NRC FORM 366 U.S. NUCLEAR REGULATORY COMMISSION LICENSEE EVENT REPORT (LER) (See reverse for required number of digits/characters for each block)					APPROVED BY OMB NO. 3150-0104 EXPIRES 04/30/98 ESTIMATED BURDEN PER RESPONSE TO COMPLY WITH TI MANDATORY INFORMATION COLLECTION REQUEST: 50.0 HR REPORTED LESSONS LEARNED ARE INCORPORATED INTO T LICENSING PROCESS AND FED BACK TO INDUSTRY. FORWA COMMENTS REGARDING BURDEN ESTIMATE TO THE INFORMATI AND RECORDS MANAGEMENT BRANCH (T-6 F33), U.S. NUCLE REGULATORY COMMISSION, WASHINGTON, DC 20555-0001, AND THE PAPERWORK REDUCTION PROJECT										
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ABSTRA	CT ()	ait to 140	enaces	A ADDION D	AIE).	nale enand t	(DOM with a	n lines)	(16)				1		
On Aug	gust 6.	1998.	Units 1	and 2 were	e operat	ting in Mod	te 1 at	100%	(16) DOWEI	. Ass	part of the	South'	Texas	Pro	iect's
Setpoin	nt Imp	rovem	ent Prop	gram, a ver	rificatio	on of newl	y deve	loped	instru	ment l	oop uncerta	inty cal	culati	ons	jeer s
determi	ined th	hat the	instrum	nent uncert	ainty a	ssociated	with th	ne Ém	ergenc	y Core	Cooling S	vstem a	ccum	ulate	or
pressur	e and	volum	e alarm	s were in a	condit	tion where	Techr	nical S	pecific	cation	Limiting Co	ondition	for C)pera	ation
3.5.1 co	ould b	e exce	eded wi	ithout oper	rator ki	nowledge.	These	e instr	ument	loops	are used to	satisfy	Techr	nical	
Specific	cation	Surve	illance 4	4.5.1.1. by	verify	ing the acc	umula	tor pr	essure	and vo	olume are w	ithin lin	nits by	y the	•
absence	e of al	arms.	The cal	use of this	event v	was progra	mmati	ic in n	ature a	and per	rtains to the	setpoir	nt pro	gran	n at the
previou	I CXas	Projec	t. Prog	Fammatic	weakne	esses in th	e setpo	bint pr	ogram	at the	South Texa	as Proje	ct we	re	
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instrum	nent lo	op unc	ertainty	calculatio	ons and	implemen	tation	of ne	w Eme	rgency	Core Cool	ing Sys	tem a	ccui	nulator
pressur	e and	volum	e alarm	setpoints.											

NRC FORM 366 (4-95)



NRC FORM 366A (4-95)			U.S. NUC	LEAR REGULATOR	Y COMMISSION
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DESCRIPTION OF EVENT:

On August 6, 1998, Units 1 and 2 were operating in Mode 1 at 100% power. On August 6, 1998, it was determined that the instrument uncertainty in the calculations for the Emergency Core Cooling System accumulator pressure and volume alarm setpoints could have resulted in a condition of the exceeding the Technical Specification limits prior to receiving an alarm. This was contrary to Technical Specification Surveillance Requirement 4.5.1.1.a.(1).

As a part of the South Texas Project's Setpoint Improvement Program, a verification of newly developed Instrument Loop Uncertainty Calculation ZC-7036 determined that the instrument uncertainty associated with the Emergency Core Cooling System accumulator pressure alarm is ± 22.7 psig. In addition, a verification of newly developed Instrument Loop Uncertainty Calculation ZC-7026 determined that the instrument uncertainty associated with the Emergency Core Cooling System accumulator volume alarm is approximately ± 21 gallons. These instrument loops are used to satisfy Technical Specification Surveillance 4.5.1.1.

Technical Specification Limiting Condition for Operation 3.5.1 requires each Safety Injection System accumulator nitrogen cover-pressure be maintained between 590 psig and 670 psig and each accumulator borated water volume be maintained between 8800 and 9100 gallons. Technical Specification Surveillance 4.5.1.1 requires that the accumulator pressure and volume be verified within limits by the absence of alarms. Therefore, the alarm should be calibrated such that it actuates at or before the Technical Specification limit accounting for the appropriate instrument uncertainties. The bistable setting for the accumulator low pressure alarm had been set at 603 psig or 13 psi above the Technical Specification limit. Since the accumulator pressure monitoring alarm uncer inty was determined to be ± 22.7 psig, the Technical Specification limit could have been exceeded without the actuation of the alarm. The accumulator high pressure Technical Specification limit was similarly affected by this condition. The bistable setting for the accumulator high pressure alarm was 662 psig or 8 psig below the Technical Specification limit. With an uncertainty of 22.7 psig, the Technical Specification limit could have been exceeded without the actuation of the alarm. In addition, the bistable setting for the accumulator high volume alarm had corresponded to approximately 9088 gallons or 12 gallons below the Technical Specification limit. Since the accumulator volume alarm uncertainty was determined to be approximately +21 gallons, the Technical Specification limit could have been exceeded without the actuation of the alarm. The bistable setting for the accumulator low volume alarm was determined to correspond to approximately 8858 gallons or 58 gallons above the Technical Specification limit. This setting was adequate to meet the Technical Specification limit when accounting for instrument uncertainty.

Temporary logs were established in both Control Rooms to require verification that indicated accumulator pressure and indicated accumulator volume is maintained to meet Technical Specification Limit.

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DESCRIPTION OF EVENT (CONTINUED):

The South Texas Project had previously identified through external and internal assessments that a generic issue regarding the inadequacy of instrument uncertainty calculations and other calculation-related programmatic issues existed. Nuclear Regulatory Commission Inspection Report 50-498/97-24; 50-499/97-24, dated November 21, 1997, discussed these same issues. The South Texas Project determined that these programmatic issues should have been categorized and tracked in the Corrective Action Program as conditions adverse to quality and, therefore, would have been subject to periodic supervisory and management review. As a result of these findings, the The South Texas Project initiated a Setpoint Improvement Program in 1998 which included corrective action to ensure that appropriate uncertainty calculations were accomplished for safety-related plant process values. Development of Instrument Loop Uncertainty Calculations ZC-7026 and ZC-7036 was part of the corrective action that led to the discovery of this event.

CAUSE OF EVENT:

The cause of this event was programmatic in nature and pertains to the setpoint program at the South Texas Project. Specifically, the lack of suitable instrument setpoint/uncertainty calculations with respect to accumulator volume and pressure was the direct cause of this event. Programmatic weaknesses in the setpoint program at the South Texas Project were previously identified in self assessments and inspections. The specific condition being reported here was identified as the result of the corrective actions being implemented to address those programmatic weaknesses in the South Texas Project setpoint program.

ANALYSIS OF EVENT:

Failure to meet the requirements of Technical Specifications is reportable pursuant to 10CFR50.73(a)(2)(i)(B). The design function of the accumulators is to rapidly inject into a faulted Reactor Coolant System to refill the reactor vessel with borated water. Since the accumulators are passive components, the accumulators are pressurized with nitrogen to ensure the accumulator volume is injected to the Reactor Coolant System. The range of accumulator pressure and volume setpoints are selected to bound the values used in safety analysis. The linearing design basis accident that utilizes an assumed value for initial accumulator pressure and volume as an analysis input is a Large Break Loss of Coolant Accident (LOCA). The accident analysis results reported in the Updated Final Safety Analysis Report demonstrates that the Emergency Core Cooling System criteria of 10CFR50.46 will be met.

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ANALYSIS OF EVENT (CONTINUED):

The initial accumulator pressure and volume used as input values in different calculations are given in the following:

Accident Analysis Calculations	Accumulator Pressure	Accumulator Volume				
LOCA (Appendix K) LOCA (Mass & Energy) LOCA (Containment Press/Temp) Hot Leg Switch Over Emerg. Sump pH (minimum pH) Emerg. Sump pH (maximum pH)	600 psia (=585.3 psig), minimum 600 psia (=585.3 psig), minimum 644.7 psia (=630 psig), maximum N/A N/A	8977 gal (=1200 ft ³), nominal 11819 gal (=1580 ft ³), maximum N/A (included in Mass/Energy) 9100 gal, maximum 9194 gal, maximum				

For the LOCA Appendix K analysis, lower accumulator pressure is limiting. A reanalysis of the Large Break LOCA performed to support Phase 2 Fuel demonstrated that Emergency Core Cooling System criteria of 10CFR50.46 will be met for both the current plant design and proposed plant design change with a minimum initial accumulator pressure of 583.6 psia (= 568.9 psig) which bounds the alarm setpoint of 603 psig minus the uncertainty. Also for this analysis, less accumulator volume is more limiting. As discussed in the basis for Technical Specification 3.5.1.1, the calculated peak clad temperature is not sensitive to accumulator volume, therefore a nominal accumulator volume is assumed. This reanalysis demonstrated for the condition determined on August 6, 1998, the Emergency Core Cooling System would have performed its intended safety function.

The Large Break LOCA analysis for mass and energy release purposes is limiting on high accumulator volume. This analysis utilizes approximately 11819 gallons (=1580 cubic feet) and therefore bounds the 9088 gallon high alarm value plus uncertainty of approximately 21 gallons. The same analysis is also limiting on low accumulator pressure and assumed 585.3 psig which does not bound the low pressure alarm setpoint. However, the post LOCA containment pressure analysis (which uses the mass and energy as input) is not sensitive to the small variation of accumulator pressure.

For containment pressure analysis after a LOCA, high accumulator pressure is more limiting. The accumulator pressure assumed is 630 psig which does not bound the Technical Specification or alarm setpoint value. However, as stated above, the calculated post LOCA containment pressure is not sensitive to accumulator pressure. Moreover, the high pressure assumption in the containment analysis competes with the low pressure assumption in the mass and energy analysis. The overall effect is that the post LOCA containment pressure is not affected by the condition discovered regarding instrument uncertainties.

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EXT (If more space is required, use add	litional copies of NRC Form 366A)	(17)		Giller Standel Transferd and Skappenia.						
ANALYSIS OF EVENT (CONTINUE	ED):									
The Hot Leg Switch Over analysis is lin	miting on high accumulator volum	e. The	assumed	maximum volu	me of 9100					
gallons is lower than the high alarmed s	etpoint plus the uncertainty by 9 g	allons.	This smal	l discrepancy h	as negligible					
effect on the hot leg switch over time.					00					
-										
The minimum Emergency Sump pH a	nalysis is affected by high accumi	ulator v	olume. 7	The analysis as	sumes 9194					
affected by low accumulator volume at	etpoint plus the uncertainty. The	maxim	um Emer	gency Sump pH	I analysis is					
uncertainty	ad assumed 8770 gallons which all	so bour	ids the lov	w alarm setpoir	nt minus the					
uncontainty.										
There were no adverse safety or radiolo	ogical consequences from this ever	it.								
CORRECTIVE ACTION:										
1. Temporary logs have been est	tablished in both Control Rooms	to reau	ire verific	cation that the						
accumulator pressure band ac	counts for the calculated instrum	nent un	certaintie	s and ensures t	that the					
accumulators are pressurized v	within Technical Specification Li	mits.		1.000100						
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2. Temporary logs have been est	ablished in both Control Rooms	to reau	ire veritio	cation that the						

 The development of a new Instrument Loop Uncertainty Calculation ZC-7026 and implementing Design Change Package associated with the Emergency Core Cooling System accumulator volume will be completed by October 19, 1998.

accumulators are maintained within Technical Specification Limits.

- The development of a new Instrument Loop Uncertainty Calculation ZC-7036 and implementing Design Change Package associated with the Emergency Core Cooling System accumulator pressure will be completed by October 19, 1998.
- New Emergency Core Cooling System accumulator volume and pressure alarm setpoints for meeting Technical Specification Limiting Condition for Operation 3.5.1 will be implemented by December 31, 1998.

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ADDITIONAL INFORMATION:

The South Texas Project has submitted to the Nuclear Regulatory Commission two other Licensee Event Reports within the last three years regarding occurrences when instrument uncertainties were not correctly taken into account to ensure that Technical Specification Surveillance requirements were met.

- Unit 1 Licensee Event Report 97-001 determined that the temperature switches used for area temperature monitoring had incorrect tolerances such that the temperature limits of the areas monitored could have been exceeded without detection.
- Unit 1 Licensee Event Report 97-006 determined that the average temperature and pressurizer pressure limits for
 protection against departure from nucleate boiling did not take into account measurement instrument
 uncertainties.