

TXU Energy Comanche Peak Steam Electric Station P.O. Box 1002 (E01) Glen Rose, TX 76043 Tel: 254 897 8920 Fax: 254 897 6652 Iance.terry@txu.com

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C. Lance Terry Senior Vice President & Principal Nuclear Officer

Ref: 10CFR50.73(a)(2)(iv)(A)

CPSES-200301393 Log # TXX-03115 File # 10010

July 14, 2003

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

SUBJECT: COMANCHE PEAK STEAM ELECTRIC STATION (CPSES) DOCKET NOS. 50-445 AND 50-446 REACTOR TRIP ON UNITS 1 AND 2 DUE TO GRID DISTURBANCE LICENSEE EVENT REPORT 445/03-003-00

Gentlemen:

Enclosed is Licensee Event Report (LER) 03-003-00 for Comanche Peak Steam Electric Station Units 1 and 2, "Reactor Trip on Units 1 and 2 due to Grid Disturbance."

This communication contains no new commitments regarding CPSES Units 1 and 2.





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Sincerely,

TXU Generation Company LP

By: TXU Generation Management Company LLC, Its General Partner

> C. L. Terry Senior Vice President and Principal Nuclear Officer

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Roger D. Walker Regulatory Affairs Manager

JDS/js

Enclosure

c - T. P. Gwynn, Region IV
W. D. Johnson, Region IV
D. H. Jaffe, NRR
Resident Inspectors, CPSES

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	The breat Becc switter south available south a	plete EXPE Limit to I May 1 cent pc smissi kV sw t Stand loss of protec ause ti tchyan loss of sequer dwater rce tha ilable	cred sub 400 space 5, 200 ower an on line itchya dby) of f non-s ctive re isolate the swit d was of f non-s at react t was t but did	Sum Sum Sum Sum Sum Sum Sum Sum Sum Sum	pplemental R N DATE) , approxim 0252 v Junit 2 a proxim nd sub tural ci y relate ing sys e switc ard bro hergize y relate rips. B Unit 1 from th start c	Manufa teport Exp mately with at 99. hately irculi irculi irculi irculi irculi class ac Stem chyan ed ac Stem class ne 13 or loa	Units 8 per y four ent re ation 2 pow assoc d froi 5 faile d the 2 pow units 3 1E 8 kV ud bed	Reportable To EPIX N 2 c-spaced typ a 1 and 2 cent pover miles f eactor tri in accord er. ciated within the fai ad to isol Reactor er. CPS at CPSH electrical switchyp cause of	x x x x x x x x x x x x x x	NO lines) (I ode 1 distur- both with CPS I to in- e faul- ant Pu- nits 1 eriences exp he en- ower	Cause (Pathone in the initial	ower nce o S sw its. I ant e Park ate lo 1 345 ps in d 2 e i an a ience s pro	System Opera on the O itchyar Both un mergen ter Line both un mergen kV trar both un experier automat d a slov sy diese ovided t	EXPECTED SUBMISSION DATE (15) tion) with Comanche d resulted its were s cy proced e breaker f aker failu ismission nits (4 per need turbitic start of w transfer l generato to the 1E o	faile faile uni faile tabi lure faile re b line to to to to to to to to to to	Month it 1 at 1 ak-Park a loss o lized in s as a ro ed to tri ackup i c, the 3- it) tripp rips and Auxili heir all emaine trical b	p the relayin 45kV ed du d ary ternato d uses a	To EPIX Year 5kV e 3 of ng. e to
	The bread Becc swift the sub Fee source avait desi	plete EXPE Limit to 1 May 1 cent pc smissi kV sw t Stand loss of protec iker to ause the tchyard loss of sequer dwated rce tha ilable i gned.	cred sub 400 space 5, 200 ower an on line itchya dby) of f non-s ctive re isolate the swit d was of f non-s at react t was t but did	Sum Sum Sum Sum Sum Sum Sum Sum Sum Sum	pplemental R N DATE) , approxim 0252 M Junit 2 a proxim nd sub tural ci y relate ing syss switc ard bro hergize y relate tips. E Unit 1 from th start co functio	Manufa teport Exp mately with at 99. hately irculi irculi irculi irculi irculi class ac Stem chyan ed ac Stem class ne 13 or loa	Units 8 per y four ent re ation 2 pow assoc d froi 5 faile d the 2 pow units 3 1E 8 kV ud bed	Reportable To EPIX N 2 c-spaced typ a 1 and 2 cent pover miles f eactor tri in accord er. ciated within the fai ad to isol Reactor er. CPS at CPSH electrical switchyp cause of	x x x x x x x x x x x x x x	NO lines) (I ode 1 distur- be CP both with CPS I to in- e faul- ant Pu- nits 1 eriences exp he en- ower	Cause (Pathone in the initial	ower nce o S sw its. I ant e Park ate lo 1 345 ps in d 2 e i an a ience s pro	System Opera on the O itchyar Both un mergen ter Line both un mergen kV trar both un experier automat d a slov sy diese ovided t	EXPECTED SUBMISSION DATE (15) DATE (15) DATE (15) EXPECTED SUBMISSION DATE (15) DATE (15) Comanche d resulted its were s cy proced e breaker f aker failu asmission nits (4 per nced turbit ic start of w transfer 1 generato	faile faile uni faile tabi lure faile re b line to to to to to to to to to to	Month it 1 at 1 ak-Park a loss o lized in s as a ro ed to tri ackup i c, the 3- it) tripp rips and Auxili heir all emaine trical b	p the relayin 45kV ed du d ary ternato d uses a	To EPIX Year 5kV e 3 of ng. e to

All times in this report are approximate and Central Daylight Time unless noted otherwise.

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Enclosure to T	<u>XX-0311</u>	5					
NRC FORM 366A (1-2001)				l	U.S. NUCLEAR R	EGULATORY COMM	USSION
		LICENSEE EVENI	r report	C (LEH	R)		
Facility Name (1)			Docket		LER Numbe	rt (6)	Page(3)
COMANCHE	PFAK ST	TEAM ELECTRIC STATION UNIT 1		Year	Sequential Number	Revision Number	2 OF 7
			05000445	03	003	H 00	
NARRATIVE (If more	space is require	ed, use additional copies of NRC Form 366A) (17)					
I.	DES A.	CRIPTION OF REPORTABLE F REPORTABLE EVENT CLAS The subject event is reportable pu 10CFR50.73(a)(2)(iv)(A), "any automatic actuation of any of the Specifically, 10CFR50.73(a)(2)(iv) including: reactor scram or reactor PWR auxiliary or emergency feed	SIFICATION resuant to the revent or cond systems listed v)(B)(1), reactor or trip and 100	require lition the lin para tor protoc FR50.	hat resulte agraph (a) tection sys)(2)(iv)(B)." stem (RPS)	or

B. PLANT OPERATING CONDITIONS PRIOR TO THE EVENT

On May 15, 2003, Comanche Peak Steam Electric Station (CPSES) Unit 1 and Unit 2 were in Mode 1, with Unit 1 at 100 percent power and Unit 2 at 99.8 percent power.

C. STATUS OF STRUCTURES, SYSTEMS, OR COMPONENTS THAT WERE INOPERABLE AT THE START OF THE EVENT AND THAT CONTRIBUTED TO THE EVENT

There were no Technical Specification inoperable structures, systems, or components that contributed to the event.

D. NARRATIVE SUMMARY OF THE EVENT, INCLUDING DATES AND APPROXIMATE TIMES

On May 15, 2003 at 0252 a B-phase to ground fault occurred on the Parker line approximately four miles from the CPSES 345kV switchyard. The failure of the switchyard breaker protection to adequately recognize and clear the fault resulted in a total loss of the 345kV switchyard. The fault detector relays (EIIS: (FK)(51)) in both the primary and backup protection schemes of the CPSES Parker line circuit breaker did not function properly. Due to the failure of the primary and backup protection schemes for the CPSES to Parker transmission line breaker, the fault resulted in a total loss of the CPSES 345kV switchyard approximately 20 seconds after the fault began.

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(1-2001)		LICENSEE EVEN	г рерорі	T A FI	D)				
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Facility Name (1)			Docket	Year		R Number	(6)	Revision	Page(3)
COMANCHE	PEAK S	TEAM ELECTRIC STATION UNIT 1	05000445	03		Number 003		Number 00	3 OF 7
NARRATIVE (If mor	e space is requi	red, use additional copies of NRC Form 366A) (17)		1 1					
		The Reactor Coolant Pumps (EIIS	S:(AB)(P)) se	nsed lo	w vol	ltage	due	to the lo	SS
		of non-safety related ac power and				-			
		approximately 1.5 seconds after fa		-			_		
1		Both unit generator breakers (EII				-			
		distance relaying actuating genera subsequent load rejection protecti						and	
		All plant actuations occurred as d	esigned Th	 React	or Co	volant	Dur	nne	
		tripped as expected due to the loss							
		Coolant Pumps coasted down. Th	he Auxiliary I	Feedwa	ter P	umps	actu	ated and	1
		provided auxiliary feedwater to the						ed. The	;
		Reactor Operators controlled AFV	•		-				
		maintained the SG water levels. I immediately following the reactor			ation	occui	теа		
		minematery tonowing the reactor	i uip as expo						
		Natural circulation flows were est							
		subcooling maintained. The react							
		natural circulation until the React Unit 1 and 0625 for Unit 2.	or Coolant Pl	imps w	ere si	tarteo	at U	533 IOF	
		The system response of the Unit	l and Unit 2 t	rips and	d the	opera	tor a	actions	
		were consistent with the plant des		upporti	ng an	alyse	s pre	esented i	in
		CPSES Final Safety Analysis Rep	port (FSAR).						
	E.	THE METHOD OF DISCOVE	RY OF EAC	H CO	MPO	NEN	то	R	
		SYSTEM FAILURE, OR PRO	CEDURAL O	OR PE	RSO	NNE	LE	RROR	
		Control board indicators and alar	ms alerted the	reacto	r ope	rator	(util	ity,	
		licensed) in each unit that the gen						tor trip	
		breakers were open, and the Reac	tor Coolant P	umps v	vere t	trippe	d.		
	001		DEC						
П.		MPONENT OR SYSTEM FAILU							
	А.	FAILURE MODE, MECHANI COMPONENT	SM, AND EI	FECI	'S OI	F EAG		FAILEI	D
		The trip of Units 1 and 2 as a resu							
		transmission lines was not expect							
		and backup fault detection circuit	relays did no	t functi	ion as	s desig	gned	l.	

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NRC FORM 366A (1-2001)						S. NULLERS SA	SUULA	IUKI COMM	1221014	
		LICENS	SEE EVF	ENT REPORT	(LER	.)				
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Facility Name (1)				Docket	Year M	LER Number	r (6)	Revision	Page(3)	
COMANCHE	PEAK S?	FEAM ELECTRIC STAT	ION UNIT 1	05000445	03	<u>Number</u> 003		Number 00	4 OF 7	
NARRATIVE (If more	space is require	ed, use additional copies of NRC Form 366.	A) (17)				<u></u>			
	В.	CAUSE OF EACH	I COMPO	NENT OR SYSI	rem f	AILURF	E			
		Management oversi protective circuit de contacts of the fault isolation of the grid	esign contri	ibuted to a high re circuit relays which	sistance	e build-u	p on	the		
C. SYSTEMS OR SECONDARY FUNCTIONS THAT WERE AFFECTED BY FAILURE OF COMPONENTS WITH MULTIPLE FUNCTIONS										
Not applicable no failure of components with multiple functions have been identified.										
	D.	FAILED COMPO	NENT IN	FORMATION						
		Manufacturer: NSS/A-Model Num Fault detector relay.	nber:	General Electric Model 12CHC21	A2A					
Ш.	<u>ANA</u>	LYSIS OF THE EV	<u>ENT</u>							
	A.	SAFETY SYSTEN	A RESPO	NSES THAT OC	CURR	ED				
		1. The reactor trip	p breakers	opened.						
		2. The main turbi	ine tripped	(turbine stop valv	es close	:d).				
		3. The control roo drop into the co		chanism allowed a	ull the c	ontrol roo	ds to	fully		
		•	-	AFW) pumps start tors as required.	ed auto	matically	' and	l delivero	ed	
		-		Valves (ARVs) actemperature as desi		o control	stea	um line		
			•	d 6.9kV busses pro power supply as		. .	pply	v was slo	W	

Enclosu	re to T	XX-0	<u>3115</u>			
NRC FORM (1-2001)	4 366A	-				
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U.S. NUCLEAR REGULATORY COMMISSION

LICENSEE EVENT REPORT (LER)

Facility Name (1)	Docket			LER Numbe	er (6)		Page(3)
COMANCHE PEAK STEAM ELECTRIC STATION UNIT 1	05000445	Year		Sequential Number		Revision Number	
		03	\vdash	003	Η	00	5 OF 7
NARRATIVE (If more space is required, use additional copies of NRC Form 366A) (17)							

B. DURATION OF SAFETY SYSTEM TRAIN INOPERABILITY

Not applicable -- No safety system was rendered inoperable.

C. SAFETY CONSEQUENCES AND IMPLICATIONS

The event is bounded by the analysis of the loss of non-emergency AC power to the station auxiliary transient as described in section 15.2.6 of the FSAR. The analysis uses conservative assumptions to demonstrate the capability of pressure relieving devices and the adequacy of the secondary heat removal systems.

A loss of non-emergency AC power to the station auxiliaries is classified as an ANS Condition II transient - a fault of moderate frequency. The loss of non-emergency AC power to the station auxiliaries would also result in a loss of normal feedwater, as the condensate pumps would lose power to operate; loss of the main condenser as a heat sink due to loss of Circulating Water; and loss of forced cooling due to loss of Reactor Coolant Pumps. Following the Reactor Coolant Pump coastdown, the natural circulation capability of the RCS provides an alternate means to remove residual and decay heat from the core. The residual and decay heat is removed by the secondary system by steaming through either the main steam safety valves or the atmospheric relief valves. (For this event, only the atmospheric relief valves were required for decay heat removal and the main steam safety valves were not challenged.) The steam generator liquid inventory is replenished by the Auxiliary Feedwater System. The analysis presented in section 15.2.6 of the FSAR demonstrates that the natural circulation flow in the RCS following a loss of AC power event is sufficient to remove residual heat from the core without violating any event acceptance criteria.

During the event, the Auxiliary Feedwater System of each unit responded as expected and maintained the necessary steam generator heat transfer capability. The atmospheric relief valves were used to provide a controlled steam release path. There were no equipment malfunctions or failures that complicated the plant response or otherwise elevated risk beyond the initiating event. The CPSES 138kV switchyard provided power to class 1E buses during this event. This event is bounded by the analysis of a Station Blackout and the loss of normal feedwater flow described in the FSAR in which conservative assumptions are made in the analysis to minimize the energy removal capability of the Auxiliary Feedwater system. This transient was assumed to be initiated from full power.

Enclosure to TXX-03115

NRC FORM 366A (1-2001)

LICENSEE EVENT REPORT (LER)

Facility Name (1)	Docket			LER Numbe	t (6)		Page(3)
COMANCHE PEAK STEAM ELECTRIC STATION UNIT 1		Year		Sequential Number		Revision Number	
COMPANELLE I LAW STEAM ELECTRIC STATION ON IT I	05000445	03	Н	003	Η	00	6 OF 7

NARRATIVE (If more space is required, use additional copies of NRC Form 366A) (17)

There were no safety system functional failures associated with this event.

Based on this analysis it was concluded that this event did not adversely affect the safe operation of CPSES Units 1 and 2 or the health and safety of the public.

IV. CAUSE OF THE EVENT

A fault on the Parker 345kV transmission line in conjunction with failure of primary and backup protection relays for the CPSES to Parker switchyard breaker, caused the remote grid breakers to trip and de-energize the CPSES 345kV switchyard resulting in the trip of Units 1 and 2 reactors. Management oversight of switchyard activities, maintenance practices, and protective circuit design contributed to a high resistance build-up on the contacts of the fault detection circuit relays which prevented successful isolation of the grid disturbance.

V. CORRECTIVE ACTIONS

The distribution/transmission company, Oncor, replaced the fault detector relays and adjusted the setpoints of the relays to prevent cycling of the contacts. Oncor ensured the remaining switchyard protection relays would function as designed by documenting and evaluating protection relay targets in the 345kV switchyard. Additionally, the 345kV switchyard East and West bus lockouts were tested to verify operability and that lockouts functioned correctly. Furthermore, Oncor has evaluated their activities as performed under the ERCOT (Electric Reliability Council of Texas) guidelines and has determined that the grid continues to be highly reliable.

As part of the corrective action program, TXU Energy is improving management oversight of switchyard activities to reduce the potential of a similar event. Some of the improvements include the following:

- 1. Tracking of switchyard equipment within the CPSES Preventative Maintenance Program and documenting equipment related issues in the corrective action program.
- 2. Performing post work reviews and tracking of switchyard maintenance activities by TXU Energy personnel.
- 3. Enhancing Oncor's switchyard maintenance calibration and testing process to provide more detailed specific instructions.
- 4. Review and, if necessary, change the setpoints of the switchyard fault detector relays and eliminate supervision of ground relays by switchyard fault detector relays.

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U.S. NUCLEAR REGULATORY COMMISSION

LICENSEE EVENT REPORT (LER)

Facility Name (1)

COMANCHE PEAK STEAM ELECTRIC STATION UNIT 1

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NARRATIVE (If more space is required, use additional copies of NRC Form 366A) (17)

VI. PREVIOUS SIMILAR EVENTS

Although there have been previous events that resulted in RPS actuation due to a grid disturbance (refer to LER 445/91-013-00, LER 445/91-019-00, LER 445/91-021-00, and LER 445/91-022-00), the evaluation performed during the aforementioned LERs did not consider the impact on the fault detector relays. Therefore, corrective actions taken to resolve the root causes of the previous events would not have prevented this event.