L	d have stopped the criticality would be icensed)	1
	The Secondary Operato preparation for second	or was performing t ndary plant startup	he Main Turbine Warmup in	
	NO III - CONTROL ROOM	1 (Utility, License	d)	
	Was not directly invo	olved in startup.		
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NRC Form 366A (6-89)

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NRC FORM 366A		NUCLEAR REGULATORY COMMISSION		
(6-89)	0.3,		APPROVED OMB NO. 3150-0104 EXPIRES: 4/30/92	
	LICENSEE EVENT REPORT TEXT CONTINUATION	(LER)	ESTIMATED BURDEN PER RESPONSE TO COMPLY WTH 1 INFORMATION COLLECTION REQUEST: 500 HRS. FORW. COMMENTS REGARDING BURDEN ESTIMATE TO THE RECO AND REPORTS MANAGEMENT BRANCH (P-530), U.S. NUCL REGULATORY COMMISSION, WASHINGTON, DC 2055, AND THE PAPERWORK REDUCTION PROJECT (31500104), OFF OF MANAGEMENT AND BUDGET, WASHINGTON, DC 2050,	THIS ARD RDS EAR D TO FICE
FACILITY NAME (1)		DOCKET NUMBER (2)	LER NUMBER (6) PAGE (3)	
			YEAR WWWSEQUENTIAL WREER	
Palo Verde	Unit 1.	0 15 10 10 10 15 12 18	88-0116-0131120F	2 1
TEXT (If more spece is required, a	se edditionel NRC Form 366A's1 (17)			
	SHIFT TECHNICAL ADVI	SOR (Utility, Licen	sed)	
	The Shift Technical the startup and reco withdrawal of the Sh indicated that the c of the rod withdrawa in providing this in would have provided their nearness to cr	Advisor (STA) was o rded count-rates pe utdown groups and R ount rates had doub 1. The STA should formation to the Co additional indicati iticality.	bserving the progress of riodically during egulating groups. He led twice during the course have been more aggressive ntrol Room staff. This on to the Control Room on	1
,	APS Management belie involved in monitori communication that t have recommended to became apparent that anticipated.	ves that the STA sh ng the startup acti he reactor was near the SS that the evo criticality could	ould have been more vities and providing direct ing criticality. He should lution be stopped when it be achieved earlier than	1
В.	During the ENS notif trip occurred as the calculate a new ECC, reactor was approach was not discussed th criticality or that	ication, it was dis CEA's were being i and the CEA's were ing criticality pri at the reactor had the PDIL's had been	cussed that the reactor nserted in order to being inserted since the or to the ECC. However, it achieved earlier exceeded.	1
,	APS believes that th been discussed in a	e criticality and P subsequent ENS repo	DIL information should have rt.	
	Investigation into t addressing whether a applicable. Based u Department Instructi notifications was de additional administr more explicit direct	his aspect of the e dditional reporting pon the results of on prescribing the veloped. As an imm ative controls were ions for NRC notifi	vent was performed requirements were the investigation, a requirements for NRC ediate corrective action, promulgated to provide cations.	
	The results of this	investigation are p	rovided in Section VI.D.	
c.	Exact discussions of available in the var determined that chan techniques.	the event were imp ious logs. APS eva ges were required t	acted by information luated this aspect and o enhance the log keeping	
	The results of this VI.C.	evaluation are disc	ussed in Section VI.A and	
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}	Ĺ	ICENSEE		REPORT (LER)		INFOR COMM	ENTS	ION REC	COLLE	STION G BUR	REQUEST	SOO H	RS. FOR	CORDS
		, revi	001111				AND F REGUI THE F	LATO	RTS IRY (RWO	MANAG COMMIS RK REC	SION,	T BRANCH WASHING N PROJE	TON, DC CT (3150	0.5. NU 20555, A -0104), (OFFICE
FACILITY NAME (1)					DOCKET NUMBER (2)				INGTON,	PAGE (3)					
FACILITY NAME (I)					VEAR WINDER (6)			4	PAGE						
Dala Vand		1								UMBER		NUMBER	1		
Palo verde	e Unit	1	•		0 5 0 0 0 5 2 8	8	8 J8	-	0	116	<u> </u> _	0 3	13	} OF	2 1
TEXT (If more space is rea	quired, use add	titional NRC For	m 366A'3) (17)						- 1	f					
	D .	As pre	viousi	y ciscuss ed as a i	ed, additional eva	aru nt	acı in	on: bot	s/: th	inve the	SCI	gatic	ons		I
		report	ing/no	tificatio	on aspects and in t	the	ar	ea	0	£ Hu	man	L			
		Perfor	mance	Evaluatio	on System. Based u	upo	n t	:he	r	esul	ts	of th	nese		ı
		evalua	ltions	Supplemen	nt No. 2 to this re	epo	rt	wa:	S	issu	ed.				
		The re	sults	of the Hu Section	man Performance Ev VT A	val	uat	io:	n	Syst	em	revie	ew ar	e	
		concar													
VI.	SUPPL	EMENTAL	. INFOR	MATION	1										
	The i	- f	itan tu	this co	tion is provided a	20	. r			+	' A D	C1 e			1
	inves	nrormac tigatio	on into	the circ	cumstances surround	as din	ar	:he	e.	vent	de	scrib	oed i	n	1
	this	LER.					Ŭ								
	•	A			, duated to oddroga	+h			~~	~~~	1 do	nri fi	ind		
	А.	during	the a	n was con pproach t	co criticality on M	un May	14	, .	19	88.	Th	e °	Leu		
		evalua	ition w	as perfor	med using the INPO	ой	luma	in 1	Pe	rfor	man	ce			
		Evalua	tion S	ystem (HI	PES) which was deve	elo	ped	l sj	pe	cifi	cal	ly fo	or 		
		During	sing n the H	PES evalu	ation, the problems a	ac ms	ide	nt:	ar if:	pow ied	dur	ing t	:he		
		Post T	rip Re	view (PTH	() process and disc	cus	sed	l iı	n	Sect	ion	I.I.	wer	е	
		analyz	ed. T	he HPES i	is intended to iden	nti	fy.	the	e_	"cau	sal	fact	ors"		
		the HE	ing th	e root ca lustion	uses discussed in additional problem	Se mg	CC1 Wer	.on 'e	. L idi	.⊥. enti	AL	so au d and	iring 1		
•		analyz	ed.	ituación,	addicional problem		wei			~		u un	-		
		The fo	llowin	g provide	es a summary of the	e H	IPES	c c	on	cerr	ıs e	valua	ated		
		and th	neir re	spective	corrective actions	s.									
		1.	Critic	ality was	s not declared by t	the	Co	nt	ro	1 Rc	om	stafi	E whe	n	
			Correc	tive Act	ions:								•		•
			OULIEC	CIVE NCC.		_	_					-			
			a.	Job perfe	ormance standards a	and	l re	qu	ir no	emer	125 1114	for t	the	A	
				declarat:	ion of reactor stat	tus	: W6	ere	d d	evel	.ope	d and	1		1
				implement	ced.						•				1
			b.	Procedure	es, instructions, a	and	i pı	og	ra	ms v	ere	revi	Lsed	to	I
				incorpor	ate the specific re	equ	iire	eme	nt	s ar	ıd				
				responsi	oility for declarin	ng	cri	ti	ca	Lity	· •				
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NRC FORM 366A	U.S.	NUCLEAR REGULATORY COMMISSION	APPROVED OMB ND 3150.0104
LICENS	SEE EVENT REPORT	(LER)	EXPIRES: 4/30/92 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 131500104), OFFICE OF MANAGEMENT AND BUDGET, WASHINGTON, DC 20503.
FACILITY NAME (1)		DOCKET NUMBER (2)	LER NUMBER (6) PAGE (3)
	,	,r	YEAR SEQUENTIAL A REVISION NUMBER
Polo Vordo Unit 1		0 15 10 10 10 15 10 10	
TEXT If more space is required, use additional NRG	C Form 366A'sI (17)		
· · · · · · · · · · · · · · · · · · ·	c. Simulato on-the-j responsi status b develope	r training (initial ob training were re bility it is for th ased upon the polic d.	and requalification) and vised to address whose e declaration of reactor ies and procedures
2.	The Control Ro reactor startu Reg Group 3 CE became apparen Power Dependen	om Supervisor (CRS) p even though count A's were withdrawn t that criticality t Insertion Limits	did not terminate the rate nearly doubled when from 0 to 30 inches and it would be achieved near the (PDIL's).
	Corrective Act	ions:	
•	a. A policy between develope incorpor procedur training	which requires mor members of the Cont d and implemented. ated into the Condu e and subsequently	e formal communications rol Room staff was The policy was ct of Shift Operations incorporated into simulator
	b. The admi in Contr as neces effectiv	nistrative procedur ol Room operations sary to ensure that ely utilized on shi	es governing the STA role were reviewed and revised the STA is more ft.
	c. Simulato a large (ECC) an provided	r training involvin error between the E d the actual critic	g scenarios where there is stimated Critical Condition al condition is being
3.	The reactor wa	s taken critical be	low the PDIL's.
	(Note: A cont on duty was a	ributory factor in relief crew SS fill	this concern is that the SS ing in for the normal SS).
	Corrective Act	ions:	
	a. Guidance conduct consiste members.	was established on of operations betwe ncy between the on-	the standardization and en crews to ensure shift and replacement crew
	b. Simulato a large conditio	r training involvin error between the E n is being provided	g scenarios where there is CC and the actual critical

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NRC FORM 366A (689)		NUCLEAR REGULATORY COMMISSION	APPROVED OMB NO. 3150 0104 EXPIRES: 4/30/92 ESTIMATED BURDEN PER RESPONSE TO COMPLY WTH THIS
TEXT	CONTINUATION		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)
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	arm 3664'st (17)	0 5 0 0 0 5 2 8	88 - 016 - 03 15 F 21
	c. The operation instructe operation involved and ensur prior to	ations crew supervised regarding their ns including that the in critical evolut ring all aspects of task performance.	sion involved have been re- responsibilities for unit hey should be directly ions by providing guidance the task are understood
4.	The ECC used for (approximately criticality was however, it was establish a new was only used to Corrective Act	or the startup was of 3 hours and 25 min s achieved). An EC s not finalized nor w boron concentration to predict the expen- ion:	calculated for 0000 MST utes prior to the time C for 0200 was calculated; was it utilized to on. The 0200 calculation cted change due to xenon.
	The ECC and Rea require that th ECC must be with criticality.	actor Startup proce he projected time o th in one hour of t	dures were modified to f criticality used for the he actual time of
5.	APS's HPES inve that the Primar the reactor to 30 inches and 4	estigation identifier ry Operator did not criticality when Re 45 inches.	ed as a concern the fact recognize the nearness of eg Group 3 was withdrawn at
	NOTE: Subsequer was aware Reg Group	ntly, the Primary Op e that the reactor o p 3 was withdrawn a	perator has stated that he was near criticality when t 30 inches and 45 inches.
	Based upon the actions were de	HPES concern, the seveloped:	following corrective
	Corrective Act	ions:	
· .	a. An evalua startup (practical to instru of this e sufficien continues requireme	ation of the Primar to determine if he l knowledge skills ument indications w evaluation indicate nt practical knowle s to maintain his 1 ents.	y Operator involved in the possessed sufficient in applying reactor theory as performed. The results that the RO possessed dge. The individual icense qualification

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NRC FORM 366A (6-89)			U.S. 1	NUCLEAR REGULATORY COMMISSION	APPROVED OMB NO. 315	00104
	LICENSE	E EVEN CONTI	T REPORT (NUATION	LER)	EXPIRES: 4/30/92 ESTIMATED BURDEN PER RESPONSE T INFORMATION COLLECTION REQUEST: COMMENTS REGARDING BURDEN ESTIM AND REPORTS MANAGEMENT BRANCH REGULATORY COMMISSION, WASHINGT THE PAPERWORK REDUCTION PROJEC OF MANAGEMENT AND BUDGET, WASHI	O COMPLY WTH THIS 500 HRS. FORWARD ATE TO THE RECORDS (P-530), U.S. NUCLEAR ON, OC 2055, AND TO T (3150-0104), OFFICE NGTON, DC 20503.
FACILITY NAME (1)				DOCKET NUMBER (2)	LER NUMBER (6)	PAGE (3)
					YEAR NUMBER NUMBER	
Palo Verde Ur	nit 1			0 5 0 0 0 5 2 8	8 8 - 0 1 6 - 0 3	16 OF 21
TEXT (// more spece is required, use e	daitoonei NKC +0	b.	" Simulator off-norma reactor to concentra being con theory to other meto critical	training was revi al startup scenario crip or when errors ation are present). nducted to ensure t plant operations chods allowed by th CEA position or Bo	sed to include non-id s (e.g., shortly afte in boron or xenon Simulator training hat operators can app by applying 1/M plots e procedure for deter ron concentration.	eal or r a is ly and mining
	6.	Rod W inche	orth data s were not	for Reg Groups 1 a t included in the C	nd 2, and Group 3 bel ore Data Book.	ow 60
		Corre	ctive Acti	lons:		'n
		a.	The revie has been	ew process for chan upgraded.	ges related to core r	eloads
		b.	The proce reviewed adequate	edural controls for and revised to ens ly meets the needs	the Core Data Book w ure that the data pro of the users.	ere vided
		с.	The train Engineeri staff has knowledge	ning and qualificat ing Evaluations Dep s been upgraded to e of the effect of	ion requirements for artment Reactor Engin include an integrated core reloads.	the eering
	7.	New c facto conce 011-0 peaki Corre	ore reload rs associa rn is also 0 involvin ng factors ctive Acti	d calculations incl ated with Reg Group o related to the ev ng a reactor trip c s.) lons:	uded high radial peak 3 CEA's. (Note: Th ent described in LER aused by conservative	ing is 88-
		a.	A more es establisi concernin	Efective and produc ned with Combustion ng specific operati	tive interface has be Engineering (CE) ng practices at Palo	en l Verde.
		Ъ.	The revie has been	ew process for chan reviewed and upgra	ges related to core r ded.	eloads
		с.	The train Fuels Man has been	ning and/or qualifi nagement staff resp reviewed and upgra	cation requirements f onsible for core relo ded as necessary.	or the ads
		d.	Transien made ava:	t Data Acquisition ilable to the Safet	System (IQ) data is b y Analysis group.	eing
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NRC FORM 366A	U.S	NUCLEAR REGULATORY COMMISSION	APPROVED OMB NO. 3150 0104	
LICEN	SEE EVENT REPORT XT CONTINUATION	(LER)	EXPIRES: 4/30/92 ESTIMATED BURDEN PER RESPONSE TO COMPLY INFORMATION COLLECTION REQUEST: 500 HRS. COMMENTS REGARDING BURDEN ESTIMATE TO TH AND REPORTS MANAGEMENT BRANCH (P.330). U.S. REGULATORY COMMISSION, WASHINGTON, DC 205 THE PAPERWORK REDUCTION PROJECT (3150-01C OF MANAGEMENT AND BUDGET, WASHINGTON, DC	WTH THIS FORWARD E RECORDS NUCLEAR 55, AND TO 14), OFFICE 20503,
FACILITY NAME (1)		DOCKET NUMBER (2)	LER NUMBER (6) PA	3E (3)
Palo Verde Unit 1		0 15 10 10 10 1 51 2 1 8		DF 211
TEXT (If more space is required, use additional NA	RC Form 366A'sJ (17)			!
8.	The "Xenon" co reactivity due incorrect coef	mputer program used to xenon had large ficients.	to calculate the uncertainties due to	
	Corrective Act	ion:		
	The administra program (e.g. distribution of upgraded. The the Xenon prog Determining xe criticality wi effect of xeno	tive control requir determining and ver coefficients) were e upgraded administr gram is sufficiently enon worth during tr th xenon present, a on on shutdown margin	ements for the Xenon ifying the correct xenon valuated and have been ative controls ensure that accurate for: 1) ansients, 2) Predicting nd 3) Quantifying the n.	
9.	The Compliance not notify the prior to makin	e representative (ut e Compliance Manager ng the 4-hour ENS no	ility, non-licensed) did (utility, non-licensed) tification.	·
	A Department D ENS notificati Operations Sup interim measur the contents of notification of the Compliance	Instruction prescrib ions has been implem pervision and Compli ce prior to developm of a 1986 letter req of ENS calls was upd a Engineers.	ing the requirements for ented and provided to Unit ance Engineers. As an ent of the instructions, uiring Management ated and disseminated to	
10.	The Shift Tech not update his approach to ci	nnical Advisor (STA) s log concerning the citicality until two	(utility, licensed) did events surrounding the days after the event.	
	Corrective Act	cions:		1
	a. The STA determin effectiv	work schedule has b ned that the present ve use of the STA re	een evaluated and it was schedule is the most source.	
	b. The need shift tu during S	l for accuracy and c urnover and log taki STA staff meetings.	ompleteness in the areas of ng has been re-emphasized	E
	c. The STA assure require particu	involved in this ev that he has a proper ments of completion Larly logkeeping.	ent has been counseled to understanding of the of all on shift tasks,	

NRC Form 366A (6-89)

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NRC FORM 366A (6-89)	U.S.	NUCLEAR REGULATORY COMMISSION	APPROVED OMB NO. 3150-0104 EXPIRES: 4/30/92
LICENSE	E EVENT REPORT	(LER)	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 2055, 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)
			YEAR SEQUENTIAL WREVISION NUMBER NUMBER
Palo Verde Unit 1	•	0 5 0 0 0 5 2 8	8 8 - 0 1 6 - 0 3 1 8 OF 2 1
TEXT (If more spece is required, use additional NRC I	Form 366A's/ (17)		
11.	The Unit Log an operational mod ACTION statemen recorded in the	nd Control Room Log des or entry into Te nts. For example, o e Unit or Control Ro	did not reflect entry into echnical Specification criticality was not bom Logs. This information
	should have bee	en entered into the	logs as a "late entry".
	Corrective Act	ions:	
	a. The "Cond revised to occurring those act happened	duct of Shift Operat to require the logg g during an abnormal tions were not logge	tions" procedure was ing of significant actions I event as late entries if ed at the time they
•	b. The "Cond evaluated requiring Control I oncoming	duct of Shift Operat d and revised to ind g an on-shift superv Room Log prior to th crew to assure comp	tions" procedure was clude instructions visory review of the ne,shift turnover to the pleteness of the logs.
	c. The Unit Control 1 meet the Shift Op	Operations Manageme Room and Unit Logs standards establis erations" procedure	ent periodically reviews to assure that the logs hed in the "Conduct of
	d. The logk requalif to be su	eeping instruction of ication training was fficient.	during Simulator s evaluated and determined
12.	The Event Noti notifications) critical.	fication Worksheet did not include the	(for making ENS e fact that the reactor was
	Corrective Act	ions:	
	A procedure wa adequate infor representative	s developed to ensu mation is obtained i for NRC notificati	re that accurate and by the Compliance on.
B. Inves took APS's	stigation was co to withdraw Reg s investigation,	nducted to determin Group 3 to 60 inch the following Reg	e the length of time it es withdrawn. Based upon Group 3 to 60 inches
with APS's upon motic	irawal informati s best approxima operator's stat on provided by t	on is provided. Th tion of the withdra ements and times fo the Plant Computer (e information provided is wal sequence and is based r starting/stopping CEA ID)(CPU).

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NRC Form 368A (6-89)

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NRC FORM 266A (6-89) LICEN TI	ISEE EVE	US. INT REPORT	NUCLEA	IR REGI	JLATORY	COMMIS	5510N	ESTIMA INFORM COMMEI AND RE REGULA THE PA OF MAN	TED BU IATION NTS REG PORTS TORY (PERWOF AGEMEN	APPROVI E) RDEN PE COLLECT ARDING MANAGE COMMISSI RK REDU VT AND B	ED OMB NO. XPIRES: 4/30 R RESPONS FION REQUE BURDEN ES MENT BRAN ION, WASHIN ION, WASHIN ION, WASHIN ION PRO	3150-0)/92 EE TO EST: 50 TIMAT ICH (P-4 NGTON JECT (SHING)	104 COMPLY W1)0 HRS. FO E TO THE R 530), U.S. NI , DC 20555, (3150-0104), TON, DC 205	TH THIS RWARD ECORDS UCLEAR AND TO OFFICE 03.
FACILITY NAME (1)			DOCKE	T NUM	8ER (2)				LER NU	MBER (6	3		PAGE	(3)
Palo Verde Unit 1	, L -		0 5	5 0	0 0	5 2	18	YEAR 8	- 0	UNNER		3 1	19 OF	2 1
TEXT (If more space is required, use additional i	RC Form 366A's	1/ (17)												
									R	leg G	roup			
Tim	e		F	Reg	Grou	,			3	Pos	ition			
<u>(hr</u>	<u>s, min,</u>	<u>sec.)</u>	2	Ac	tivi	<u>y</u>			2	Appr	<u>ox) *</u>			
0	3 23	37	V	Jith	drawa	al St	tart	;			0			
0	3 24	32	V	lith	drawa	al St	top				30			
0	3 26	55	ţ	√ith	drawa	al St	tart	;			30			
0	3 27	21	V	lith	drawa	al St	top				45			
l o	3 30	03	V	lith	drawa	al St	tart	:			45			
l o	3 30	25	V	√ith	drawa	al St	top				52			
	3 30	26	V	Jith	drawa	al St	tart	:			52			
	3 30	44	V	Jith	drawa	al S(top				58			
l	3 30	48	V	Jith	drawa	al St	tart	:			58			
Ċ	3 30	50	ĩ	Jith	drawa	al St	top				60			

* CEA positions are based upon operators statements for stops at 30, 45, and 60 inches.

- APS's investigation into this event included an evaluation of the C. logs that have been maintained during reactor startups. This investigation included an evaluation of the scope and adequacy of the logs that were maintained during this event, and an evaluation of the logs that were maintained during previous reactor startups. An evaluation of Control Room logs including the logs maintained during this event identified that the logkeeping practices were inconsistent, that is, the details included in the logs and the actions recorded appeared to be dependent upon the individual making the entry instead of following pre-established guidelines. A subsequent evaluation of the guidance provided in this area determined that additional controls were necessary to establish consistency in the information recorded in the logs. Therefore, 40AC-9ZZ02, "Conduct of Shift Operations" was revised to provide more prescriptive guidance for the information required to be entered into the logs.
- D. APS Licensing Department conducted an independent evaluation of the reportability aspects of this event. The evaluation was specifically conducted to determine if a one-hour notification was required pursuant to 10CFR50.72. As a result of this evaluation, it was determined that the four-hour notification conducted following the event was appropriate and that no one-hour notification was required.
- E. A formal "PVNGS Incident Investigation Program" (79PR-0IP01) was developed. This program includes improvements to the post trip review process.



LICENSEE EVENT REPORT (LER) TEXT CONTINUATION Structure device a second se	C FORM 266Å	U.S. N	UCLEAR REGULATORY COMMISSION	APPROVED OM8 NO. 315	0.0104
CLITY MAKE IN Palo Verde Unit 1 0 5 0 0 0 5 2 8 0 16 0 0 3 2 0 00 0 0 0 0 0 0 0 0 0 0 0		LICENSEE EVENT REPORT (TEXT CONTINUATION	LER)	ESTIMATED BURDEN PER RESPONSE T INFORMATION COLLECTION REQUEST COMMENTS REGARDING BURDEN ESTIM AND REPORTS MANAGEMENT BRANCH REGULATORY COMMISSION, WASHINGT THE PAPERWORK REDUCTION PROJEC OF MANAGEMENT AND BUDGET, WASHI	O COMPLY WTH THIS 500 HRS. FORWARD (P530), U.S. NUCLEAF ON, DC 20555, AND TO TT (3150-0104), OFFICI NGTON, DC 20503.
Paio Verde Unit 1 0 5 0 0 5 2 8 8 8 - 0 1 6 - 0 3 2 0 0 5 1/// over pair & mathematic and status 0 5 0 0 5 2 8 8 8 - 0 1 6 - 0 3 2 0 0 5 1/// over pair & mathematic and status 0 5 0 0 5 2 8 8 8 - 0 1 6 - 0 3 2 0 0 5 1/// over pair & mathematic and status 0 5 0 0 5 2 8 8 8 - 0 1 6 - 0 3 2 0 0 5 1/// over pair & mathematic and status 0 5 0 0 0 5 2 8 8 8 - 0 1 6 - 0 3 2 0 0 5 1/// over pair & mathematic and status 0 5 0 0 0 5 2 8 8 8 - 0 1 6 - 0 3 2 0 0 5 1// over pair & mathematic and status 0 5 0 0 0 5 2 8 8 8 - 0 1 6 - 0 3 2 0 0 5 1// over pair & mathematic and status 0 = 5 0 0 0 5 2 8 8 8 - 0 1 6 - 0 3 2 0 0 5 1// over pair & mathematic and status 0 = 5 0 0 0 5 2 8 8 8 0 0 3 2 0 0 5 1// over pair = mathematic = 0 = 10 = 0 = 10 = 10 = 10 = 10 = 10	ILITY NAME (1)		DOCKET NUMBER (2)	LER NUMBER (6)	PAGE (3)
Palo Verde Unit 1 0 5 0 0 5 2 8 8 0 0 6 0 3 2 0 0 0 0 3 2 0 0 0 0 3 2 0 0 0 0 3 2 0 0 0 0 3 2 0 0 0 0 3 2 0 0 0 3 0 0 0 3 0 0 0 3 3 0 0 0 3 3 3 0 0 0 3 3 3 3 3 3 3 3 3 3 3 3 3				YEAR SECUENTIAL SUCH AUMBER	
 F. AFS's investigation into this event included an evaluation to determine if additional operator actions were required as a result of being critical below PDIL specifications. A clarification of Technical Specification Surveillance Requirement 4.1.1.2.1.b was necessary since it cross references Specification 3.1.3.6 (PDIL requirements). The concern was that if the Control Element Assemblies (CEA's) are not within the Transient Insertion Limits of Technical Specification 3.1.3.6, is immediate boration required in accordance with Technical Specification 3.1.1.2 ACTION "a" or is there a two-hour period to restore CEA's in accordance with Specification 3.1.1.2 ACTION "a" or Technical Specification 3.1.1.2 ACTION "a". APS has determined that operators have two hours to restore the CEA's to within the PDIL limits. Immediate boration pursuant to Technical Specification 3.1.1.2 ACTION "a" is not required unless the two-hour ACTION of Specification 3.1.3.6 cannot be met. G. AFS believes that the corrective actions taken in response to this event will be effective in preventing recurrence. Increased procedural requirements and additions to training have increased the knowledge and awareness of plant personnel. The information available to operators in the Control Room has been increased by, for example, the addition of procedural warnings and red worth curves for all regulating groups. The performance of reactor startups has been improved by having a reactor engineer in the Control Room performing 1/M plots during reactor engineer in the addition and resulted in a conservative manner. Record keeping in the Control Room has been improved by continuing supervisory review of logbooks. Investigation of events and the associated documentation have been improved by the implementation of the Incident Investigation Program. 	Palo Verde	e Unit 1	0 5 0 0 0 5 2 8	8 8 - 0 1 6 - 0 3	210 0F 2
 F. APS's investigation into this event included an evaluation to determine if additional operator actions were required as a result of being critical below PDIL specifications. A clarification of Technical Specification Surveillance Requirement 4.1.1.2.1.b was necessary since it cross references Specification 3.1.3.6 (PDIL requirements). The concern was that if the Control Element Assemblies (CEA's) are not within the Transient Insertion Limits of Technical Specification 3.1.3.6, is immediate boration required in accordance with Technical Specification 3.1.1.2 ACTION "a" or is there a two-hour period to restore CEA's in accordance with Specification 3.1.1.2 ACTION "a". APS has determined that operators have two hours to restore the CEA's to within the PDIL limits. Immediate boration pursuant to Technical Specification 3.1.1.2 ACTION "a" is not required unless the two-hour ACTION of Specification 3.1.3.6 cannot be met. G. APS believes that the corrective actions taken in response to this event will be effective in preventing recurrence. Increased procedural requirements and additions to training have increased the knowledge and awareness of plant personnel. The information available to operators in the Gontrol Room has been increased by, for example, the addition of procedural warnings and rod worth curves for all regulating groups. The performance of reactor startups has been improved by having a reactor engineer in the Control Room performing 1/M plots during reactor startups, and by procedure requiring that actual criticality be achieved within one hour of the time assumed in the 'predicting calculation. The additional training described in Section VI.A has been provided to plant personnel and resulted in an increased awareness of the necessity to operate the plant in a conservative manner. 	(If more space is required,	use additional NRC Form 366A's) (17)			
Since the May 14, 1988 event, APS management has communicated to plant personnel the importance of conservatism during operations. In addition, management has re-emphasized to plant personnel that safety always takes precedence over schedule.	F. G.	APS's investigation in determine if addition of being critical bel- Technical Specification necessary since it cra- requirements). The cra- Assemblies (CEA's) are of Technical Specifica- in accordance with Te- is there a two-hour pro- Specification 3.1.3.6 APS has determined the CEA's to within the Pro- Technical Specificati- the two-hour ACTION on APS believes that the event will be effecti- procedural requirement the knowledge and awa available to operator for example, the addi- curves for all regular startups has been improcedure requiring the hour of the time assuradiational training deplant personnel and r necessity to operate Record keeping in the supervisory review of associated documentat of the Incident Invess Since the May 14, 198 plant personnel the i In addition, manageme safety always takes p	nto this event incl al operator actions ow PDIL specification on Surveillance Reconserves Spec- oncern was that if e not within the Tr ation 3.1.3.6, is in chnical Specification eriod to restore CH ACTION "a". at operators have to DIL limits. Immedi- on 3.1.1.2 ACTION " f Specification 3.1 corrective actions ve in preventing re- ts and additions to reness of plant per s in the Control Ro- tion of procedural ting groups. The pr roved by having a to ng 1/M plots during hat actual critical med in the predict escribed in Section esulted in an increa- the plant in a conse- control Room has he logbooks. Investor tigation Program. 8 event, APS manage- mportance of conse- ont has re-emphasized precedence over sche	uded an evaluation to swere required as a m ions. A clarification quirement 4.1.1.2.1.b effication 3.1.3.6 (Pf the Control Element cansient Insertion Lin mediate boration red ion 3.1.1.2 ACTION "a" A's in accordance with the boration pursuant a" is not required un the boration pursuant a" is not required un the boration pursuant a" is not required un the boration pursuant the boration pursuant a" is not required un the boration pursuant a" is not required un the boration pursuant as taken in response to courrence. Increased the training have increased the training have increased the training have increased the training and rod word berformance of reactor ceactor engineer in the greactor startups, and lity be achieved with ing calculation. The the VI.A has been provide ased awareness of the servative manner. been improved by contained and by the implement aboved by the implement aboved by the implement aboved by the implement and to plant personnel edule.	o result n of was DIL mits quired " or th the t to nless o this ased tion d by, th r ne nd by in one ded to e inuing d the ation d to ions. that

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NRC FORM 348A	U.S. P	NUCLEAR REGULATORY COMMISSION	APPROVED OMB NO. 31	50-0104		
	LICENSEE EVENT REPORT (TEXT CONTINUATION	LER)	EXPIRES: 4/30/92 ESTIMATED BURDEN PER RESPONSE TO COMPLY WI INFORMATION COLLECTION REQUEST: 500 HRS. FO COMMENTS REGARDING BURDEN ESTIMATE TO THE RI AND REPORTS MANAGEMENT BRANCH (P530), U.S. NI REGULATORY COMMISSION, WASHINGTON, OC 20555, THE PAPERWORK REDUCTION PROJECT (3150-0104), OF MANAGEMENT AND BUDGET, WASHINGTON, DC 205			
FACILITY NAME (1)		DOCKET NUMBER (2)	LER NUMBER (6)	PAGE (3)		
			YEAR NUMBER NUMBER			
Palo Verde	Unit 1	0 5 0 0 0 5 2 8	88-0116-013	210F 21		
	APS has reviewed the personnel (utility, 1988 event. Not all Control Room respons: maintained his respec examinations were new performance during the other post-event assignant to a and the many program concluded that these perform their respect assignments.	post-event perform licensed) who were personnel have bee ibilities since the ctive NRC license e cessary for certain his period, in the igned responsibilit be satisfactory. B improvements descr individuals can be tive responsibiliti	ance of the Control I involved in the May n assigned permanent event. However, eac ven though some repea- individuals. Their Control Room and in ies, has been evalua ased on this perform ibed above, APS has relied upon to prop- es, including Control	Room 14, ch has at their ted by ance, erly 1 Room		

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