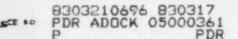
roge log REFERENCE: SO123-VI-1.0 SO123 VI-1.5 TEMPORARY CHANGE NOTICE (When form filled out) NOTE: Technical Specification Violation if not processed within the stated time limits. Procedure No. 5023 - 17 - 3, 2 TCN No. Revision No. 10 Ime Testing for Channel B Procedure Title Kispense (If known, Writer) Procedure Author PAX 1. The following change shall be in effect. Attach a copy of the effected page(s), if applicable on attachment 8.1 page 10 of 11 show the following at the bottom of the page Contoinment Pass High ≤ 21.0 sec (Umt 3), ≤ 20.9 sec (Umt 2) NOTE 4a Containment Press High - 23.0 ser + Unto 2+3 -Not 46 CCW Value Reason -2 Correct omission RECEIVED FEB 3 1983 Date chighated 1-27-83 Issuance Date JAN 2 8 1983 CDM (For CDM SITE 3 Does this change affect FSAR or Tech. Spec commitments? Yes\_\_\_\_ No \_\_\_\_ 5 Does this change affect the nonred ological environment of any offsite area previously undisturbed during site preparation and plant construction? Yes\_\_\_\_\_No\_\_\_\_\_ 6 Is the intent of the original document altered? Yes\_\_\_ 7 No 8 Is the document to be changed an Emergency and Abnormal Operating Instruction? Yes\_ No (If the answer to 5, 6, 7 or 8 is YES, a TCN is NOT Authorized.) Does this change affect licensing commitment requirements as stated in the Reference Section? Yes\_\_\_\_ 19 No\_ 1-1 154 Originator A 10. Is the TCN to be incorporated into next permanent revision within 60 days of issuance date? 11. - No\* Yes \* One time change only egainst Procedure/Station Order No. Rev No 2-3-33 12 Copy sent to the Nuclear Safety Group 13. Signatures Required. Approved by (at least one (1) SRO) Final approval by

Approval must be by two members of the plant management staff at least one of whom holds an SRO license on the unit affected. (For TCN approval, members of the plant management staff are defined as any Station Supervisor, including the level of foreman, exercising responsibility in the specific area and unit addressed by the change 1.



	P6 101	: 19
REFERENCE SO123 VI 1.0 SO123 VI 1.1	TEMPORARY CHANGE NOTIC	ENCODE: ACTOA
NOTE: Technical Specification Violation	n if not processed within the stated time limits.	
Procedure No. 50 23-17- 3.		TCN NO9
Procedure Title PPS Response	a time test for them	18
rocedure Author 1/11 Revenique	2_ PAX 57-564 (If known, Writer) R.A.	BIALECKI PAX 59276
1. The following change that be	effect Attach a copy of the effected page(s), if a	
see allach	a pages	
2. Reason: Const en	was and add ming	step
3. Date originated 1-17-85	4. Issuance Date_JAN 17	1983 CDM (For CDM Use Only)
5. Does this change affect FSAR of	or Tech. Spec. commitments? Yes No	/
<ol> <li>Does this change affect the non plant construction? Yes A</li> </ol>	nradiological environment of any offsite area previo	usly undisturbed during site preparation and
7. Is the intent of the original doc	cument altered? Yes No.	/
<ol> <li>Is the document to be changed (If the answer to 5, 6. 2 or 8 is YES)</li> </ol>	an Emergency and Abnormal Operating Instruction	n? Yes No
	ig commitment requirements as stated in the Refere	nce Section? Yes No
10. Originator I'm Kindrie		2800 has /
11. Is the TCN to be incorporated i	into next permanent revision within 60 days of issue	
* One time change only against Proc		Rev. No
12. Copy sent to the Nuclear Safety	Group Juna Grando	1-24-831
13. Signatures Required:	SITE FIL	ECOPY
SO1 **(Series)	SO2, SO3, or SO23 (Series)	50123 **(Series)
SO1 **(Series) Approved by two OSRC members:		SO123 **(Series) Approved by two OSRC members:
	Approved by: *** (at least one (b) SRO)	SO123 **(Series) Approved by two OSRC members:
Approved by two OSRC members:	Approved by: " (at least one () SRO)	Approved by two OSRC members:
Approved by two OSRC members.	Approved by: " (at least one () SRO) "Ordereck	Approved by two OSRC members:
Approved by two OSRC members:	Approved by: " (at least one (b) SRO) "Outer of the second of the secon	Approved by two OSRC members:
Approved by two OSRC members: •) •) Reviewed by entire Committee on ••	Approved by: " (at least one (b) SRO) "Outer of the second of the secon	Approved by two OSRC members:
Approved by two OSRC members: 1) a) Reviewed by entire Committee on ** DATE - MUET BE WITHIN 2 DAYE	Approved by: " (at least one (b) SRO) "Ordereck Final approved, The "Drian Kote	Approved by two OSRC members: () Reviewed by entire Committee on: ** Pare - MUST BE WITHIN 7 DAY 8 Approved by: *** (at least one (1) SRO)
Approved by two OSRC members: •) •) Reviewed by entire Committee on ••	Approved by: " (at least one (b) SRO) 1) Oldereck Final approved by The Delay Kots COGNIZANT FUNCTIONAL STAT DUANAGAN A	Approved by two OSRC members: () Reviewed by entire Committee on: ** Pate - MUST SE WITHIN 7 DAY Approved by: *** (at least one (1) SRO) )
Approved by two OSRC members: *) *) Reviewed by entire Committee on **	Approved by: " (at least one (b) SRO) 1) Our of the set of the se	Approved by two OSRC members: () Reviewed by entire Committee on: ** Pate - MUST SE WITHIN 7 DAY Approved by: *** (at least one (1) SRO) )
Approved by two OSRC members: )] a) Reviewed by entire Committee on ** DATE - MUET BE WITHIN 2 DAYS RECEIVED	Approved by: " (at least one (b) SRO) 1) Our of the set of the se	Approved by two OSRC members: () Reviewed by entire Committee on: ** PATE - HURY &E WITHIN 3 DAYS Approved by: *** (at least one (1) SRO) ) Approved by:

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\* SO1 and SO123 (series) TCNs will be routed to she OSRC with Routing Document SO(123) 109 which will be signed by the Station Manager.

\*\*\* Approval must be by two members of the plant management staff at least one of whom holds an SRO license on the unit affected. (For TCN approval, members of the plant management staff are defined as any Station Supervisor, including the level of foreman, exercising responsibility in the specific area and unit addressed by the change.)

TCN9 TOUS peouden # 5073-21-3.2- 1-1 add following steps: P620719 6.24.27 Disconneit the "Bistable test" leaks and replace the engut simulator leads on the terminols they were removed from in step 6.24.2 Technician Aate Reset all bistables. 6. 24. 28 1-Educian Pote 6.24.29 Record the largest response Time Value of stiger 6.24.22, 6.24.25 and 6.24.26 in the Data Collection table Technician Soto

(1)		307 19	-	1 ST
STEP NO.	DESCRIPTION	VALUE	UNITS	
5.2.32	PT-DIDI-2 Mich Pro Prove	1	T	
6.3.12	PT-0101-2 High Par Press PT-0102-2 Low Par Press			
6.4.12	P1-1013-2-Low SG-1 Press			
	PT-JA23-E Low SC-2 Press		1	
.7.12	LT-1113-2 Low SG-1 Level LT-1123-2 Low SG-2 Level	1		
.8.12	PT-D351-2 High Cont. Press			영화 영화
.9.12	PT-0352-2 High High Cont. Press			
.10.12	LI-0305-2 LOW RWT Level			
.12.12	PDT-0978 2 Low SG-1 Flow PDT-0979-2 Low SG-2 Flow			
.14.16	TE-0112-2			1.1.1.1.1
.15.16	TE-9178-2			
.16.16	TE-0122-2 TE-9179-2	1		
.18.4	RTSG Uncorrected			
.19.35	High Linear Power to RTSG			1.2
20.13	High Log Bistable to RTSG			
20.28	High Log Preamp Low Temperature_IIIIECK TT-9178-2			
.23 .40	Low Temperature III2200 TT-9179-2			
23 .60	High Temperature_IIIIA TT-0112 -2	10000		
23 .80	High Temperature 11322HA TT-0122 -2			
23.84.28	Pzr Pressure Excore Power			
23.55,23	ST 113A W1 RCP Speed			
23.85.95	ST 123 W2 RCP Speed			
13.25.58	ST 133 W3 RCP Speed ST 143 W4 RCP Speed	1.000		
24.29	High Par Press to RTSG			1
25.29	Low Fir Press to RTSG		1	
26.28	Low Pzr Press to SIAS			
27.29	Low Par Press to CCAS Low SG-1 Level to RTSG			
29.29	Low SG-1 Level to EFAS-1			
29.29	Low SG-2 Level to RTSG			
1.29	Low SG-2 Level to EFAS-2 Low SG-1 Press to RTSG			
229	Low SG-1 Press to MSIS			
3.29	Low SG-2 Press to RTSG			
5.29	Low SG-2 Press to MSIS			
6.28	High Cont. Press to RTSG High Cont. Press to CIAS			
6.41	High Cont. Press to CCAS		. 1	
6.55	High Cont. Press to SIAS	1		
7.29	Low SG-1 Flow to RTSG			
£ 29 9.29	Low SG-2 Flow to RTSG			
0.29	High-High Cont. Press to CSAS Low RWT Level to RAS			
1.29	Highap SG-1 to EFAS-1			

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	Pol7	Rec. Time	Test No.	Relay Time	Test No.	
	*P018 (If aligned) *HV-9324 *HV-9327 *HV-9330 *HV-9333					Tetal Th
Low	Pressure Safety Inject	tion	I			
	*P015 *KV-9325		1			2.1
Charg	"HV-9328 Ing Pumps				1	
1	P-190 P-191 (1# Aligned)					
11 man						
-/E	E Isolation sel Start Delay of 10 t Spray Pumps Emergency Cooling	sec + instr. an	d Logic Response	Only	1	
CW Pum	50 S					
60	025 (If Aligned)					

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	Field Comp.	Rec. Time	Test No.		F-1	C
	MY-6212		iest no.	Relay Time	Test No.	Total Tim
	84-6218					
. c.c	.W. Valves (Emerger	ncy Cooler Isulatio	n)			L
	HV-6365	1				•
	HY-6367 HY-6370 HY-6371					
Ene	gency Cooling Fans	l				
	*E-399					
	*E-401				I	
the stand	IL FREISUND MIAN					
SIAS CIAS (1)	Containment Isolat	Ion (See Items)				
SIAS CIAS (1) taframer CSAS	(see Pressurizer P Containment Isolat nt Pressure High Hi	Ion (See Items)				
SIAS CIAS (1) Itaframer CSAS (1)	(see Pressurizer P Containment Isolat nt Pressure High Hi Containment Spray	Ion (See Items)				
SIAS CIAS (1) Itaframer CSAS (1)	(see Pressurizer P Containment Isolat nt Pressure High Hi	Ion (See Items)				
SIAS CIAS (1) Itaframer CSAS (1)	(see Pressurizer P Containment Isolat nt Pressure High Hi Containment Spray *HV-9367 *HV-6501	Ion (See Items)				
SIAS CIAS (1) Itatraner CSAS (1) (1) (1) (1) (1) (1) (1) (1) (1) (1)	(see Pressurizer P Containment Isolat nt Pressure High Hi Containment Spray *HV-9367 *HV-6501 rator Pressure Low	ion (See Items) gh				
SIAS CIAS (1) Itatraner CSAS (1) (1) (1) (1) (1) (1) (1) (1) (1) (1)	(see Pressurizer P Containment Isolat nt Pressure High Hi Containment Spray *HV-9367 *HV-6501 rator Pressure Low	ion (See Items) gh				] ]
SIAS CIAS (1) Itaframen CSAS (1) (1) Magene HSIS (1)	(see Pressurizer P Containment Isolat Int Pressure High Hi Containment Spray "HV-9367 "HV-6501 rator Pressure Low Main Steam Isolatio	ion (See Items) gh			 	
SIAS CIAS (1) Itaframen CSAS (1) (1) Magene HSIS (1)	(see Pressurizer P Containment Isolat Int Pressure High Hi Containment Spray *HV-9367 *HV-6501 rator Pressure Low Main Steam Isolatio	ion (See Items) gh				
SIAS CIAS (1) Itaframen CSAS (1) (1) Magene HSIS (1)	(see Pressurizer P Containment Isolat Int Pressure High Hi Containment Spray "HV-9367 "HV-6501 rator Pressure Low Main Steam Isolatio	n (MSIV)				

JULTU Main Feedwater Isolation (2) R-1 Field Comp. Rec. Time Test No. Relay Time HY-4048 Test Ro. Total Time HY-4052 0 (3) Steam, Blowdown, Sample and Drain Isolation R HY-4054 HV-4058 9 HV-8203 HV-5249 TCN- 1 +++ 82:9 HU- 8419 (4) Auxiliary Feedwater Isolation HY-4705 Ten-HV-5713 HV-4713 HY-4730 HV-4731 9. Refueling Water Storage Tank A. RAS (1) Containment Sump Valves Open \*HV-9303 (2) ECCS Miniflow Valves Shut \*HY-9306 TCN \*HV-9307 10. 4.16 KV. Emergency Bus Undervoltage a. LOV (Loss of voltage and degraded voltage) ۰. they but he are 

in the set of the trademe

11. Steam Generator Level-Low With Either No Pressure-Low Trip or & P-High

(1) Aux. F.W. (AC Train)

Field Comp.	Rec. Time	Test No.	Relay Time	Test No.	
P-141 *HV-4713 *HV-4731 *HV-4054				Jest NO.	Total Tim
Aux. F.W. (Steam/D	C Train)				
S/G #1 (E089) P-140 HV-4706 HV-4716 HV-4715 HV-4054 S/G #2 (E088) P-140 HV-4716 HV-4716 HV-4705 HV-4705 HV-4730 HV-4053					

P

Field Comp.	Rec. Time	Test No.	0.1		
*P019 *P018 (If aligned *HV-9323 *HV-9326 *HV-9329 *HV-9332	,		Relay Time	Test Mo.	Tetal Tim
Low Pressure Safety Inj	lection				
*7016 *77-9322 *77-9351					
Charging Pumps		I			
P-192 P-191 (If Aligned)					
afnment Isolation g. Diesel Start Delay of afnment Spray Pumps ) P-0/3	10 sec + instr. e	and Logic Respons	e Only		
CCW Pumps	7				

10 10

	Field Comp.	Rec. Time		1	COMPACT CONTRACT	
	MY-6213 MY-6219		Test No.	Relay Time	Test No.	Total Tt
					¢ .	A CONTRACTOR
	C.W. Valves Emergenc	Cooler Isolation				
	HV-6368 HV-6369					the second
	HY-6372 HY-6373	1. 1. 1. 1. 1. 1. 1. 1. 1. 1. 1. 1. 1. 1				
d. Em	Frency Cooling Fans					14.16
	A DESCRIPTION OF THE OWNER OWNER OF THE OWNER OW					_
~- /	*E-400		1			
Contefins	ent Pressure High 5 (see Pressurizer Pr					
(1)	Contelment Spray					
1	*HY-9368 *HY-6500		1			
	Station in the second se					of the second division
ean Gane	rator Pressure Low					
PSIS	rator Pressure Low					
(1)	Mein Steam Isolation	(MSIA)				
(1)		(MSIV)				
	Mein Steam Isolation HV-8204 HV-8205					
	Mein Steam Isolation HV-R204 HV-8205	(M21A)				

216-11-210 Main Fordwater Isolation (2) ۰. R-1 Field Comp. Rec. Time Test No. Relay Time Test P. MY-4045 Tetal Time MY-4052 9 (3) Steam, Bloudown, Sample and Drain Isolation 0 ROF M- 4053 MV-4057 W-8202 HV-8249 TCN-HM-8227 HU-8421 (4) Reaflitery Feedwater Isolation MY-4706 44-5712 HU- 4712 Ten-MY-4714 MY-4715 1.24 . Bafueling Mater Storage Tank RAS . (1) Containment Sump Valves Open WY-\$302 (2) ECCS Miniflow Valves Shut \*MY-9347 MY-9348 10. 4.16 KV. Emergency Bus Undervoltage a. LOW (Loss of voltage and degraded voltage) TONG Acres -

- 11. Steam Generator Level-Low (With Either No Pressure-Low Trip or AP-High)
  - .

Field Comp.	Rec. Time	Test No.	Relay Time	Test No.	Total Time
*P-504 *HV-4712 *HV-4714 *HV-4053					

R-1

EFAS (1) Aux. F.W. AC Train

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Alforder Prover Night A Period Trip Unit Rescion Nescion Las Por Night A Resci Prover Night A Period Correct Las Por Night A Period Correct Correct Correct Las Por Night A Period Correct Correct Correct Correct Correct Correct Correc	
Cu Limer Paser Night Les Peres Night P28 Press Night P28 Press Lu P28 Press Lu P28 Press Lu P29 Press Lu P29 Lu Lu P20 Lu P20 Lu Lu P20	

1	RESPONSE TIME	AULE (Continued)	IMLAT 8.1	PAGE & OF 11	Contraction of the
	Reaso	or Trips			THE REAL PROPERTY OF
function	CPC Rimon			• • • • • • •	The second second
Lesal Port Penalty MI	Processing (Corre	CLOD RESPONSE TIM	Tech. Spec.	Vorified	
1. Ex-Core Detectors			Accept. Crit.	Inisiai/Pere	6
TCN- 2. CEA Positions					
Ban 13. CAA Postows - Frwalty Fattor			.68 sec*	· · · · · · · · · · · · · · · · · · ·	2
1. factor a			-Steces		QN
1. Ex-Care Datectors		그는 것은 사람에서 생	.53 Sec		0
2. CEA PORIEION			60 mm		F
3. Cold Leg Tons.			.68 sec*		
4. Mot Log Toos.			.68 sec**	가격 수 집에 있는 것	N
			.68 sec##		
The roug shart speed			.68 sec##		
Co- 6. PRSRIR Protoure 7. Cen fustion Reading Factor HOTEL Cold and Maddle Factor					
NOTE: Cold and Not Log Tempera basis. Record the time 1. Cold Log Imp. 5	ture sensors		.68 sec###		
the correction of the	constants separately	se time tested on a s	153 Sec		
1. Call Log Imp. 5	ansurs.				
	value/units	Acceptance Criteria	Verified		
2. Nos Leg long. Sen		5.4 sec			
Street, Str		5.4 sec	initiei/date		
OIEDIES:	Value milts		Teleton		
outron detectors are astern			initiai/date		
unterinet shall be menselt tel frem tel	Line Line testing				
noutron detectors are exclused from te e chornel shall be menticited from de Response time shall be menticited from repinse time shall be menticited from	the cor output or input o	of first electronic	mutron flux signal and	the state	
repinse time shall be	the onset of a simile	CIA draw	omponent in channel.	reion er	
The montherit of I the	the manage of				······································
tesponse time shell be mastured from a por 18 months by morns of the Lou shell be less than or bqual to 6.0 Response time shall be massured from stant shall be less than or equal to tice interval remulted for the their pressure transmitter pressure.	the output and of	A Reactor Coolant P	ump cossidore	and shake the second	· · ·····
shell be less then or besst the Lou	B Current Step Reserves	or. fild response the	abell to		· · · · ·
Response time shall be manual to 0.0	encomde. (5.4 sec, ma	hul a Chu method. , The	mussured A of the	t lesst	7:
tice interval less then or equal to	the output of the pres	automate for a	+/- accurace of	The	12:
stant shall be less than or equal to time interval romutrod fun the that snashure transmitter pressure.	samiller to schieve the	pressure transmitter. I	the transmitter man	" and equipment)	115
	63.2	tof its total chang	e when sub ince is equi	velent to	2.
				step change	
		and a second sec		· · · · · · · · · · · · · · · · · · ·	In the Table
		the set of the second	· · · · · · · · · · · · · · · · · · ·		
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	1. 一葉 4		*. ······	In the set of the set of the	
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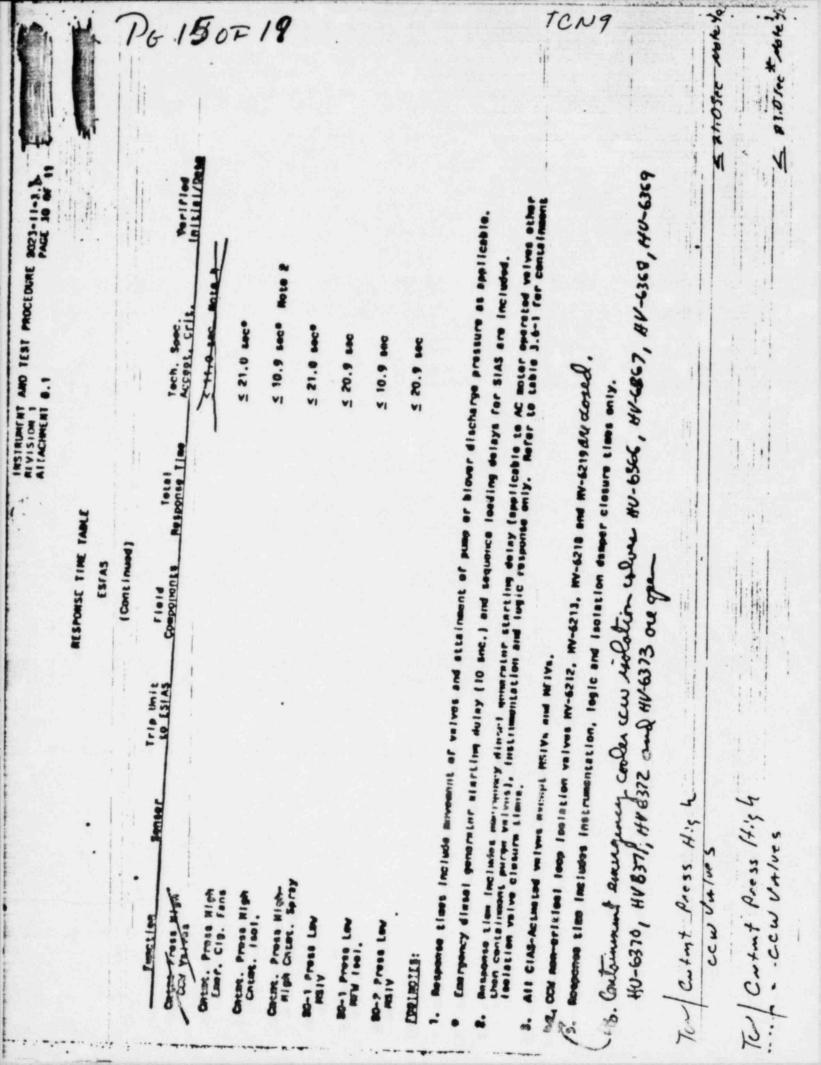
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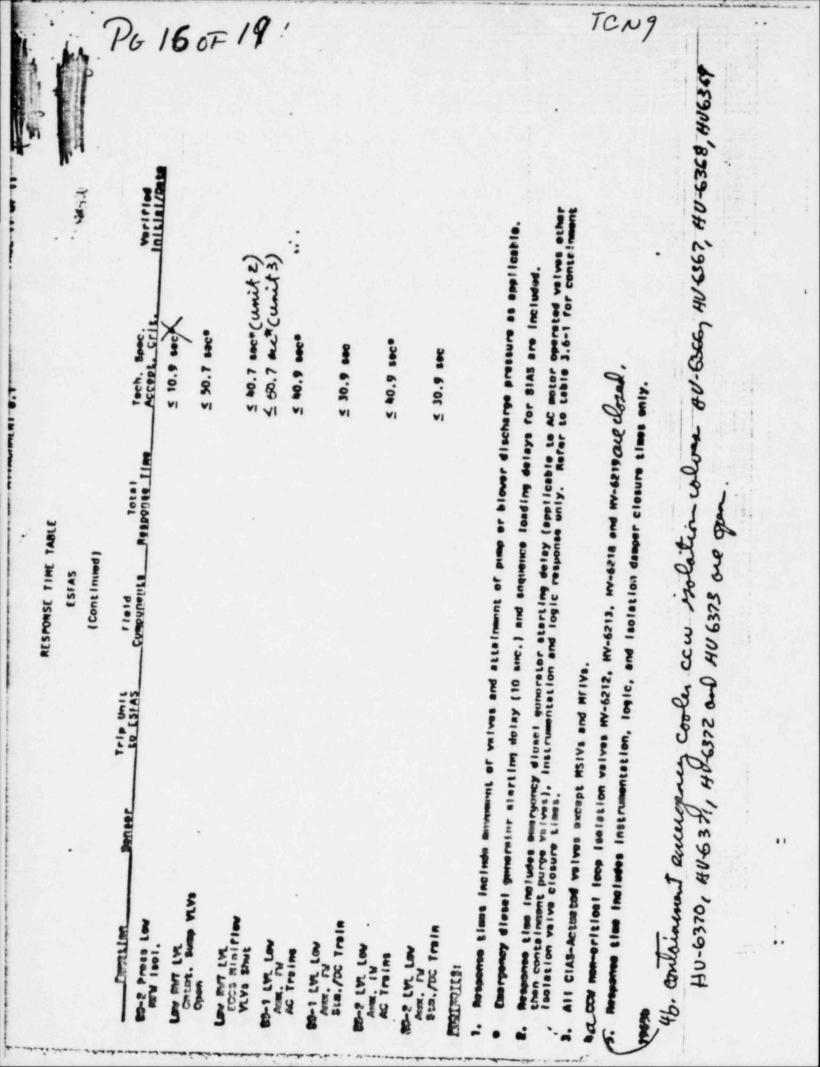
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RESPONSE TIME TABLE ESTAS	
18 8	Tech. Spec. Vertried Accept. Crit. Inisiei/Dete
The Prese Low	
Fill Prove Low Count. Borry France	2 23.6 tece
The Proves Leve	
	5 21.2 mm
Corner. Prove High Lung. Corner. Prove High	2 41.0 tec
Criter. Sorry Funge Mise. Prose High COM Panes	23.4 sec
ALTROICS:	£ 31.0 Mac.
Compares time include sovement of values and attainment of pump or blower discharge pressure as applicable. Compares time includes summarized delay (10 uec.) and sequence leading delays for SIAS are included. Supports time includes summarized distel generator starting delay (septicable to AC motor exerted values other and containment pumps values), instrumentation and logic response only. Astar to table 3.6-1 for containment All CIAS-Actuated values except MSIVs and MrIVs.	discharge pressure as applicable. elays for SIAS are included. le to AC motor secreted valves other herer to table 3.6-1 for containment
A moment in includes instrumentation, ionic, and isolation demos closed classifies configurate particular interaction indiction demos closer elevent.	1904 cland 1 1 m my. 4 V-6366, 646567, 4 V-6368 ; HV 6369
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RESPONSE TIME TABLE

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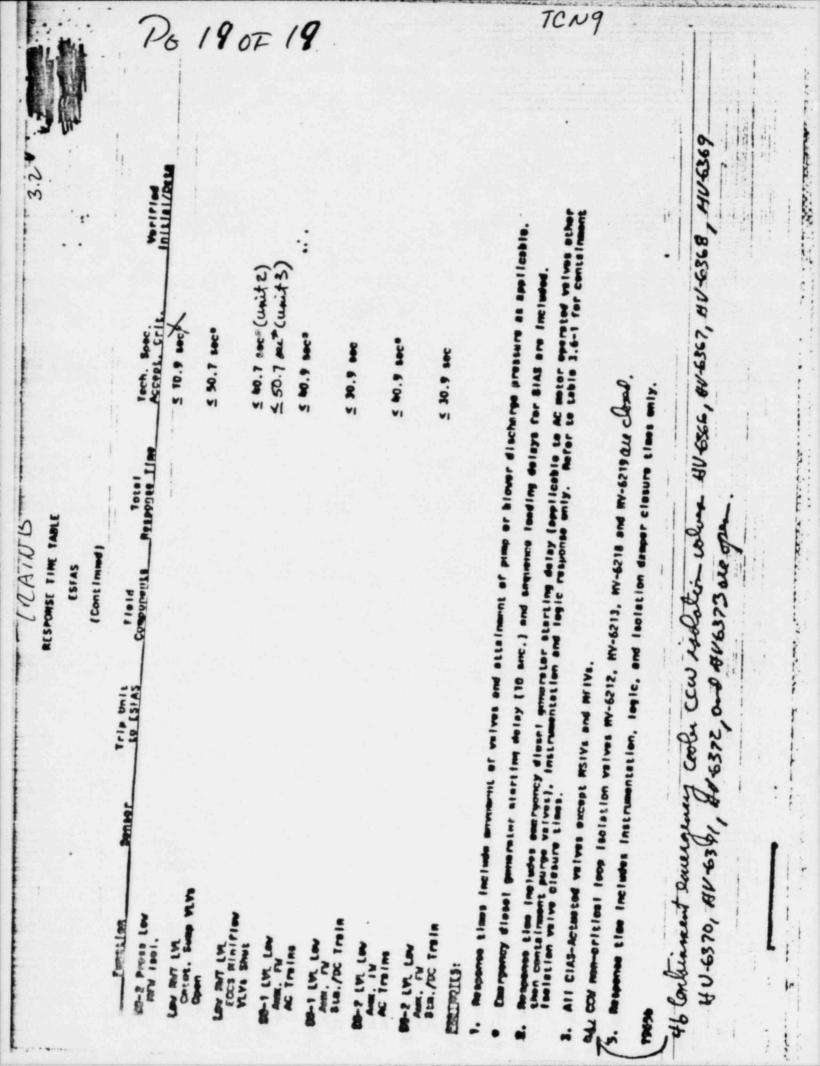
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•	- mellon	- Tenner	Trip Unit	Tield	Tetel	승규는 것은 것을 하는 것이 없다.		-
1	ITTSI LOW		LO ESTAS	Components	Response Time	Accept, Crit.	MoriPian IniList/peta	6
	LPSI Press Low					≤ 31.7 sec*		R
•	Contart. 1 pol.					5 41.2 sec*		6 OT
•	Catat. Saray Pumps					11.2 sec* Note and	-	T
	CON Putters					≤ 25.6 sec*		~
	TR Press Low					≤ 31.2 sec*		
	2R Ping Low					STU.2 Sec Bote &	Cc.	)
	R Proces					SASZAC Note 4	al to	.1 ]
	Emer. Cig. Fons						gr 110	0 7
0	Wrst Press High					5 21.2 sec*	61 -	
0	tat. Press High			(† 14) 19		5 41.0 sec*		
•	Child, Spray Pumps					≤ \$1.0 sec*		
-	COV Pumps					≤ 25.4 sec*		
12	I BOTTER:					≤ 31.0 sec*		
		sets manage						
•			t of valves and (	stisinment of p	ump ar blover dis	icharge pressure as app		
2.	100 hand as a loss form				TO TOUGING BOIDU	Pas Bills		-
	then containment pu	The VEIVES)	instrumentation	or starting de and logic res	iay (applicable t	a for SIAS are include a AC motor operated we r to table 3.6-1 for c	N. IVEL ather	2
3.	Att CIAS-Actusted V					to table 3.6-1 for c	ontelmont	7
- Q	CON REPORTIGIONI IN							
3.	CCM mon-eritiont to Response time inclu		Walves #V-6212.	W-6213, W-6	18 and W-6219 QA	e closed,	· · · · · · · · · · · · · · · · · · ·	
		100000	D	and isolation (		40.6367, 40.6368,	HV-6369, HV-6371	
						and the second		
-								

1 \$ \$1.0 In \* when y 18 OF E RIOSPE MUKYO 19 TCN 9 The se and This a line 46. Cartonnent energency contes ce violation ulane 110-6566, 41-6869, 111-6369, 110-6369 American time includes marrynny dinset wennene starting delay (applicable to AC motor operated values other then containment purge values), instrummination and lugic response only. Nefer to table 3.6-1 for containment Response times include arrownil of valves and stairment of pump or blower discharge pressure as applicable. THIS AN MOLES Eastgoncy dissel genoralint miarting duiny (10 and.) and sequence loading delays for SIAS are included. < 10.9 secs Note 2 Tech. Spec. Accept. Crit. 5 21.0 LOCO £ 21.0 Mec\* £ 20.9 sec £ 10.9 860 £ 20.9 800 Ma, CON MON-OFICIONI 1000 INVICTION VAIVUS MY-6212, 24-6213, MY-6218 AND MY-6219 BAY CLOSED. ATTACHMENT ... Arepones time includes instrumentation, legic and isolation demper closure times only. -----Field Fetal RESPONSE TIME TABLE [Continues] ESTAS HU-6370, HV 8371, HV 6372 Ond HV 6373 Ou gra-TRAIN 45 ------ALL CIAB-Actument without mussing ASIV, and Mitya. Trip Unit Ten Cutant Press High Ter Cutat Press High ccw Unlue S MER. Press High-High Chief. Seray Catest, Pross Wigh Last, Cig. Fans MEN. Press HIGH New Party inter Childen, 1001. Laves I an M-1 Press Law New Test, Lev MD-7 Press Law CONTROLLS: AISH AISH 



REFERENCE: SO123-VI-1.u SO123-VI-1.1	TEMPORARY CHANGE NOT	ICE
NOTE: Technical Specification Violati	on if not processed within the stated time limits.	
Procedure No. SO 23 -TT- 3	S. 2 Revision No. 1	TCN NO. 8
	conse Time Test &, ch	and R
Procedure Author	PAX /// Log / Witten	PAX
	(in known, writer)	
// A	e in effect: Attach a copy of the effected page(s), i	fapplicable
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2. Reason: alle Dere	as, missing procedulal	stops and
reased attaching	into i baddauit.	
3. Date originated2-	18-921 4. Issuance Date 12-1	For CDM Use Only)
	R or Tech. Spec. commitments? Yes No _	
<ol> <li>Does this change affect the n plant construction? Yes</li> </ol>	onradiological environment of any offsite area pre	viously undisturbed during site preparation and
<ol> <li>Is the intent of the original d</li> </ol>		
8. Is the document to be change	ed an Emergency and Abnormal Operating Instruc	tion? YesNo_K
(If the answer to 5, 6, 7 or 8 is Y	ES. & TCN is NOT Authorized.)	
9. Does this change affectively	go commitment requirements as stated in the Ref	erence Section? Yes No
10. Originator Bungs	linman	
11. Is the TCN to be incorporate	d into next permanent revision within 60 days of i	ssuance date? Yes X No *
* One time change only against P		Rev. No
12. Copy sent to the Nuclear Saf	et Group Group Grandos	12-21-82
13. Signatures Required:	COM SIGNATURE	DATE
ro. aignatures nequireu.		
SO1 **(Series)		1
	SO2, SO3, or SO23 (Series)	SO123 **(Series)
Approved by two OSRC members:	Approved by (a+least one (1) SP(0)	Approved by two OSRC members:
<u>1</u>	- " gally	· 1
<u>z]</u>	- their Bill	2)
Reviewed by entire Committee on. **	Final approval, AND	Reviewed by entire Committee on: **
DATE - MUST BE WITHIN 7 DAYS		DATE - MUST BE WITHIN 7 DAYS

.. SO1 and SO123 (series) TCNs will be routed to the OSRC with Routing Document SO(123) 109 which will be signed by the Station Manager.

Approved by \*\*\* (at least one (1) SRO)

COGNIZANT FUNCTIONAL STATION MANAGER

DATE - MUST BE WITHIN 14 DAYS

DEC 21 1982 CDM

. .

3)

4)

\*)

Approved by:

Daran 1

12-15-82

MUST BE WITHIN 14 DAYS

... Approval must be by two members of the plant management staff at least one of whom holds an SRO license on the unit affected. (For TCN approval, members of the plant management staff are defined as any Station Supervisor, including the level of foreman, exercising responsibility in the specific area and unit addressed by the change.) SITE FILE COP

SCE SO(123) 110 REV. 3 08/06/82

add following steps:

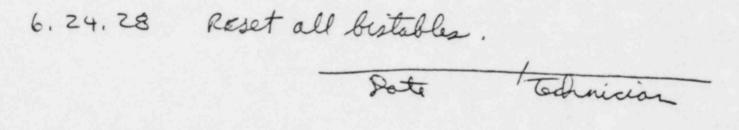
6.24.27 Disconneit the "Bistable test" leads and replace the enput semulator leads on the terminals they were removed from in step 6.24,2

technician Auti

100g 20216

TCN#8

procedure # 5073-II-3.2 K-1



6,24,29 Record the largest response Time Value of steps 6,24.22, 6.24,25 and 6.24.26 in the Data Collection table Technician Soto

SAN ONOFRE NUCLEAR GENERATING STATION UNITS 2 AND 3

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INSTR AND TEST PROCEDURE S023-11-3. Z. REVISION 1 PAGE 1 OF 11 ATTACHMENT 8.1

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## DATA COLLECTION TABLE

ATTACHMENT 8.1 DATA COLLECTION TABLE TCN (1) STEP NO. DESCRIPTION VALUE UNITS 6.2.12 PT-0101-2. High P2r Press 6.3.12 PT-0101-2. Lift P2r Press 6.4.12 PT-01012-2. Low P2r Press 6.5.12 PT-01012-2. Low SG-1 Press 6.5.12 PT-0102-2. Low SG-1 Press 6.5.12 PT-0032-2. Low SG-2 Press 6.5.12 PT-0032-2. Low SG-2 Press 6.5.12 PT-0351-2. High High Cont. Press 6.9.12 LT-1113-2. Low SG-2 I Press 6.9.12 PT-0351-2. High High Cont. Press 6.9.12 PT-0351-2. Low SG-1 Flow 6.12.12 PDT-0978-2. Low SG-1 Flow 6.14.16 TE-0112-2. 6.15.16 TE-9178-2. 6.15.16 TE-9178-2. 6.17.16 TE-9178-2. 6.18.4 RTSG Uncorrected 6.19.35 High Linear Power to RTSG 6.20.28 High Log Preamp 6.23.40 Low Temperature III+100x TT-9178-2. 6.23.40 High Temperature III+100x TT-9178-2. 6.23.40 Low Temperature III+100x TT-9178-2. 6.23.40 Low Temperature III+100x TT-9178-2. 6.23.40 Low Temperature III+100x TT-9178-2. 6.23.40 High Temperature III+100x TT-9178-2. 6.23.40 Low Temperature III+100x TT-9178-2. 6.24.20 Low SG-1 I Evel to FTSG 7.27.29 Low SG-1 I Evel to FTSG	tt
STEP NO.         DESCRIPTION         VALUE         UNITS           6.2.12         PT-0101-2. High Prr Press	\$11
6.2.12       PT-0101-2 High Pzr Press         6.3.12       PT-0102-2 Low Pir Press         6.3.12       PT-0102-2 Low SG-1 Press         6.5.12       PT-1013-2 Low SG-1 Press         6.5.12       PT-1023-2 Low SG-2 Press         6.6.12       LT-1113-2 Low SG-1 Press         6.6.12       LT-1112-2 Low SG-2 Press         6.6.12       LT-1112-2 Low SG-2 Level         6.8.12       PT-0351-2 High Cont. Press         5.9.12       PT-035-2 Low RwT Level         5.10.12       LT-035-2 Low SG-2 Flow         5.11.12       PDT-0978-2 Low SG-2 Flow         5.12.12       PDT-0978-2 Low SG-2 Flow         5.14.16       TE-0122-2         5.15.16       TE-9178-2         5.15.16       TE-9178-2         5.16.16       TE-9179-2         1.17.16       TE-9179-2         1.18.4       RTSG Uncorrected         1.19.35       High Log Preamp         -23.20       Low Temperature III+20CA       TT-9178 -2         .23.40       Low Temperature III+20CA       TT-9178 -2         .23.45       Dia Memperature III+20CA       TT-9178 -2         .23.85723       ST 1138 WI RCP Speed       S3.45         .23.85723       ST 1138 WI RCP Speed       <	0
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2.4.12       PI-1013-2. Low SG-1 Press $5.12$ PI-1023-2. Low SG-2 Press $2.6.12$ LI-1113-2. Low SG-1 Level $2.7.12$ LI-1123-2. Low SG-2 Level $8.12$ PT-0351-2. High Cont. Press $9.12$ PT-0352-2. High High Cont. Press $9.12$ PT-0352-2. Low SG-1 Flow $11.12$ PDT-0978-2. Low SG-2 Flow $12.12$ PDT-0978-3. Low SG-2 Flow $12.12$ PDT-0978-3. Low SG-2 Flow $14.16$ TE-0112-2. $15.16$ TE-0122-3. $16.16$ TE-0122-3. $17.16$ TE-9179-2. $18.4$ RISG Uncorrected $19.35$ High Log Bistable to RISG $20.28$ High Log Preamp $23.20$ Low Temperature III+2004 TT-9178-2. $23.43$ Low Temperature III+2004 TT-9178-2. $23.57.21$ Pzr Pressure $23.57.21$ Pzr Pressure $23.857.23$ ST 1134 WI RCP Speed $23.87.23$ ST 1134 WI RCP Speed $23.87.23$ ST 123 W2 RCP Speed $23.87.24$ ST 123 W2 RCP Speed $23.87.25$	
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23.95.23ST 113A W1 RCP Speed23.95.35ST 123 W2 RCP Speed23.95.46ST 133 W3 RCP Speed23.95.68ST 143 W4 RCP Speed24.29High Pzr Press to RTSG25.29Low Pzr Press to RTSG26.28Low Pzr Press to SIAS26.42Low Pzr Press to CCAS27.29Low SG-1 Level to RTSG29.29Low SG-1 Level to RTSG29.29Low SG-2 Level to RTSG29.29Low SG-2 Level to RTSG29.29Low SG-2 Level to RTSG29.29Low SG-2 Level to RTSG	
ST 123 W2 RCP Speed23,85,46ST 133 W3 RCP Speed23,85,68ST 143 W4 RCP Speed24,29High Pzr Press to RTSG25,29Low Pzr Press to RTSG26,28Low Pzr Press to SIAS26,42Low Pzr Press to CCAS27,29Low SG-1 Level to RTSG29,29Low SG-1 Level to RTSG29,29Low SG-2 Level to RTSG29,29Low SG-2 Level to RTSG29Low SG-2 Level to RTSG29Low SG-2 Level to RTSG	
23,85,46ST 133 W3 RCP Speed23,25,58ST 143 W4 RCP Speed24,29High Pzr Press to RTSG25,29Low Pzr Press to RTSG26,28Low Pzr Press to SIAS26,42Low Pzr Press to CCAS27,29Low SG-1 Level to RTSG29,29Low SG-1 Level to RTSG29,29Low SG-2 Level to RTSG29,29Low SG-2 Level to RTSG29,29Low SG-2 Level to RTSG29Low SG-2 Level to RTSG	
24.29High Pzr Press to RTSG25.29Low Pzr Press to RTSG26.28Low Pzr Press to SIAS26.42Low Pzr Press to CCAS27.29Low SG-1 Level to RTSG29.29Low SG-1 Level to EFAS-129.29Low SG-2 Level to RTSG29.29Low SG-2 Level to RTSG29.29Low SG-2 Level to RTSG	
25.29Low Pzr Press to RTSG26.28Low Pzr Press to SIAS26.42Low Pzr Press to CCAS27.29Low SG-1 Level to RTSG29.29Low SG-1 Level to EFAS-127.29Low SG-2 Level to RTSG29.29Low SG-2 Level to RTSG20.29Low SG-2 Level to EFAS-2	
26.28Low Pzr Press to SIAS26.42Low Pzr Press to CCAS27.29Low SG-1 Level to RTSG29.29Low SG-1 Level to EFAS-127.29Low SG-2 Level to RTSG20.29Low SG-2 Level to RTSG29Low SG-2 Level to EFAS-2	
26.42Low Pzr Press to CCAS27.29Low SG-1 Level to RTSG29.29Low SG-1 Level to EFAS-127.29Low SG-2 Level to RTSG20.29Low SG-2 Level to EFAS-2	
29.29 Low SG-1 Level to EFAS-1 27.29 Low SG-2 Level to RTSG 0.29 Low SG-2 Level to EFAS-2	
27.29 Low SG-2 Level to RTSG 0.29 Low SG-2 Level to EFAS-2	
0.29 Low SG-2 Level to EFAS-2	
Low SG-1 Press to MSIS	
3.29 Low SG-2 Press to RTSG 4.29 Low SG-2 Press to MSTS	
5.29 High Cont. Press to RTSG 6.28 High Cont. Press to CIAS	
P.41 High Cont. Proce to Crac	
6.55 High Cont. Press to SIAS	
7.29 Low SG-1 Flow to PTSC	
Low SG-2 Flow to RTSG	
1.29 High-High Cont. Press to CSAS	
Low Kwi Level to RAS	
429 Highap SG-2 to EFAS-2	

1. Pressurizer Pressure - Low

- a. SIAS (see Safety Injection)
- 2. Safety Injection
  - a. High Pressure Safety Injection

Field Comp.	Rec. Time	Test No.	Relay Time		1
*P017	1		I neray rime	Test No.	Total Time
*P018 (If aligned) *HV-9324 *HV-9327 *HV-9330 *HV-9333					

S023-II-3,2 K-1 Poge 40816 TCN# 8

# b. Low Pressure Safety Injection

*P015		
*HV-9325	지수 있었다. 그는 것은 지구가 안내 같은 것	
*HV-9328		

c. Charging Pumps

Contraction of the second seco	The second se
P-190	
P-191 (If Aligned)	

# Containment Isolation Emerg. Diesel Start Delay of 10 sec + instr. and Logic Response Only

## 4. Containment Spray Pumps

 	1 1 1 1	No. of Concession, name	and the second second
 · P -	102		
	LUC .		

# 5. Containment Emergency Cooling

a. CCW Pumps

*P-024	
*P-025 (If Aligned)	
1	

TRAIN A

# b. C.C.W. Valves (Non Critical Loop Isolation)

Field Comp.	Rec. Time	Test No.	Relay Time	Test No.	TCNA8
HV-6212				1	Total Time
HV-6218			Service Service		

5023-II-3.2

poge 50016

# c. C.C.W. Valves (Emergency Cooler Isolation)

HV-6366		
HV-6367	전에 걸고 집에 가장 걸었다. 김 가지와 한다.	
HV-6370	이 그 가지 않는 것 같아? 이 것 같아?	
HV-6371	상품 경험을 해 요구했다. 그는 것이 같아?	

### d. Emergency Cooling Fans

presented and an and an and an and an an and an and an and an and an and an and and			
*E-399		 	
*E-399 *E-401	그 유가 집 것 같은 것이 같은 생활했다. 같		
Sector of a division of the sector of the se			

## 6. Containment Pressure High

- a. SIAS (see Pressurizer Pressure Low)
- b. CIAS
  - (1) Containment Isolation (See Items)

## 7. Containment Pressure High High

- a. CSAS
  - (1) Containment Spray

Contraction of the second seco		
*HV-9367		 
*HV-6501	이 이 옷을 위해 집안이 가져졌다. 것	Same in the second second

## 8. Steam Generator Pressure Low

- a. MSIS
  - (1) Main Steam Isolation (MSIV)

HV-8204	
HV-8205	

### (2) Main Feedwater Isolation

SOZ3-II-3,2 Poge 60\$16 R-1 TCN# 8

Field Comp.	Rec. Time	Test No.	Relay Time	Test No.	Total Time
HV-4048		T	1		1
HV-4052					
L		Sector States and			

(3) Steam, Blowdown, Sample and Drain Isolation

HV-4054 HV-4058			
HV-8203			
HV-8248	김 씨는 지수가 같다.	13 Dec.4 944	
HV-8219			

(4) Auxiliary Feedwater Isolation

HV-4705 HV-5713						
HV-4730						
HV-4731	이 있는 것이 같은 것이?					
the second se						

9. Refueling Water Storage Tank

a. RAS

(1) Containment Sump Valves Open

	*HV-9303	
21	FCCC Ministra Maria	

(2) ECCS Miniflow Valves Shut

*HV-9306 *HV-9307			
L			

- 10. 4.16 KV. Emergency Bus Undervoltage
  - a. LOV (Loss of voltage and degraded voltage)

SO23-TE-3,2 poye 7916 TCN#8 R-1

11. Steam Generator Level-Low With Either No Pressure-Low Trip or △P-High

- a. EFAS
  - (1) Aux. F.W. (AC Train)

Field Comp.	Rec. Time	Test No.	Relay Time	Test No.	Total Time
P-141 *HV-4713 *HV-4731 *HV-4054					•

(2) Aux. F.W. (Steam/DC Train)

S/G #1 (E089) P-140 HV-4706 HV-4716 HV-4715 HV-4054			
S/G #2 (E088) P-140 HV-4716 HV-4705 HV-4730 Hv-4053			

- 1. Pressurizer Pressure Low
  - SIAS (See Safety Injection)

Field Comp.

\*P019

\*HV-9323 \*HV-9326 \*HV-9329 \*HV-9332

- 2. Safety Injection
  - a. High Pressure Safety Injection

\*P018 (If aligned)

Test No.	Relay Time	Test No.	Total Tim
----------	------------	----------	-----------

b. Low Pressure Safety Injection

and the second s	
*P016	
*HV-9322	
*HV-9331	
A REAL PROPERTY OF THE PARTY OF	

TRAIN B

c. Charging Pumps

P-192	
P-191 (If Aligned)	
hanness and an and an an an and an an an and an	

3. Containment Isolation

Emerg. Diesel Start Delay of 10 sec + 'str. and Logic Response Only

Rec. Time

4. Containment Spray Pumps

*P-103	
1-105	

- 5. Containment Emergency Cooling
  - a. CCW Pumps

*P-026	
*P-025 (If Aligned)	
1	

SO23-II-3,2 Joy 8 9/16

SO23-II-3.2 E-1 poge 9 416.

b. C.C.W. Valves (Non Critical Loop Isolation)

Field Comp.	Rec. Time	Test No.	Relay Time	Test No.	Total Time
HV-6213 HV-6219					Lotors - Look - State gran

c. C.C.W. Valves Emergency Cooler Isolation

HV-6368			
HV-6369	2 M		
HV-6372			
HV-6373			

d. Emergency Cooling Fans

Comment of the owner owne	provide states of the second party of the second states of the second states of the second states of the second	and the second se	the second s	
*E-400	States and setting			
*E-401				
-E-401		a sa ini ini ina sa ini i		

### 6. Containment Pressure High

- a. SIAS (see Pressurizer Pressure Low)
- b. CIAS
  - (1) Containment Isolation (See Items)

## 7. Containment Pressure High High

- a. CSAS
  - (1) Containment Spray

for the second s	No. of Concession, Street, Stre	and the second se	and the second	
*HV-9368 *HV-6500				
*HV-6500			2012년 2월 28일 문화	
		and the second	A CONTRACTOR OF	

- 8. Steam Generator Pressure Low
  - a. MSIS
    - (1) Main Steam Isolation (MSIV)

Personal and the second s	
HV-8204	
HV-8205	
the second se	the second s

### Main Feedwater Isolation

5023-72-5.2 Paye 10g/16 R-1 TENAS Field Comp. Rec. Time Test No. Relay Time Test No. Total Time HV-4018 HY-4052

#### (3) Steam, Blowdown, Sample and Drain Isolation

HV-4053 HV-4057			
HV-8202		전 문화 가지 않는 것	
HV-8249		지, 이 가지 않아요.	AND SHEEP IN SHEEP IN A SHEEP IN A
HV-8221	and the second		

#### (4) Auxiliary Feedwater Isolation

HV-4706		
HV-5712		
HV-4714		
HV-4715		

#### 9. Refueling Water Storage Tank

### RAS

(1) Containment Sump Valves Open

	*HV-9302	
	Sector Supervised and the sector of the sect	
10	FOOR WE ARE	

(2) ECCS Miniflow Valves Shut

and the second		
*HV-9347	1	
*HV-9347 *HV-9348	A Contract Mark	
L		

## 10. 4.16 KV. Emergency Bus Undervoltage

a. LOV (Loss of voltage and degraded voltage)

(2)

S023-II-3.2 R-1 Arge 11 g16 TCN # 8

- 11. Steam Generator Level-Low (With Either No Pressure-Low Trip or  $\triangle P$ -High)
  - a. EFAS
    - (1) Aux. F.W. AC Train

Field Comp.	Rec. Time	Test No.	Relay Time	Test No.	Total Time
*P-504 *HV-4712 *HV-4714 *HV-4053					

RESPON	ALTACHMENT &	ALTACHMENT 8.1 PAGE 7 OF11		ainai Kal
Read	RESPONSE TIME TABLE Reactor Trids			tow# 8.
Function Sensor Trip Unit RI	Total Response Time	Tech. Spec. Accept. Crit.	Verified	
Los Per High	V			
PZA Press High	VI	45 sec*		
PZR Press Low	VI	≤ .90 sec		
Cntmt. Press High	VI	≤ .90 sec	•	
SG-1 Press Low	VI	5.90 880		
50-2 Press Low	VI	2 .90 sec		
80-1 LVL LOW	vi	5.90 sec		
80-2 LVL LOW	VI	5.90 sec		
SG-1 LOW FIOW	VI	≤ .90 sec		
SG-2 Low Flow	VI	≤ .90 sec		
EDOINOIES:	VI	5.90 sec		

\* -

dotoctor outplat or input of first electronic component in channel. estasponse time shall be measured from the onset of a single CEA drop.

PResponse time shail be measured from the unset of a 2 out of 4 Reactor Coolant Pump coastdown.

#Response time shall be monestrud from the output of the sensor. RID response time shall be measured at least once per 18 months by muans of the loop timent. Step Response (LCSR) method. The measured R of the slowest T

RTD shall be less than or equal to 6.0 suconds.

###Response time shall be munsured from the output of the pressure transmitter. The transmitter response time constant shall be less than or equal to 0.1 seconds viere the pressure transmitter response time is equivalent to the time interval required for the transmitter to achieve 53.2% of its total change when subjected to a step change

INSTRUMENT	AND	TEST	PROCEDURE	600
REVISION 1			THOULDUNE	
ATTACHMENT	8 1			PAG

		~		
SAN ONOF CLEAR GENERATING STATION		INSTRUM	ENT AND TEST PROCEDURE SO23-11-3.2	Page 135716
		REVISION		
	RESPONSE TIME T	ABLE (Continued)		TCN#8.
		or Trips		TUN
Function CP	C Signal RISC	a total		
Local Power Density Hi	ocessing [Correc	(ted) Response Time	Tech. Spec. Verified Accept. Crit. Initial/De	
1. Ex-Core Detectors				
2. CEA Positions			.68 sec*	
DHBR_LOW			,68 	
1. Ex-Core Detectors				
2. CEA Position			.68 sec*	
3. Cold Leg Temp.			.68 sec**	
4. Hot Leg Temp.			.68 sec##	
5. RC Pump Shaft Speed			.68 sec##	
6. PRSRZR Pressure			.68 sec#	
MOTE: Cold and Hot Leg Temperature basis. Second the time cons	sensors are respon	se time tested on a su		
1. Cold Log Tomp. Sense	tants separately.	a and toated on a sti	and alone	
server and some outer	value/units	Acceptance Criteria 5.4 sec	Verified	
2. Hot Leg lump. Sunsur			initial/date	
QINOIES:	value units	5.4 sec	initial/date	
aut ron determine				
eutron dotoctors are exampt from tespen • channel shall be mentioned from dotect Response time shall be mentioned from th	and Lime testing. R	esponse time of the new	ULTON Flux stands	
the second second second from the	III ODLOT OF a all		chiefter.	
sponse time shall be measured from the	to onsol of a single	CEA drop.		
Response time shall be measured from the	misat of a 2 out of	f 4 Reactor Coolant Pum	np coasidown.	
Response time shall be measured from the e per 18 months by means of the loop ( shall be less than or equal to 6.0 so Response time shall be measured from t stant shall be less than or equal to 0 time interval required for the term	urront Step Response	sor. RID response time	shall be measured at least	
Response	CS. Ther, me	the alling the there has	LING BIOWOBL	N 1
Response time shall be measured from t stant shall be less than or equal to 0 time interval required for the transm pressure transmitter processor	he output of the pre	ssure transmitter. Th	" transmitter of the test equip	ment) !
istant shall be less than or equal to 0 time interval required for the transm pressure transmitter pressure.	itter to achieve 63.	2% of its total change	response time is equivalent to when subjected to a step change	

SAN ONOFR. JCLEAR GENERATING STATION UNITS 2 AND 3

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12. 1 4. 24

17

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\*r 4 4%

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INSTRUMENT AND TEST PROCEDURE SO23-11-3 2 REVISION 1 PAGE 9 OF 11 ATTACHMENT 8.1

page 14 08 16. TCN# 8.

#### RESPONSE TIME TABLE

ESFAS

Eunction	Sensor	to ESFAS	Field Components	Total Response Time	Tech. Spec. Accept, Crit.	Verified Initiel/Dete
HPSI					≤ 31.2 sec*	
PZR Press Low LPSI					≤ 41.2 sec*	
Cotet. 1sol.					≤ 11.2 sec* Note 2	
Cotat. Spray Pumps					and 3 ≤ 25.6 sec*	
CON PUMPS					≤ 31.2 sec*	
PZR Press Low CCW Valves					2 N.2 600 Note 4 a	
CCCW Column PZR Press Low Emer. Cig. Fons					< 23,2 sec Note 4 1 ≤ 21.2 sec*	•
Antmt. Press High					< 41.0 sec*	
Cotat. Press High LPSI					≤ 41.0 sec*	
Cotmt. Spray Pumps					<u>≤</u> 25.4 sec*	
CCW Pumps					≤ 31.0 sec*	
COTMOTES:						
. Response times inc	lude movemen	t of valves and	attainment of	pump or blower die	charge pressure as app	
Emergency dissel g	enerator sta	rting delay (10	sec.) and secu		s for SIAS are included	licable.
			and a solution	industring delay	a tor sins are included	<b>.</b>

 Response time includes emergency diesel generator starting delay (applicable to AC motor operated valves other than containment purge valves), instrumentation and logic response only. Refer to table 3.6-1 for containment isolation valve closure times.

3. All CIAS-Actuated valves except MSIVs and MFIVs.

Da. CCM non-critical loop isolation valves HV-6212, HV-6213, HV-6218 and HV-6219are closed

5. Response time includes instrumentation, logic, and isolation damper closure times only.

46. containment energency cooler ccw solation volves #V-6366, AU-6367, #V-6368, HU-6369 HI16370, HV.6377 HIL6377 and HI16273 are man

INSTRUMENT AND TEST PROCEDURE S023-11-3

Page 15 of 16 TCN# 8

#### RESPONSE TIME TABLE

ESFAS

#### (Continued)

Eunction	Sensor	to ESTAS	field Components	lotal	Tech, Spec.	
Contat Press High CCW Vertves			20mpoliolits	Response Time	Accept. Crit.	Verified Initial/Date
Cntat. Press High Emer. Cig. Fens					< 11.0 see Note 4	
Cntmt. Press High Cntmt. Isol.	1.				≤ 21.0 sec*	
Contest. Press High- High Contest. Spray					≤ 10.9 sec* Note 2	
SG-1 Press Low MSIV					≤ 21.0 sec*	
SC-1 Press Low NFW Isol.					≤ 20.9 sec	
SC-2 Pross Low NSIV					≤ 10.9 sac	
FOOIMOTES.					≤ 20.9 sec	

#### LANT ANT PARTY

\*\*\*\*\* ...\*\* · \*

1.

Response times include movement of valvos and attainment of pump or blower discharge pressure as applicable.

Emergency diesel generator starting dutay (10 sec.) and sequence loading delays for SIAS are included. 2.

Response time includes unergoncy dimet generator starting delay (applicable to AC motor operated valves other then containmont purgo valvos), instrumontation and logic response only. Refer to table 3.6-1 for containment

3. All CIAS-Actuated valves except MSIVE and MEIVE.

to CCW non-oritical loop isolation valvus HV-6212, HV-6213, HV-6218 and HV-6219042 closely Response time includes instrumentation, logic and isolation damper closure times only.

45, Containment enveryonen cooler CCW isolation colver HV-6366, HV-6367, HU-6568, HV-6369 HV-6370, HV-6371, HO-6372 and HV-6373 are you.

SAN ONOI JCLEAR GENERATING STATION

INSTRUMENT AND TEST PROCEDURE SO23-11-3

poge 16.8 16. TCN# 8

### RESPONSE TIME TABLE

#### ESFAS

(Continued)

Function	Sensor	to ESFAS	field Components	Response Time	Tech, Spec.	Verified
MEW Isol.					Accept. Crit.	Initial/Data
Low RVT LVL Cntst. Sump VLVs Open					≤ 50.7 sec*	
LOW MAT LVL ECCS Miniflow VLVs Shut					≤ 40.7 sec*(uni	· /
AUX. FW					≤ 50.7 cec*(uni ≤ 40.9 soc*	x3)
AIDE. FW AIDE. FW Stm./DC Train					≤ 30.9 sec	
Aux. IN Active Trains					≤ 40.9 sec*	
Aux. FW Stm./DC Train					≤ 30.9 sec	
OOINOILS:						
. Response timos inc	inda movemen	L OF VALVOE and				
<ul> <li>Response timus inc Emergency diusei g</li> </ul>	unorator stat	tim dotay (10	accarment of p	nump or blower dis	charge pressure as a	pplicable.
. Response time incl	udes emurgana	y diuset autors	Loc stanting da	ince loading delay	charge pressure as an for SIAS are includ	ded.
isolation valve ch	urge valves), osure times.	instrumentatio	n and logic res	ponse unly. Refe	AC motor operated v to table 3.6-1 for	alves other
All CIAS-Actuated	valves except	MSIVs and MILV				conternment
CCW non-oritical in	pop isolation	VALVAS HV-6212	HV-6213 HV-6		0 0	
. Response time inclu	udes instrume	ntation, logic,	and isolation	damper closure tim	e closed,	
<b>2656</b>						
46. containment	t encerges	ney cooler	cour int	tion of		11000 11000000 11000
HU-6370,	40-6371,	HU-6372 and	HU 6373 0	and color	2 AU-6566, AU	16367, 40-6368, 40636
				ypin.		

PAGE 1 of 6

### TEMPORARY CHANGE NOTICE

NOTE	TECHNICAL SPECIFICATION	NOLATION IF NOT PROCE	SSED WITHIN THE STA	TED TIME LIMITS	
Proced	ure No. 5023 - II - 3.2.	Revision No	01	TCN NO. 7	
Proced	no Tillo Plant Protecti	on system Respon	Time Test	for channel	B
Proced	ro Author Dan Asay	PAX 1685 (11	known, Writer)		XAX
١.	The following change shall be i	n effects Atlach a copy of	the effected page(s), If	applicable	
	:	SEE Attach	ed pages	,	RECEIVED
2.	Rosson: Typographical	errors, reword	ing, deletions		NOV 1 198
3.	Date ariginated 10-20-8	2			CDM SITE
4.	Issuance date 10-20	-82 Fer	CDAI Use Only)		Comone
5.	Does this change affect FSAR a	r Tech. Spec. commitment	YES NO	X	
6.	Does this change affect the non plant construction? YES	radiological environment of	any offsite area previo	ously undisturbed during a	te preparation and
7.	is the intent of the original docu		NO X		
8.	is the document to be changed a			YES NO X	
	(If the answer to 5, 6, 7 or 8 is 1				/
9.	Does this change affect licensin			ance Section? VES	~~~
10.	Originator Lian fills	say	10-20-82/120 Dute/Time	2	
11.	Is the TCN to be incorporated in				
	"One time change only against F				····
12.	Copy sent to the Nuclear Safety		uls_		
		CDM Signatur	•	Date	
	Signatures Required:				
1	* (Series)	5023 (Series)	501	23+*(Series)	
Appri	oved by two OSRC members:	Approved by:		roved by two OSRC memb	Hers:
-		molor	A		
Revie	twed by entire Committee an:**	Final approvator OW	Revi	ewed by entire Committe	e an;**
Dute	MUST BE WITHINT DAYS	Brein Ke	5 Dure	MUST BE WITHIN T DA	Ŷ\$Ĵ
		Cognizant Functional Sta 10-27-9 Date (MUST BE WITHOUT)	2 lat le	oved by:*** sast one (1) SRO)	
			Аррг	oved by a	
	STE FU	E COP	Con	izant Functional Station A	Aanayer
			Date	MUST BE WITHIN 14 DA	¥5)

SOI and SOI23 (series) TCNs will be routed to the OSRC with Rauting Document SO(123)-109 which will be signed by the Station Manager.

Approval must be by two members of the plant management staff at least one of whom holds an SRO license on the unit affected. (Far TCN opproval, members of the plant management staff are defined as any Station Supervisor who holds an SRO license including the level of toreman, exercising responsibility in the specific area and unit addressed by the change.)

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INSTRUMENT AND TEST PROCEDURE SO23-11-3.2 REVISION PAGE 97 PAGE 2 of 6

6.0 PROCEDURE

CIMUD DI ..

operating temperature

at

below the RTD resistance

してい

à

545 °F

420 chms at

(Approximately

1.5.8

6.13.1.4 "Voltage Adjustment" fully counterclockwise.

.5 Current selector switch in LOW position.

.6 Range selector to "20" VDG. FOSITION GAIN TO "100".

TCI 7

.7 Voltmeter internal/external switch in "INT" position, and connect a DVM to "EXT DVM" Jack .

Date Technician

6.13.2 Ensure ERT-1 power switch, located in back, is in the OFF position, then connect 115 VAC power to the ERT-1 and the ELC-1.

Date Technician

NOTE: Refer to Figure A-5 for the following steps:

6.13.3 Connect a cable from the ERT-1 "OUTPUT" BNC connector to the ELC-1B "ANALOG IN" BNC connector.

Date Technician

6.13.4 Connect a cable from ELC-18 "TRIGGER BNC" connector to the ERT-1 "CONTROL IN" BNC connector.

Date Technician

6.13.5 Place ERT-1 power ON/OFF toggle switch to the "ON" position and verify "POWER" LED energized.

Date Technician

6.13.6 Press ELC-1B "ON/OFF" pushbutton and verify that the light energizes. The "START" light, "TEST/DUMP" light, and "READY" LED should also energize.

	1
Date	Technician

INSTRUMENT AND TEST PROCEDURE 5023-11-3.2 REVISION 9 PAGE 102 PAGE 3 of 6 TCO 7

6.0 PROCEDURE

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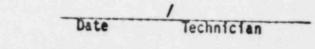
- 6.15 Loop Current Step Response Testing of Cold Leg Temperature Sensor TE-9178-2
  - NOTE: For most consistent results, the temperature of the reactor coolant should be approximately 540°F.
  - 6.15.1 In Spec 200 cabinet L-125, remove the RTD leads from terminals 17 and 18 of TB-1 and connect them to the sensor connector strip on the ERT-1.

Date Technician

- 6.15.2 Adjust the "TRIM" pot on ERT-1 until the amplifier offset voltage is ZERO. (Trim switch UP).
  - NOTE: The amplifier offset voltage must be checked and set to zero whenever the GAIN is changed.

Date Technician

6.15.3 Place the "IRIM" switch in the DOWN position.



-6:15:4 Place current selector switch in the "HIGH" position.

Date Technician

Balance the Wheatstone bridge by adjusting the coarse resistor network switches and the fine decade resistors until the bridge output reads ZERO.

\* reverse the order of 6.15.4, 6.15.5

\* 6.15.5

\* 6.15.4

3

-6.15.5

Date Technician

NOTE: Bridge output is only indicated on the voltmeter when the voltmeter selector switch is in the "D" position. Allow at least three minutes for the reading to stabilize.

INSTRUMENT AND TEST PROCEDURE SO23-11-3.2 REVISION PAGE 103 PAGE 4 of 6

6.0 PROCEDURE

6.15.6

Move the voltmeter selector switch on ERT-1 to the "B" position and adjust the supply voltage to approximately & Vdc. This provides & made through the RTD assuming the bridge is still balanced. Allow three minutes for stabilization time.

Repeat steps 6.15.5 and 6.15.6 until no further edjustments are necessary. Allow at losst three minutes for the readings to stabilizer

6.15.0

A

6.15.10

6.15.7

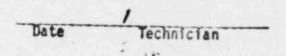
Move the current selector switch to the "LOW" position and rebalance the bridge. Allow three minutes for stabilization time.

6.15.9 Place the current selector switch to "HIGH". Allow reading to stabilize. Do NOT rebalance the bridge.

	1
Date	Technician

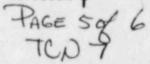
Adjust the amplifter gain of ERT-1 to obtain as close as possible to 5.0 Vdc on the voltmeter with the voltmeter selector switch in position "D". With this 5:0 Vdc to the analog input BNG of the ELC-18, the ELC-18 digital indicator should read approximately 4095 when ELC-18 is in "READY" mode with "Test/Dump" pushbutton pressed. Position Guin subctor switch at the lowert value to provide 29.90 VDC. Turn voltage adjust "ccw" to obtain 9.90 VDC

NOTE: The amplifier offset voltage must be checked and set to zero whenever the GAIN is changed. Trim switch must be up to adjust the offset and down at all other times.



5. 5.

INSTRUMENT AND TEST PROCEDURE SO23-II-3.2 REVISION PAGE 104



6.0 PROCEDURE

6.15.44

10

11

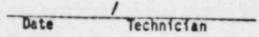
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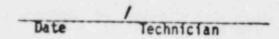
Place current selector switch in "LOW" position and ensure bridge returns to a balanced condition. A slight adjustment of the decade resistors may be necessary.



6.15.12 Ensure the "AVERAGE/SINGLE SHOT" selector switch on the ELC-1B is in the "AVERAGE" position.



6.15.79 With the ELC-1B in the "READY" mode, press the "START" pushbutton. The ELC-1B should go the "SAMPLE" mode for 20 seconds during which time the analog output of the ERT-1 should rise. Then the ELC-1B should return to the "READY" mode.



Date Technician

- 6.15. Allow the bridge to return to a balanced condition, and rebalance if required.
- 14
- 6.15.45

Repeat steps 6.15.15 and 6.15.14 nine additional times. On the tenth sample the ELC-1B should go to the "SAMPLE" mode for 20 seconds, then "ANALYZE" mode until the calculations are complete. Then the ELC-1B will go the "DISPLAY" mode.

Date Technician

15 6.15.<del>16</del>

With the ELC-IB selector switch in position "D", the digital indicator should read the average total time constant for all ten samples.

NOTE: This value represents the amount of time, in seconds, that it takes for the RTD to reach 63.2% of the step change. Record this response time in the "DATA COLLECTION TABLE" at the back of this procedure.

Technician Date

16

17

18

INSTRUMENT AND TEST PROCEDURE \$023-11-3.2 REVISION PAGE 6 6 6 TCN 7

6.0 PROCEDURE

6.15.17 In Spec 200 cabinet L-125, replace the RTD leads on terminals 17 and 18 of TB-1.

Date Technician

6.15.19 Turn the "VOLTAGE ADJUSTMENT" on the ERT-1 fully counterclockwise.

Date Technician

6.15.19 Press the "RESET" pushbutton on the ELC-1B and verify that the analyzer returns to the "READY" mode.

Technician Date

- 6.16 Loop Current Step Response Testing of Hot Leg Temperature Sensor TE-0122-2
  - NOTE: For most consistent results, the temperature of the reactor coolant should be approximately 540°F.
  - 6.16.1 In Spec 200 cabinet L-125, remove the RTD leads from terminals 2 and 3 of TB-1 and connect them to the sensor connector strip on the ERT-1.

Technician Date

6.16.2 Adjust the "TRIM" pot on ERT-1 until the amplifier offset voltage is zero. (Trim switch up).

NOTE: The amplifier offset voltage must be checked and set to zero whenever the GAIN is changed.

Technician Date

SAN ONOFRE NUCLEAR GENERATING STATION	INSTRUMENT AND TEST PROCEDURE	SO23-II-3.2
UNITS 2 AND 3	REVISION 1	PAGE 1
EFFECTIVE DATE: JUN 2 1 1902	CDM ENCODE NO. NC119-TRP	FAGE 1

## PLANT PROTECTION SYSTEM RESPONSE TIME TEST FOR CHANNEL B (Eighteen Month Interval)

	Section		Table of	Con	itents		Page
1.0 2.0 3.0 4.0 5.0 6.0	PRECA	ENCES DUISITES UTIONS -OFF LIST					2 2 4 4 6 6
	6.1 6.2 6.3 6.4 6.5	Response Time Response Time	Testing Testing Testing	of of	Low Pressurize Low SG-1 Press		or 18 or 26 33
	6.6				Low SG-2 Press Low SG-1 Level		40 47
	6.7	Response Time	Testing	of	Low SG-2 Level	Sensor	54
	6.8					Pressure Sensor	
	6.9 6.10	Response Time	Testing	of		Pressure Sensor	
		Water Tank Le	vel Senso	or			75
	6.11				Low SG-1 Flow		82
	6.12 6.13	Test Equipmen	t Set Up	for	Low SG-2 Flow Loop Current	Step Response	89
					perature Detec		96
	6.14	Loop Current Temperature S			e Testing of H 2-2	lot Leg	98
	6:15				e Testing of C	old Leg	100
	6.16	Temperature S			e Testing of H	lot Log	102
	0.10	Temperature S				ou Leg	105
	6.17				e Testing of C	old Lea	105
		Temperature S					109
	6.18				esponse Time U	ncorrected	113
		High Linear P	ower to F	RTSG	Response Time		115
					TSG Response T		122
					D and Low DNBR		129
		CPC/CEAC Resp		e Te	sting		129
		RTD-CPC I/O R			· · · · · · · · · · · · · · · · · · ·	1	136
	6.24				to RTSG Respo		189
					to RTSG Respon		193
					to ESFAS Respo	nse lime	197
	6.27	Low SG-1 Leve					204
	6.29	Low SG-1 Leve Low SG-2 Leve					209 214
	N + E. d	FOU ON F FEAG	1 CO MIDO	1 1/6	sponse i me		614

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SAN ONOFRE NUCLEAR GENERATING STATIONINSTRUMENT AND TEST PROCEDURE S023-II-3.2UNITS 2 AND 3REVISION 1PAGE 1AEFFECTIVE DATE:CDM ENCODE NO. NC119-TRP

## PLANT PROTECTION SYSTEM RESPONSE TIME TEST FOR CHANNEL B (Eighteen Month Interval)

Section	Table of Contents	Page
6.30	Low SG-2 Level to ESFAS Response Time	218
6.31	Low SG-1 Pressure to RTSG Response Time	223
6.32	Low SG-1 Pressure to ESFAS Response Time	228
6.33	Low SG-2 Pressure to RTSG Response Time	233
6.34	Low SG-2 Pressure to ESFAS Response Time	237
6.35	High Containment Pressure to RTSG Response Time	242
6.36	High Containment Pressure to ESFAS Response Time	247
6.37	Low SG-1 Flow to RTSG Response Time	255
6.38	Low SG-2 Flow to RTSG Response Time	260
6.39	High Containment Pressure to ESFAS Response Time	264
6.40	Low RWT Level to ESFAS Response Time	269
6.41	High SG-1 Differential Pressure to ESFAS Response Time	273
6.42	High SG-2 Differential Pressure to ESFAS Response Time	278
6.43	Restoration	283
RECORD	05	286
ATTACH	IMENTS	286

### LIST OF EFFECTIVE PAGES

PAGE NO					RE	VISION NO.
1 - 2 3 - 284 285						1 0
Attachment	8.1	Pages	(1 -	11)		
Attachment	8.2	Pages		7)		1
Attachment		Pages	(1)			1
Attachment	8.4	Pages	(1 -	3)		1
Attachment		Pages	(1 -	4)		1
Attachment	8.6	Pages	(1 -	3)		1
Attachment	8.7	Pages	(1)			1
Attachment	8.8	Pages	(1 -	3)		i
Attachment	8.9	Pages	(1 -	5)		1
Attachment	8.10	Pages	(1 -	2)		1
Attachment		Pages	(1 -	3)		1
Attachment			(1 -	8)		1

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7.0

**REVISION 1** PAGE 2

### PLANT PROTECTION SYSTEM RESPONSE TIME TEST FOR CHANNEL B (Eighteen Month Interval)

#### 1.0 OBJECTIVES

1.1 To verify that the PPS trip paths response times are in accordance with Technical Specifications 4.3.1.3 and 4.3.2.3 and tables 3.3-2 and 3.3-5

#### 2.0 REFERENCES

- San Onofre Units 2&3 Final Safety Analysis Report, Amendment 24. 2.1 dated April 1981.
- 2.2 Applicable Logic, Functional, P&ID Elementary, and Interconnection diagrams.
- 2.3 Applicable Manufacturers technical manuals.
- Calibration procedures are specified in this instruction. 2.4

#### 3.0 PREREQUISITES

- The Watch Engineer's approval is required prior to the beginning 3.1 of the work.
- 3.2 Equipment clearance(s) or permission, as applicable, must be obtained from the Control Operator Before beginning work.
- An approved equipment outage request (OD-16) if required, is on 3.3 file in the Control Room.
- Check the applicable radiation and contamination survey 3.4 information BEFORE entering the job area. Use this survey information to assist in maintaining your exposure ALARA.
- 3.5 Measuring and test equipment to be used for this calibration shall have an accuracy at least four times the allowable accuracy of the device to be calibrated.

SAN ONOFRE NUCLEAR GENERATING STATION INSTRUMENT AND TEST PROCEDURE S023-II-3.2 UNITS 2 AND 3 REVISION 0 PAGE 3

## 3.0 PREREQUISITE (Continued)

- 3.5.1 Measuring and Test Equipment
  - .1 Test gauges (.5% accuracy or better)
  - .1.1 Two 0-3000 psig
  - .1.2 Two 0-1000 psig
  - .1.3 Two 0-200 psig
  - .1.4 One 0-1500 psig
  - .1.5 One 0-950 inch H<sub>2</sub>O
  - .2 Pressure Transmitter Validyne DP15TL or equivalent
  - .3 Recorder dual trace (frequency response 100 Hz)
  - .4 DVM Fluke 9600A or equivalent
- 3.5.2 Special Measuring and Test Equipment
  - .1 C-E procured test box, Electro Mechanics Model 39300
  - .2 EPRI designed pressure sensor test box Industrial Design and Engineering Association Model ID-100
  - .3 LCSR test equipment Analysis and measurement services ERT-1 and ELC-1B
- 3.5.3 Noncalibrated Test Equipment
  - .1 Four 6 Vdc power supplies
  - .2 250 ohm test resistor
  - .3 PPS response time test panel L151
  - .4 Four PPS input simulator boxes
  - .5 Eight LED's (6.0 Volt, 20 ma)
  - .5 Assorted test leads, coaxial cables
- 3.6 Record the description, model and serial number, calibration due date for each measuring and test instrument used for this calibration at Step 7.3, Records section.

### REVISION O PAGE 4

#### 4.0 PRECAUTIONS

- Observe proper electrical precautions when working on energized 4.1 equipment.
- Follow proper procedures when connecting and disconnecting the 4.2 pressure test rig to ensure that no damage occurs to the pressure and level (differential pressure) transmitters.
- Use only grade A demineralized water in the pressure test rig. 4.3
- Nuclear instrument cable connectors must be kept clean during 4.4 safety channel testing.
- Advise operations of the status of all signal outputs from a 4.5 transmitter prior to tagging the transmitter out of service and isolate the signal outputs as necessary to maintain the plant in a safe condition.
- Do not open the ID-100 "sight gauge/fill" valve when the unit is 4.6 pressurized.
- The rated pressures and currents of the transmitters and 4.7 components being tested should not be exceeded.
- 4.8 In the event any unanticipated conditions occur during calibration, the Technician shall immediately notify the Control Operator.
- 4.9 Receiving approval to begin work does not in any way obviate the responsibility of the Technician to determine for himself that it is prudent and safe to begin work.
- 4.10 If the calibration data do not meet the acceptance criteria, the device shall be identified as "nonconforming" and the responsible Instrument Foreman shall be notified immediately. Under no circumstances shall a nonconforming device be returned to service.

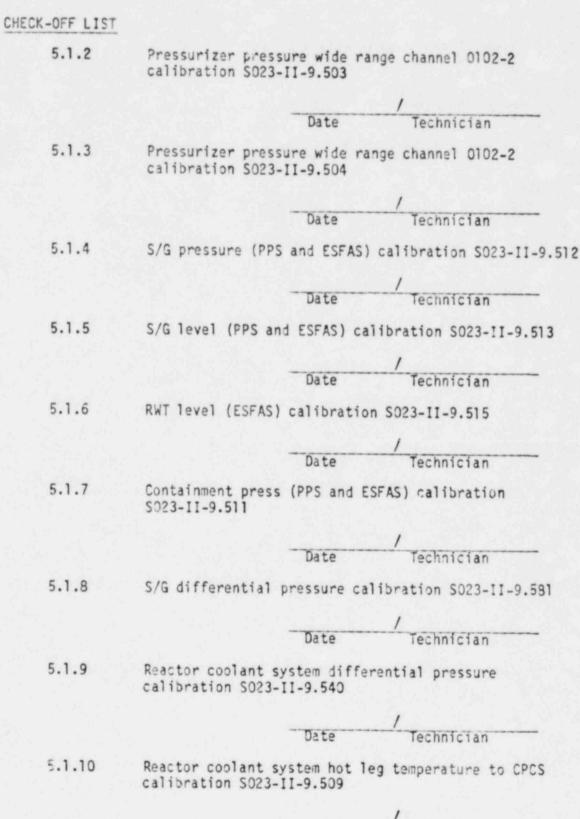
#### 5.0 CHECK-OFF LIST

- 5.1 Assure the following calibrations and/or tests have been satisfactorily completed on the appropriate channel. Sign and date.
  - 5.1.1 Excore safety channel B calibration S023-II-5.1

Date Technician

5.0

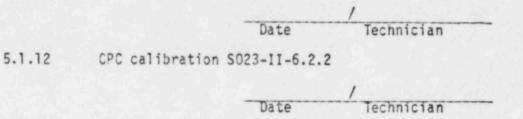
## INSTRUMENT AND TEST PROCEDURE S023-II-3.2 REVISION 0 PAGE 5



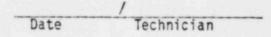
Date / Technician

SAN ONOFRE NUCLEAR GENERATING STATION INSTRUMENT AND TEST PROCEDURE S023-II-3.2 UNITS 2 AND 3 REVISION 0 PAGE 6

- 5.0 CHECK-OFF LIST
  - 5.1.11 Reactor coolant system cold leg temperature to CPCS calibration S023-II-9.508



5.1.13 CEAC calibration S023-II-6.2.4



- 5.0 PROCEDURE
  - 6.1 Equipment Setup
    - 6.1.1 Disconnect transmitter wiring at the Foxboro cabinets and connect PPS input simulator leads to the following T.B. locations and adjust for the listed input values as read on the PPS panel meters. The adjusted tolerance is +0.1 VDC. Connect jumpers to the contact input terminals with the normal input leads lifted.

Transmitter	PPS Parameter	Terminal Board Location	Initial Signal Value/Status	
PT-0101-1	High Pzr. Press.	L-121 TB 1-39/40	4.00 VDC	/ Date Tech
PT-0102-1	Low Pzr. Press. Pzr. Press. Bypass	L-121 TB 1-35/37	4.00 VDC	/ Date Tech
LT-1113-1	Low SG-1 Level High SG-1 Level	L-121 TB 1-24/25	3.50 VDC	/ Date Tech
LT-1123-1	Low SG-2 Level High SG-2 Level	L-121 TB 1-21/22	3.50 VDC	/ Date Tech
PT-1013-1	Low SG-1 Press. SG-1 P	L-121 TB 1-33/34	3.50 YDC	/ Date Tech
PDT-0978-1	SG-1 Low Flow	L-121 TB 3-13/14	5.00 VDC	/ Date Tech
PDT-0979-1	SG-2 Low Flow	L-121 TB 3-19/20	5.00 VDC	Date Tech

### CHANNEL A

SAN ONOFRE NUCLEAR GENERATING STATION INSTRUMENT AND TEST PROCEDURE S023-II-3.2 UNITS 2 AND 3 REVISION 0 PAGE 7

CHANNEL A (Continued)

## 6.0 PROCEDURE

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6.1.1 (Continued)

Transmitter	PPS Parameter	Terminal Board Location	Initial Signal Value/Status		
Contact	DNBR Trip	TBA2-52/53	CLOSED	Date	/ Tech
Contact	DNBR Pretrip	TBA2-54/65	CLOSED	Date	/ Tech
Contact	LPD Trip	TBA2-65/67	CLOSED	Date	/ Tech
Contact	LPD Pretrip	TBA2-53/69	CLOSED	Date	/ Tech
Contact	CWP	TBA2-70/71	CLOSED	Date	/ Tech
Contract	Turbine Trip	TBA2-123/124	CLOSED	Date	/ Tech
Contact	55% Power	TBA7-24/25	CLOSED	Date	/ Tech
Contact	10-4% CPC Bypass	TBA7-42/43	CLOSED		lech
PT-1023-1	Low SG-2 Press. SG-2 P	L-121	3.70 VDC	Date	Tech
PT-0351-1	High Cont. Press. RPS	TB 1-30/31 L-121	1.00 VDC	Date	Tech / Tech
PT-0352-1	High Cont. Press. ESF Hi-Hi Cont. Press.	TB 1-43/44 L-121	1.00 VDC	Date	Tech / Tech
T-0305-1	Low RWT Level	TB 1-45/47 L-121 TB 1-27/28	2.50 VDC	Date	Tech / Tech

## CHANNEL B

itter	PPS Parameter	Terminal Board Location	Initial Signal Value/Status	
J1-2	High Pzr. Press.	L-125 TB 1-39/40	4.00 VDC	/ Date Tech

REVISION O PAGE 8

#### PROCEDURE 6.0

6.1.1 (Continued)

CHANNEL B (Continued)

Transmitter	PPS Parameter	Terminal Board Location	Initial Signal Value/Status	
PT-0102-2	Low Pzr. Press. Pzr. Press. Bypass	L-125 TB 1-33/34	4.00 VDC	Date Tech
LT-1113-2	Low SG-1 Level High SG-1 Level	L-125 TB 1-24/25	3.50 VDC	Date Tech
LT-1123-2	Low SG-2 Level High SG-2 Level	L-125 TB 1-21/22	3.50 VDC	/ Date Tech
PT-1013-2	Low SG-1 Press. SG-1 P	L-125 TB 1-30/31	3.70 VDC	/ Date Tech
PT-1023-2	Low SG-2 Press. SG-2 P	L-125 TB 1-27/28	3.70 VDC	/ Date Tech
PT-0351-2	High Cont. Press. RPS High Cont. Press. ESF	L-125 TB 1-43/44	1.00 VDC	/ Date Tech
PT-0352-2	Hi-Hi Cont. Press.	L-125 TB 1-45/47	1.00 VDC	/ Date Tech
LT-0305-2	Low RWT Level	L-125 TB 1-36/37	2.50 VDC	/ Date Tech
PDT-0973-2	SG-1 Low Flow	L-125 TB 3-13/14	5.00 VDC	/ Date Tech
PDT-0979-2	SG-2 LOW Flow	L-125 TB 3-19/20	5.00 VDC	/ Date Tech
Contact	DNBR Trip	TB32-52/53	CLOSED	Date Tech
Contac <b>t</b>	DNBR Pretrip	TBB2-64/65	CLOSED	/ Date Tech
Contact	LPD Trip	TBB2-65/67	CLOSED	/ Date Tech
Contact	LPD Pretrip	BB2-68/69	CLOSED	/ Date Tecn

REVISION O PAGE 9

## 6.0 PROCEDURE

## 6.1.1 (Continued)

CHANNEL B (Continued)

Transmitter	PPS Parameter	Terminal Board Location	Initial Signal Value/Status	
Contact	CWP	TB92-70/71	CLOSED	/ Date Tech
Contact	Turbine Trip	TBB2-123/124	CLOSED	/ Date Tech
Contact	55% Power	TBB7-24/25	CLOSED	/ Date Tech
Contact	10 <sup>-4</sup> % CPC Bypass	. TBB7-42/43	CLOSED	/ Date Tech

# CHANNEL C

Transmitter	PPS Parameter	Terminal Board Location	Initial Signal Value/Status	
PT-0101-3	High Pzr. Press.	L-129 TB 1-42/43	4.00 VDC	/ Date Tech
PT-0102-3	Low Pzr. Press. Pzr. Fress. Bypass	L-129 TB 1-39 <b>9</b> 40	4.00 VDC	/ Date Tech
LT-1113-3	Low SG-1 Level High SG-1 Level	L-129 TB 1-24/25	3.50 VDC	/ Date Tech
LT-1123-3	Low SG-2 Level High SG-2 Level	L-129 TB 1-21/22	3.50 VDC	/ Date Tech
PT-1013-3	Low SG-1 Press. SG-1 P	L-129 TB 1-36/37	3.70 VDC	/ Date Tech
PT-1023-3	Low SG-2 Press. SG-2 P	L-129 TB 1-33/34	3.70	/ Date Tech

REVISION O PAGE 10

## 5.0 PROCEDURE

## 6.1.1 (Continued)

CHANNEL C (Continued)

Transmitter	PPS Parameter	Terminal Board Location	Initial Signal Value/Status	
PT-0351-3	High Cont. Press. RPS High Cont. Press. ESF	L-129 TB 1-46/47	1.00 VDC	/ Date Tech
PT-0352-3	Hi-Hi Cont. Press.	L-129 TB 1-49/50	1.00 VDC	/ Date Tech
LT-0305-3	Low RWT Level	L-129 TB 1-30/31	2.50 VDC	/ Date Tech
PDT-0978-3	SG-1 Low Flow	L-129 TB 3-13/14	5.00 VDC	/ Date Tech
PDT-0979-3	SG-2 LOW Flow	L-129 TB 3-19/20	5.00 VDC	/ Date Tech
Contact	DNBR Trip	TBC2-62/63	CLOSED	/ Date Tech
Contact	DNBR Pre-trip	TBC2-64/65	CLÓSED	Date Tech
Contact	LPD Trip	TBC2-56/57	CLOSED	/ Date Tech
Contact	LPD Pre-trip	TBC2-63/69	CLOSED	/ Date Tech
Contact	CWP	TBC2-70/71	CLOSED	/ Date Tech
Contact	Turbine Trip	TBC2-123/124	CLOSED	/ Date Tech
Contact	55% Power	TBC7-24/25	CLOSED	Date Tech
Contact	10- <sup>4</sup> % CPC Bypass	TBC7-42/43	CLOSED	Date Tech

REVISION O PAGE 11

# 6.0 PROCEDURE

# 6.1.1 (Continued)

CHANNEL D

Transmitter	PPS Parameter	Terminal Board Location	Initial Signal Value/Status	
PT-0101-4	High Pzr. Press.	L-133 TB 1- 7/8	4.00 VDC	Jate Tech
PT-0102-4	Low Pzr. Press. Pzr. Press. Bypass	L-133 TB 1- 1/2	4.00 VDC	Date Tech
LT-1113-4	Low SG-1 Level High SG-1 Level	L-133 TB 1-33/34	3.50 VDC	/ Date Tech
LT-1123-4	Low SG-2 Level High SG-2 Level	L-133 TB 1-30/31	3.50 VDC	/ Date Tech
PT-1013-4	Low SG-1 Press. SG-1 P	L-133 TB 1-39/40	3.70 VDC	Jate Tech
PT-1023-4	Low SG-2 Press. SG-2 P	L-133 TB 1-36/37	3.70	/ Date Tech
PT-0351-4	High Cont. Press. RPS High Cont. Press. ESF	L-133 TB 1-43/44	1.00 VDC	/ Date Tech
PT-0352-4	Hi-Hi Cont. Press.	L-133 TB 1-45/47	1.00 VDC	/ Date Tech
LT-0305-4	Low RWT Level	L-133 TB 1- 4/5	2.50 VDC	/ Date Tech
PDT-0978-4	SG-1 Low Flow	L-133 TB 3-13/14	5.00 VDC	/ Date Tech
PDT-0979-4	SG-2 Low Flow	L-133 TB 3-19/20	5.00 VDC	/ Date Tech
Jontact	DNBR Trip	TBD2-52/63	CLOSED	/ Date Tech
Contact	DNBR Pre-trip	TBD2-54/65	CLOSED	/ Date Tech

SAN ONOFRE NUCLEAR GENERATING STATION INSTRUMENT AND TEST PROCEDURE S023-II-3.2 UNITS 2 AND 3 REVISION 0 PAGE 12

CHANNEL D (Continued)

### 6.0 PROCEDURE

Contact

6.1.1 (Continued)

10-4% CPC Bypass

Transmitter	PPS Parameter	Terminal Board Location	Initial Signal Value/Status	
Contact	LPD Trip	TBD2-55/67	CLOSED	/ Date Tech
Contact	LPD Pre-trip	TBD2-68/59	CLOSED	Date Tech
Contact	CWP	TBD2-70/71	CLOSED	/ Date Tech
Contact	Turbine Trip	TBD2-123/124	CLOSED	/ Date Tech
Contact	55% Power	TBD7-24/25	CLOSED	1

5.1.2 Verify all pre-trip (P) and trip (T) lights are deenergized on all four bistable control panels.

TBD7-42/43

Date Technician

CLOSED

Date

Date

Tech

Tech

NOTE: If any unexpected trips occur during this test and cannot be reset, the cause should be investigated prior to continuing.

5.1.3 Verify core protection calculators (CPC's) are energized and operational to the extent required to perform this test.

Technician Date

REVISION O PAGE 13

6.0 PROCEDURE

6.1.4

Install jumpers in 2L034 and 2L035 on TB-55, TB-65, TB-75, and TB-85 between the following terminals: 25 and 27, 28 and 30, 31 and 33, 34 and 36, 37 and 39, 40 and 42, 43 and 45, 45 and 48. (64 jumpers total) and isolate the field wiring. This is to prevent inadvertent ESF actuations during the performance of response time testing.



CAUTION Do not work on more than one bay in 2L034 and one bay in 2L035 at one time.

- 6.1.5 Perform the following steps on the ID-100 hydraulic signal generator to prepare it for response time testing: Refer to Figure A-1, A-2, and A-4.
  - Connect a regulated supply of pressurized gas to the .1 GAS inlet connection on the rear panel of the TIME RESPONSE TEST SET. The pressure and capacity of the source should be adequate to provide the pressures required by the pressure sensor to be tested. Do not pressurize unit.

Date / Technician

.2 Connect a pressure gauge of the appropriate range to the GAUGE connection on the rear panel.



Ensure the transmitter to be tested is tagged out of .3 service observing the precautions of Section 4.

Date Technician

INSTRUMENT AND TEST PROCEDURE S023-II-3.2 REVISION 0 PAGE 14

## 6.0 PROCEDURE

6.1.5.4 Open the process transmitter bypass valve (if applicable) and connect the hydraulic signal generator to the process transmitter using 1/4" OD stainless tubing.

	/
Date	Technician

NOTE: The length of the signal tubing is not critical, but it should be as short and straight as practical. The tubing is connected to the "SIGNAL OUTPUT" fitting on the rear panel of the unit.

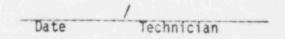
## .5 Filling

Observe the following sequence to fill the hydraulic accumulator and output signal lines. Line up the valves as shown below. Add water through the sight gauge until a level of 9 is indicated.

> Gas Isolation CLOSED Gauge Isolation OPEN Pressurize INITIAL Signal Isolation OPEN Pressure Bleed OPEN Vent/Drain CLOSED Sight Gauge/Fill OPEN

Drain CLOSED

NOTE: Overfilling will not damage the unit but may cause water to enter the pneumatic lines momentarily affecting the signal waveshape.

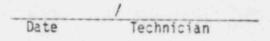


SAN ONOFRE NUCLEAR GENERATING STATION INSTRUMENT AND TEST PROCEDURE S023-II-3.2 UNITS 2 AND 3 REVISION 0 PAGE 15

5.0 PROCEDURE

6.1.5.6

6 Once the water has stabilized at the 9 level, close the SIGHT GAUGE/FILL valve.



.7 Bleeding

Observe the following sequence to bleed the signal output lines, the reference transducer, and process sensor. Line up the valves as follows:

Gas Isolation CLOSED

Gauge Isolation OPEN

Pressurize INITIAL

Signal Isolation OPEN

Pressure Bleed CLOSED

Vent/Drain CLOSED

Sight Gauge/Fill CLOSED

Drain CLOSED

Date / Technician

.8 Partially open the GAS ISOLATION valve and pressurize the unit to 5-10 psig. Carefully bleed air from the following points:

o Drain valve

o Process sensor vent

- o Close the process transmitter bypass valve (if applicable)

Date Technician

REVISION O PAGE 15

- 6.0 FROCEDURE .
  - 6.1.5.9 After all air has been bled from the system, open the PRESSURE BLEED valve and bleed off any remaining pressure. The hydraulic accumulator can now be filled or drained to the level required for the current test sequence.
    - To fill-open the PRESSURE BLEED and SIGHT GAUGE/FILL valves, add water through the sight gauge until desired level is reached.
    - To drain-open the PRESSURE BLEED and SIGHT GAUGE/FILL valves, slowly open the DRAIN valve to adjust the level in the hydraulic accumulator.

/ Technician Date

- NOTE: The following valves must always be closed prior to pressurizing the unit.
  - Pressure Bleed
  - Vent/Drain
  - Sight Gauge/Fill
  - Drain
- .10 Pressure Stability Check

The test for pressure stability is basically a check for leaks in the system.

Connect a 0.5% accuracy, 3000 psig range, pressure gauge to the TEST SET and install a 3000 psid diaphragm in the Reference Transducer. Align the valves as shown below:

Gas Isolation	CLOSED
Gauge Isolation	OPEN
Pressurize	DRIVE
Signal Isolation	CLOSED
Pressure Bleed	CLOSED

REVISION O PAGE 17

6.0 PROCEDURE

Sight Gauge/Fill	CLOSED	
Drain	CLOSED	
		1
	Date	Technician

.11 Connect the unit to a 3000 psig source of gas. A lower pressure source may be used, but it should not be less than 2000 psig. Open the GAS ISOLATION valve and pressurize the unit to 3000 psig. Allow several minutes and repeat until the pressure is stable at 3000 psig. Monitor the pressure for 5 minutes. A drop in pressure indicates leakage. The unit should be depressurized and all valve packings tightened. Repeat the pressurization procedure and verify pressure stability. If the pressure is still not stable, depressurize the unit, remove the back, and check for water leaks. Gas leaks may be detected by applying leak detecting fluids to the joints.

	/
Date	Technician

.12 Reference Stability Check

Connect test equipment as follows referring to Figure A-4 of Appendix A. Connect one pair of leads to the REF. SENSOR OUT terminals on the side of the TIME RESPONSE TEST SET and to one channel of the recorder. Connect another pair of leads to the PROCESS SENSOR OUT terminals and to the second recorder channel. Connect a DVM to the DIGITAL VOLTMETER terminals. Connect 115 VAC power to the test equipment.

Date Technician

REVISION O PAGE 13

- 6.0 PROCEDURE
  - 6.1.5.13 Open the pressure transmitter current loop and connect the transmitter current signal to the TIME RESPONSE TEST SET. It is important that the polarity of the signal is correct. This can be verified by setting the SIGNAL CONDITIONING switch to the correct loop current and placing the DVM MONITOR switch in the PROCESS SENSOR position. With no pressure applied to the transmitter, the DVM should read approximately +1 VDC.

Install a 5 psid diaphragm and 0.5% accuracy pressure .14 gauge and pressurize the unit to 5 psig. Close the GAS ISOLATION valve. Place the DVM MONITOR in the REFERENCE XMTR position and adjust the SPAN control for 10 VDC. After allowing several minutes for warmup, monitor the reference transducer output for 5 minutes, periodically verifying that the pressure has remained constant. Random drift in excess of +5 millivolts indicates a need to replace the reference demodulator.

Technician Date

- NOTE: The following major procedure subsections may be performed in any order at the discretion of the technician.
- 5.2 Response Time Testing of High Pressurizer Pressure Sensor PT-0101-2
  - NOTE: REFERENCE TRANSDUCER AND PROCESS TRANSMITTER OUTPUT ADJUSTMENT. The electrical outputs of the reference transfucer and the process transmitter must be adjusted prior to any test sequence. The following steps provide a means of achieving maximum vertical deflection of the recorder within the required pressure range.

6.0 PROCEDURE

6.2.1

Line up valves as shown below on the ID-100.

Date	Technician
	,
Drain	CLOSED
Sight Gauge/Fill	CLOSED
Vent/Drain	CLOSED
Pressure Bleed	CLOSED
Signal Isolation	OPEN
Pressurize	INITIAL
Gauge Isolation	OPEN
Gas Isolation	CLOSED

6.2.2 Open the PRESSURE BLEED valve to ensure system pressure is at zero. Place DVM MONITOR switch in the REFERENCE XMTR position. Adjust the SPAN control to the fully counterclockwise position. Note the reading on the DVM.

/ Technician Date

6.2.3 Adjust the SPAN control to the fully clockwise position. Adjust the ZERO control until the DVM indicates the voltage noted in paragraph 5.2.2 and with the same polarity (e.g., if the voltage in 5.2.2 was -15MV, adjust the ZERO control for a reading of -15MV).

CAUTION Use EXTREME CARE IN PRESSURIZING THE UNIT to avoid exceeding the pressure range of the reference transducer diaphragm and causing possible damage. It is good practice to set the gas supply regulator to a pressure slightly above the highest to be used in the test.

- 6.0 PROCEDURE
  - 6.2.3 (Continued)
  - NOTE: Use the definitions and equations below to help perform the following steps:

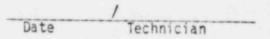
Definitions

- The pressure at which the response time is PSETPT to be determined (usually the pressure at which the sensor output causes a specific action). PINITIAL - The pressure on the hydraulic accumulator. reference transducer, and process sensor at the beginning of the test. - The pressure in the pneumatic accumulator PDRIVE at the beginning of the test. - The absolute range of the pressure senor. Span UP-RAMP PINITIAL = PSETPT - .05 span PDRIVE = PINITIAL + .5 span NOTE: Should the set point be close to the upper limit of the ensor range, the value for PDRIVE should be kept within the limits of a safe overrange for the sensor. DOWN-RAMP PINITIAL = PSETPT + .05 span PORIVE = PINITIAL - .5 span
- 5.2.4 Close the PRESSURE BLEED valve and pressurize the unit by slowly opening the GAS ISOLATION valve. Pressurize to PSEIPT or PINITIAL, whichever is greater. Table 1 of Appendix C lists the specific values for each transmitter.

Date Technician

PAGE 20

- 6.0 PROCEDURE
  - 6.2.5 Adjust the SPAN control for maximum output or null point + 10 VDC, whichever is less.



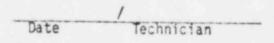
6.2.6 Pressurize the unit to PINITIAL.

Date / Technician

6.2.7 Operate REFERENCE XMTR BIAS and PROCESS XMTR BIAS controls to place the recorder traces in an appropriate position on the recorder chart. For an up-ramp test, the traces should appear on the bottom quarter of the chart. For a down-ramp test, the traces should appear on the top quarter of the chart. The process trace should always be slightly below the reference trace.

Date / Technician

6.2.8 Vary unit pressure between PINITIAL and PSEIPT while adjusting the recorder amplifier and TRTS BIAS controls to maintain the traces on the recorder chart and in the same relative position. Repeat until no further adjustments are necessary.



6.2.9 Adjust the signal rate to the value specified in Table 1 of Appendix C.

10

	/
Date	Technician

INSTRUMENT AND TEST PROCEDURE S023-II-3.2 REVISION 0 PAGE 22

- 6.0 PROCEDURE \*
  - 6.2.9 (Continued)

NOTE: The signal rate is a function of four variables; pressure, differential pressure, fluid level in the hydraulic accumulator, and the setting on the SIGNAL RATE metering valve. The SIGNAL RATE valve has been sized to provide the range of signal rates most frequently required with the fluid level at 8 on the sight gauge (approximate hydraulic accumulator level). Turning the SIGNAL RATE control in a clockwise direction will decrease the rate, turning in a counterclockwise direction will increase the rate. If higher rates are desired. fully depressurize the unit and add fluid. In a similar manner, if slower signal rates are required, fully depressurize the unit and drain the appropriate amount of fluid by opening the DRAIN valve.

NOTE: Opening the PRESSURE BLEED valve provides a vent for filling or draining.

By adding or removing fluid from the unit, the range of signal rates may be varied from approximately one inch of water per second to over 1000 pounds per second without loss of signal linearity. Extremely high signal rates are attained at higher pressures. For those applications requiring high rates at low pressures, optional equipment is available from the manufacturer. Figure A-6 shows how signal rate is determined from sample trace.

- 6.2.10 Diagnostic Self-Test of ID-100
  - .1 Line up the valves on the hydraulic signal generator as follows:

Gas Isolation	CLOSED
Gauge Isolation	OPEN
Pressurize	DRIVE
Signal Isolation	CLOSED
Pressure Bleed	CLOSED

SAN ONOFRE NUCLEAR GENERATING STATION INSTRUMENT AND TEST PROCEDURE S023-II-3.2 UNITS 2 AND 3 REVISION 0 PAGE 23

6.0 PROCEDURE

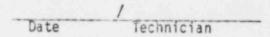
6.2.10.1

Vent/Drain	CLOSED
Sight Gauge/Fill	CLOSED
Drain	CLOSED
	Sight Gauge/Fill

Date / Technician

6.2.11 Up Ramp Generation

.1 Determine the initial, driving, and set point pressure from Table 1 of Appendix C.

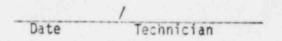


.2 Slowly open the "signal isolation" valve.



.3 Slowly open the GAS ISOLATION valve and pressurize the unit to the driving pressure (PDRIVE). Close the GAS ISOLATION valve.

.4 Once the pressure has stabilized, turn the PRESSURIZE valve to the INITIAL position. Slowly open the GAS ISOLATION valve and bring the pressure up to PSETPT.



.5 Run the recorder at a slow chart drive speed to record a short reference trace at this pressure. Be sure there is a separation between the reference trace and the process transmitter trace. Verify both traces are in appropriate relative positions.



- 5.0 PROCEDURE
  - 6.2.11.6 Slowly open the GAS ISOLATION valve and pressurize the unit to the initial pressure (PINITIAL).
    - NOTE: Make sure the SIGNAL INITIATE switch is off during the set up. Premature opening of this valve will invalidate the test. Verify both traces are in appropriate positions.

	/
Date	Technician

.7 The unit is ready to generate the appropriate up-ramp. Check the recorder to make sure the proper chart drive speed has been selected.

Date / Technician

- NOTE: The record chart drive speed selection has a strong bearing on how well the data can be evaluated. The chart drive speed should be slowest at which adequate resolution of desired timing marks is attained. The greater the angle the signal trace makes with the horizontal, the more clearly defined is the point of intersection with the reference trace. As a rough guide, the chart drive speed should be proportional to the ramp rate.
- .8

To run the test, start the recorder chart drive then depress the signal initiate switch. Record the appropriate data on the recorder chart. Include Pinitial, PDrive, PSetpt, signal rate setting, fiund level, timing mark interval, date, chart drive speed, and the words: "diagnostic self-test."

Technician Date

REVISION O PAGE 25

#### 6.0 PROCEDURE

Perform the diagnostic self-test twice and compare 6.2.11.9 the results with the signal traces for the same tests supplied with the unit.

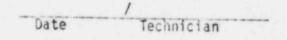
	/
Date	Technician

- Examine the trace of each signal for the following .10 qualitative waveform characteristics. Verify the results are acceptable as follows:
  - Linear within a visual "best fit" from (a) P to PSETPT.
  - (5) Complete absence of high frequency components (noise).
  - (c) Sharp and clearly defined "knee" on leading edge of test signal.
  - (d) The signal ramp rate has not decreased more than 5% of the ramp rate of the original base line signal traces supplied with the unit.

Date / Technician

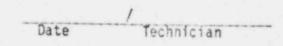
6.2.12

If diagnostic self-test is satisfactory, produce another dual trace as in step 5.2.11.8. Use this trace to compute the response time of the transmitter. Record this response time in the data collection table at the back of this procedure. Figure A-5 shows calculation method for time delay (response time). Also record on the chart "High Pressurizer Pressure Sensor," "PT-0101-1"



6.2.13

Disconnect all test leads and reconnect the normal signal leads at the process transmitter.



- 6.0 PROCEDURE
  - 6.2.14 Ensure the hydraulic signal generator is vented and disconnect it from the process transmitter.

	1
Date	Technician

6.2.15 Following appropriate procedures, return process transmitter to service.

Date / Technician

- 5.3 Response Time Testing of Low Pressurizer Pressure Sensor PT-0102-2
  - NOTE: REFERENCE TRANSDUCER AND PROCESS TRANSMITTER OUTPUT ADJUSTMENT. The electrical outputs of the reference transducer and the process transmitter must be adjusted prior to any test sequence. The following steps provide a means of achieving maximum vertical deflection of the recorder within the required pressure range.
  - 6.3.1 Line up valves as shown below on ID-100:

Gas Isolation	CLOSED
Gauge Isolation	OPEN
Pressurize	INITIAL
Signal Isolation	OPEN
Pressure Bleed	CLOSED
Vent/Drain	CLOSED
Sight Gauge/Fill	CLOSED

Drain CLOSED

6.3.2 Open the PRESSURE BLEED valve to ensure system pressure is at zero. Place DVM MONITOR switch in the REFERENCE XMTR position. Adjust the SPAN control to the fully counterclockwise position. Note the reading on the DVM.

	/
Date	Technician

INSTRUMENT AND TEST PROCEDURE S023-II-3.2 REVISION 0 PAGE 27

### 6.0 PROCEDURE

6.3.3

Adjust the SPAN control to the fully clockwise position. Adjust the ZERO control until the DVM indicates the voltage noted in paragraph 6.3.2 and with the same polarity (e.g., if the voltage on 6.3.2 was -15MV, adjust the ZERO control for a reading of -15M7).



- CAUTION Use EXTREME CARE IN PRESSURIZING THE UNIT to avoid exceeding the pressure range of the reference transducer diaphragm and causing possible damage. It is good practice to set the gas supply regulator to a pressure slightly above the highest to be used in the test.
- NOTE: Use the definitions and equations below to help perform the following steps.

Definitions:

- PSETPT The pressure at which the response time is to be determined (usually the pressure at which the sensor output causes a specific action).
- PINITIAL The pressure on the hydraulic accumulator, reference transducer, and process sensor at the beginning of the test.
- PDRIVE The pressure in the pneumatic accumulator at the beginning of the test.

Span- The absolute range of the pressure sensor.

UP-RAMP

PINITIAL = PSETPT - .05 span

PDRIVE = PINITIAL + .5 span

NOTE: Should the set point be close to the upper limit of the sensor range, the value for PDRIVE should be kept within the limits of a safe overrange for the sensor.

INSTRUMENT AND TEST PROCEDURE S023-II-3.2 REVISION 0 PAGE 28

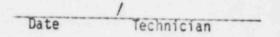
- 6.0 PROCEDURE
  - 5.3.3 (Continued)

DOWN-RAMP

PINITIAL = PSETPT + .05 span

PDRIVE = PINITIAL - .5 span

6.3.4 Close the PRESSURE BLEED valve and pressurize the unit by slowly opening the GAS ISOLATION valve. Pressurize to PSETPT or PINITIAL, whichever is greater. Table I of Appendix C lists the specific values for each transmitter.

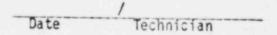


6.3.5 Adjust the SPAN control for maximum output or null point + 10 VDC, whichever is less.

5.3.6 Pressurize the unit to PINITIAL.

Date Technician

6.3.7 Operate REFERENCE XMTR BIAS and PROCESS XMTR BIAS controls to place the recorder trajes in an appropriate position on the recorder chart. For an up ramp fist, the traces should appear on the bottom quarter of the chart. For a down-ramp test, the traces should appear on the top quarter of the chart. The process trace should always be slightly below the reference trace.



6.3.8 Vary unit pressure between PINITIAL and PSEIPT while adjusting the recorder amplifier and TRTS BIAS controls to maintain the traces on the recorder chart and in the same relative position. Repeat until no further adjustments are necessary.

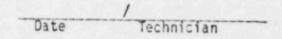
	/
Date	Technician

REVISION D PAGE 29

6.0 PROCEDURE

6.3.9

Adjust the signal rate to the value specified in Table 1 of Appendix C.



- NOTE: The signal rate is a function of four variables; pressure, differential pressure. fluid level in the hydraulic accumulator, and the setting on the SIGNAL RATE metering valve. The SIGNAL RATE valve has been sized to provide the range of signal rates most frequently required with the fluid level at 8 on the sight gauge (approximate hydraulic accumulator level). Turning the SIGNAL RATE control in a clockwise direction will decrease the rate, turning in a counterclockwise direction will increase the rate. If higher rates are desired, fully depressurize the unit and add fluid. In a similar manner, if slower signal rates are required, fully depressurize the unit and drain the appropriate amount of fluid by opening the DRAIN valve.
- NOTE: Opening the PRESSURE BLEED valve provides a vent for filling or draining.

By adding or removing fluid from the unit, the range of signal rates may be varied from approximately one inch of water per second to over 1000 pounds per second without loss of signal linearity. Extremely high signal rates are attained at higher pressures. For those applications requiring high rates at low pressures, optional equipment is available from the manufacturer. Figure A-5 shows how signal rate is determined from sample trace.

- 6.3.10 Diagnostic Self-Test of ID-100
  - Line up the valves on the hydraulic signal generator .1 as follows:

Gas Isolation	CLOSED	
Gauge Isolation	OPEN	
Pressurize	DRIVE	
Signal Isolation	CLOSED	
Pressure Blaed	CLOSED	

SAN ONOFRE NUCLEAR GENERATING STATION INSTRUMENT AND TEST PROCEDURE S023-II-3.2 UNITS 2 AND 3 REVISION 0 PAGE 30

6.0 PROCEDURE

Drain	/Vent	CLOSED
Sight	Gauge/Fill	CLOSED

Drain

CLOSED		
	1	

Date Technician

5.3.11

5.3.10.1

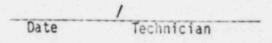
- Down-Ramp Generation
- .1 Determine the initial, driving, and set point pressures for the transmitter to be tested from Table 1 of Appendix C.

.2 Slowly open the "signal isolation" valve.

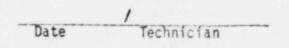
.3 Slowly open the GAS ISOLATION valve and pressurize the unit to the driving pressure (PDRIVE). Close the GAS ISOLATION valve.

Date Technician

.4 Once the pressure has stabilized, turn the PRESSURIZE valve to the INITIAL position. Slowly open the GAS ISOLATION valve and bring the pressure up to PSETPT.



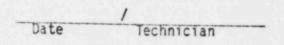
.5 Run the recorder at a slow chart drive speed to record a short reference trace at this pressure. Be sure there is a separation between the reference trace and the process transmitter trace. Verify both traces are in appropriate relative positions.



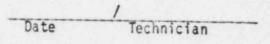
REVISION O PAGE 31

### 6.0 PROCEDURE

- 6.3.11.6 Slowly open the GAS ISOLATION valve and pressurize the unit to the initial pressure (PINITIAL).
  - NOTE: Make sure the SIGNAL INITIATE switch is off during the set up. Premature opening of this valve will invalidate the test. Verify both traces are in appropriate positions.



The unit is ready to generate the appropriate .7 downramp. Check the recorder to make sure the proper chart drive speed has been selected.



- NOTE: The record chart drive speed selection has a strong bearing on how well the data can be evaluated. The chart drive speed should be s lowest at which adequate resolution of desired timing marks is attained. The greater the angle the signal trace makes with the horizontal, the more clearly defined is the point of intersection with the reference trace. As a rough guide, the chart drive speed should be proportional to the ramp rate.
- .8 To run the test, start the recorder chart drive then depress the signal initiate switch. Record the appropriate data on the recorder chart. Include PInitial, PDrive, PSetpt, signal rate setting, fluid level, timing mark interval, date, chart drive speed, and the words: "diagnostic self-test."

Date Technician

SAN ONOFRE NUCLEAR GENERATING STATION UNITS 2 AND 3

INSTRUMENT AND TEST PROCEDURE S023-II-3.2 REVISION 0 PAGE 32

# 6.0 PROCEDURE

5.3.11.9 Perform the diagnostic self-test twice and compare the results with the signal traces for the same tests supplied with the unit.

	1
Date	Technician

- .10 Examine the trace of each signal for the following qualitative waveform characteristics. Verify the results are acceptable as follows:
  - (a) Linear within a visual "best fit" from P to PSETPT.
  - (b) Complete absence of high frequency components (noise).
  - (c) Sharp and clearly defined "knee" on leading edge of test signal.
  - (d) The signal ramp rate has not decreased more than 5% of the ramp rate of the original base line signal traces supplied with the unit.

Date / Technician

6.3.12

If diagnostic self-test is satisfactory, produce another dual trace as in step 5.3.11.8. Use this trace to compute the response time of the transmitter. Record this response time in the data collection table at the back of this procedure. Figure A-5 shows calculation method for time delay (response time). Also record on the chart "Low Pressurizer Pressure Sensor," "PT-0102-2"

/ Date Technician

6.3.13

Disconnect all test leads and reconnect the normal signal leads at the process transmitter.

/ Technician Date

SAN ONOFRE NUCLEAR GENERATING STATION INSTRUMENT AND TEST PROCEDURE S023-II-3.2 UNITS 2 AND 3 REVISION 0 PAGE 33

- 6.0 PROCEDURE
  - 6.3.14 Ensure the hydraulic signal generator is vented and disconnect it from the process transmitter.

6.3.15 Following appropriate procedures, return process transmitter to service.

- 6.4 Response Time Testing of Low SG-1 Pressure Sensor PT-1013-2
  - NOTE: REFERENCE TRANSDUCER AND PROCESS TRANSMITTER OUTPUT ADJUSTMENT. The electrical outputs of the reference transducer and the process transmitter must be adjusted prior to any test sequence. The following steps provide a means of achieving maximum vertical deflection of the recorder within the required pressure range.
  - 5.4.1 Line up valves as shown below on ID-100:

Gas Isolation	CLOSED
Gauge Isolation	OPEN
Pressurize	INITIAL
Signal Isolation	OPEN
Pressure Bleed	CLOSED
Vent/Drain	CLOSED
Sight Gauge/Fill	CLOSED
Drain	CLOSED

6.4.2

Open the PRESSURE BLEED valve to ensure system pressure is at zero. Place DVM MONITOR switch in the REFERENCE XMTR position. Adjust the SPAN control to the fully counterclockwise position. Note the reading on the DVM.

	/	
Date	Technician	

REVISION O PAGE 34

### 6.0 PROCEDURE

6.4.3

Adjust the SPAN control to the fully clockwise position. Adjust the ZERO control until the DVM indicates the voltage noted in paragraph 6.4.2 and with the same polarity (e.g., if the voltage in 5.4.2 was -15MV, adjust the ZERO control for a reading of -15MV).

Date Technician

- CAUTION Use EXTREME CARE IN PRESSURIZING THE UNIT to avoid exceeding the pressure range of ----the reference transducer diaphragm and causing possible damage. It is good practice to set the gas supply regulator to a pressure slightly above the highest to be used in the test.
- NOTE: Use the definitions and equations below to help perform the following steps:

Definitions

- PSETPT The pressure at which the response time is to be determined (usually the pressure at which the sensor output causes a specific action).
- PINITIAL The pressure on the hydraulic accumulator, reference transducer, and process sensor at the beginning of the test.
- The pressure in the pneumatic PDRIVE accumulator at the beginning of the test.

Span - The absolute range of the pressure senor.

UP-RAMP

PINITIAL = PSETPT - .05 span

PDRIVE = PINITIAL + .5 span

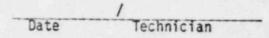
NOTE: Should the set point be close to the upper limit of the sensor range, the value for PDRIVE should be kept within the limits of a safe overrange for the WINSON.

- 5.0 PROCEDURE
  - 6.4.3 DOWN-RAMP

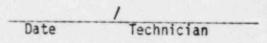
PINITIAL = PSETPT + .05 span

PDRIVE = PINITIAL - .5 span

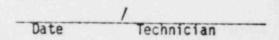
6.4.4 Close the PRESSURE BLEED valve and pressurize the unit by slowly opening the GAS ISOLATION valve. Pressurize to PSETPI or PINITIAL, whichever is greater. Table I of Appendix C lists the specific values for each transmitter.



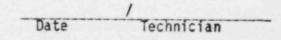
6.4.5 Adjust the SPAN control for maximum output or null point + 10 VDC, whichever is less.



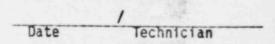
5.4.6 Pressurize the unit to PINITIAL.



6.4.7 Operate REFERENCE XMTR BIAS and PROCESS XMTR BIAS controls to place the recorder traces in an appropriate position on the recorder chart. For an up-ramp test, the traces should appear on the bottom quarter of the chart. For a down-ramp test, the traces should appear on the top quarter of the chart. The process trace should always be slightly below the reference trace.



6.4.8 Vary unit pressure between PINITIAL and PSETPT while adjusting the recorder amplifier and TRTS BIAS controls to maintain the traces on the recorder chart and in the same relative position. Repeat until no further adjustments are necessary.



SAN ONOFRE NUCLEAR GENERATING STATION UNITS 2 AND 3

### INSTRUMENT AND TEST PROCEDURE S023-II-3.2 REVISION O PAGE 36

6.0 PROCEDURE

6.4.9

Adjust the signal rate to the value specified in Table 1 of Appendix C.

Technician Date

- NOTE: The signal rate is a function of four variables; pressure, differential pressure, fluid level in the hydraulic accumulator, and the setting on the SIGNAL RATE metering valve. The SIGNAL RATE valve has been sized to provide the range of signal rates most frequently required with the fluid level at 8 on the sight gauge (approximate hydraulic accumulator level). Turning the SIGNAL RATE control in a clockwise direction will decrease the rate, turning in a counterclockwise direction will increase the rate. If higher rates are desired, fully depressurize the unit and add fluid. In a similar manner, if slower signal rates are required, fully depressurize the unit and drain the appropriate amount of fluid by opening the DRAIN valve.
- NOTE: Opening the PRESSURE BLEED valve provides a vent for filling or draining.

By adding or removing fluid from the unit, the range of signal rates may be varied from approximately one inch of water per second to over 1000 pounds per second without loss of signal linearity. Extremely high signal rates are attained at higher pressures. For those applications requiring high rates at low pressures, optional equipment is available from the manufacturer. Figure A-5 shows how signal rate is determined from sample trace.

- Diagnostic Self-Test of ID-100
  - .1 Line up the valves on the hydraulic signal generator as follows:

Gas Isolation CLOSED Gauge Isolation OPEN Pressurize DRIVE Signal Isolation CLOSED

6.4.10

SAN ONOFRE NUCLEAR GENERATING STATION UNITS 2 AND 3

INSTRUMENT AND TEST PROCEDURE S023-II-3.2 REVISION 0 PAGE 37

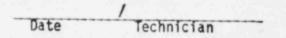
6.0 PROCEDURE

6.4.10.1.1	Pressure Bleed	CLOSED
	Drain/Vent	CLOSED
	Sight Gauge/Fill	CLOSED
	Drain	CLOSED
		1

- 6.4.11 Down-Ramp Generation
  - .1 Determine the initial, driving, and set point pressures for the transmitter to be tested from Table 1 of Appendix C.

.2 Slowly open the "signal isolation" valve.

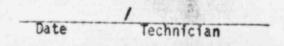
.3 Slowly open the GAS ISOLATION valve and pressurize the unit to the driving pressure (PDRIVE). Close the GAS ISOLATION valve.



.4 Once the pressure has stabilized, turn the PRESSURIZE valve to the INITIAL position. Slowly open the GAS ISOLATION valve and bring the pressure up to PSETPT.



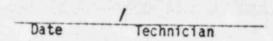
.5 Run the recorder at a slow chart drive speed to record a short reference trace at this pressure. Be sure there is a separation between the reference trace and the process transmitter trace. Verify both traces are in appropriate relative positions.



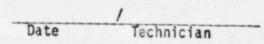
SAN ONOFRE NUCLEAR GENERATING STATION UNITS 2 AND 3

INSTRUMENT AND TEST PROCEDURE S023-II-3.2 REVISION 0 PAGE 38

- 6.0 PROCEDURE
  - 6.4.11.5 Slowly open the GAS ISOLATION valve and pressurize the unit to the initial pressure (PINITIAL).
    - NOTE: Make sure the SIGNAL INITIATE switch is off during the set up. Premature opening of this valve will invalidate the test. Verify both traces are in appropriate positions.



.7 The unit is ready to generate the appropriate down-ramp. Check the recorder to make sure the proper chart drive speed has been selected.



- NOTE: The record chart drive speed selection has a strong bearing on how well the data can be evaluated. The chart drive speed should be slowest at which adequate resolution of desired timing marks is attained. The greater the angle the signal trace makes with the horizontal, the more clearly defined is the point of intersection with the reference trace. As a rough guide, the chart drive speed should be proportional to the ramp rate.
- .8

To run the test, start the recorder chart drive then depress the signal initiate switch. Record the appropriate data on the recorder chart. Include PInitial, PDrive, PSetpt, signal rate setting, fluid level, timing mark interval, date, chart drive speed, and the words: "diagnostic self-test."

Technician Date

SAN ONOFRE NUCLEAR GENERATING STATION UNITS 2 AND 3

INSTRUMENT AND TEST PROCEDURE S023-II-3.2 REVISION 0 PAGE 39

### 6.0 PROCEDURE

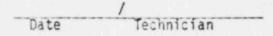
5.4.11.9 Perform the diagnostic self-test twice and compare the results with the signal traces for the same tests supplied with the unit.

	/
Date	Technician

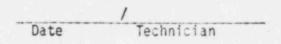
- .10 Examine the trace of each signal for the following qualitative waveform characteristics. Verify the results are acceptable as follows:
  - (a) Linear within a visual "best fit" from P to PSETPT.
  - (b) Complete absence of high frequency components (noise).
  - (c) Sharp and clearly defined "knee" on leading edge of test signal.
  - (d) The signal ramp rate has not decreased more than 5% of the ramp rate of the original base line signal traces supplied with the unit.

Date / Technician

5.4.12 If diagnostic self-test is satisfactory, produce another dual trace as in step 5.4.11.9. Use this trace to compute the response time of the transmitter. Record this response time in the data collection table at the back of this procedure. Figure A-6 shows calculation method for time delay (response time). Also record on the chart "Lo SG-1 Pressure Sensor," "PT-1013-2"



6.4.13 Disconnect all test leads and reconnect the normal signal leads at the process transmitter.



## REVISION O PAGE 40

- 6.0 PROCEDURE
  - 6.4.14 Ensure the hydraulic signal generator is vented and disconnect it from the process transmitter.

Date Technician

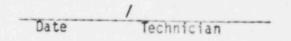
6.4.15 Following appropriate procedures, return process transmitter to service.

Date Technician

- Response Time Testing of Low SG-2 Pressure Sensor PT-1023-2 5.5
  - NOTE: REFERENCE TRANSDUCER AND PROCESS TRANSMITTER OUTPUT ADJUSTMENT. The electrical outputs of the reference transducer and the process transmitter must be adjusted prior to any test sequence. The following steps provide a means of achieving maximum vertical deflection of the recorder within the required pressure range.
  - 6.5.1 Line up valves as shown below on ID-100:

Gas Isolation	CLOSED
Gauge Isolation	OPEN
Pressurize	INITIAL
Signal Isolation	OPEN
Pressure Bleed	CLOSED
Vent/Drain	CLOSED
Sight Gauge/Fill	CLOSED
Drain	CLOSED

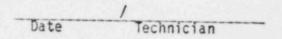
Open the PRESSURE BLEED valve to ensure system 6.5.2 pressure is at zero. Place DVM MONITOR switch in the REFERENCE XMTR position. Adjust the SPAN control to the fully counterclockwise position. Note the reading on the DVM.



## 6.0 PROCEDURE

6.5.3

Adjust the SPAN control to the fully clockwise position. Adjust the ZERO control until the DVM indicates the voltage noted in paragraph 5.5.2 and with the same polarity (e.g., if the voltage in 6.5.2 was -15MV, adjust the ZERO control for a reading of -15MV).



- CAUTION Use EXTREME CARE IN PRESSURIZING THE UNIT to avoid exceeding the pressure range of the reference transducer diaphragm and causing possible damage. It is good practice to set the gas supply regulator to a pressure slightly above the highest to be used in the test.
- NOTE: Use the definitions and equations below to help perform the following steps:

Definitions

- PSETPT The pressure at which the response time is to be determined (usually the pressure at which the sensor output causes a specific action).
- PINITIAL The pressure on the hydraulic accumulator, reference transducer, and process sensor at the beginning of the test.
- PDRIVE The pressure in the pneumatic accumulator at the beginning of the test.

Span - The absolute range of the pressure senor.

UP-RAMP

PINITIAL = PSETPT - .05 span

PDRIVE = PINITIAL + .5 span

NOTE: Should the set point be close to the upper limit of the sensor range, the value for PDRIVE should be kept within the limits of a safe overrange for the sensor.

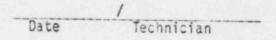
REVISION O PAGE 42

- 5.0 PROCEDURE
  - 6.5.3 DOWN-RAMP

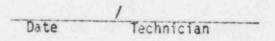
PINITIAL = PSETPT + .05 span

PDRIVE = PINITIAL - .5 span

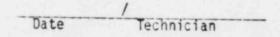
6.5.4 Close the PRESSURE BLEED valve and pressurize the unit by slowly opening the GAS ISOLATION valve. Pressurize to PSETPI or PINITIAL, whichever is greater. Table I of Appendix C lists the specific values for each transmitter.



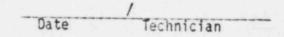
6.5.5 Adjust the SPAN control for maximum output or null point + 10 VDC, whichever is less.



Pressurize the unit to PINITIAL. 6.5.6

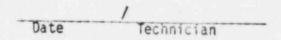


6.5.7 Operate REFERENCE XMTR BIAS and PROCESS XMTR BIAS controls to place the recorder traces in an appropriate position on the recorder chart. For an up-ramp test, the traces should appear on the bottom quarter of the chart. For a down-ramp test, the traces should appear on the top quarter of the chart. The process trace should always be slightly below the reference trace.



6.5.8

Vary unit pressure between PINITIAL and PSEIPT while adjusting the recorder amplifier and TRTS BIAS controls to maintain the traces on the recorder chart and in the same relative position. Repeat until no further adjustments are necessary.

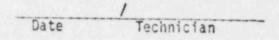


REVISION O PAGE 43

6.0 PROCEDURE

6.5.9

Adjust the signal rate to the value specified in Table 1 of Appendix C.



- NOTE: The signal rate is a function of four variables; pressure, differential pressure. fluid level in the hydraulic accumulator, and the setting on the SIGNAL RATE metering valve. The SIGNAL RATE valve has been sized to provide the range of signal rates most frequently required with the fluid level at 8 on the sight gauge (approximate hydraulic accumulator level). Turning the SIGNAL RATE control in a clockwise direction will decrease the rate, turning in a counterclockwise direction will increase the rate. If higher rates are desired, fully depressurize the unit and add fluid. In a similar manner, if slower signal rates are required, fully depressurize the unit and drain the appropriate amount of fluid by opening the DRAIN valve.
- NOTE: Opening the PRESSURE BLEED valve provides a vent for filling or draining.

By adding or removing fluid from the unit, the range of signal rates may be varied from approximately one inch of water per second to over 1000 pounds per second without loss of signal linearity. Extremely high signal rates are attained at higher pressures. For those applications requiring high rates at low pressures, optional equipment is available from the manufacturer. Figure A-5 shows how signal rate is determined from sample trace.

- 6.5.10 Diagnostic Self-Test of ID-100
  - Line up the valves on the hydraulic signal generator .1 as follows:

Gas Isolation CLOSED Gauge Isolation OPEN Pressurize DRIVE

Signal Isolation CLOSED

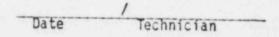
SAN ONOFRE NUCLEAR GENERATING STATION INSTRUMENT AND TEST PROCEDURE S023-II-3.2 UNITS 2 AND 3 REVISION 0 PAGE 44

6.0 PROCEDURE

6.5.10.1     Pressure Bleed     CLOSED       Drain/Vent     CLOSED       Sight Gauge/Fill     CLOSED		Drain	CLOSED	
		Sight Gauge/Fill	CLOSED	
6.5.10.1 Pressure Bleed CLOSED		Drain/Vent	CLOSED	
	6.5.10.1	Pressure Bleed	CLOSED	

6.5.11 Down-Ramp Generation

.1 Determine the initial, driving, and set point pressures for the transmitter to be tested from Table 1 of Appendix C.



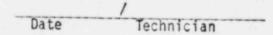
.2 Slowly open the "signal isolation" valve.



.3 Slowly open the GAS ISOLATION valve and pressurize the unit to the driving pressure (PDRIVE). Close the GAS ISOLATION valve.



.4 Once the pressure has stabilized, turn the PRESSURIZE valve to the INITIAL position. Slowly open the GAS ISOLATION valve and bring the pressure up to PSETPT.



.5 Run the recorder at a slow chart drive speed to record a short reference trace at this pressure. Be sure there is a separation between the reference trace and the process transmitter trace. Verify both traces are in appropriate relative positions.

Technician Date

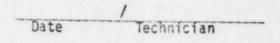
SAN ONOFRE NUCLEAR GENERATING STATION INSTRUMENT AND TEST PROCEDURE S023-II-3.2 UNITS 2 AND 3 REVISION D PAGE 45

6.0 PROCEDURE

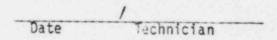
.....

5.5.11.6

- 1.6 Slowly open the GAS ISOLATION valve and pressurize the unit to the initial pressure (PINITIAL).
  - NOTE: Make sure the SIGNAL INITIATE switch is off during the set up. Premature opening of this valve will invalidate the test. Verify both traces are in appropriate positions.



.7 The unit is ready to generate the appropriate down-ramp. Check the recorder to make sure the proper chart drive speed has been selected.



- NOTE: The record chart drive speed selection has a strong bearing on how well the data can be evaluated. The chart drive speed should be slowest at which adequate resolution of desired timing marks is attained. The greater the angle the signal trace makes with the horizontal, the more clearly defined is the point of intersection with the reference trace. As a rough guide, the chart drive speed should be proportional to the ramp rate.
- .8

To run the test, start the recorder chart drive then depress the signal initiate switch. Record the appropriate data on the recorder chart. Include Pinitial, PDrive, PSetpt, signal rate setting, fluid level, timing mark interval, date, chart drive speed, and the words: "diagnostic self-test."

Technician Date

SAN DNOFRE NUCLEAR GENERATING STATION UNITS 2 AND 3

INSTRUMENT AND TEST PROCEDURE S023-II-3.2 REVISION 0 PAGE 45

- 6.0 PROCEDURE \*
  - 5.5.11.9 Perform the diagnostic self-test twice and compare the results with the signal traces for the same tests supplied with the unit.

- .10 Examine the trace of each signal for the following qualitative waveform characteristics. Verify the results are acceptable as follows:
  - (a) Linear within a visual "best fit" from P to P<sub>SETPT</sub>.
  - (b) Complete absence of high frequency components (noise).
  - (c) Sharp and clearly defined "knee" on leading edge of test signal.
  - (d) The signal ramp rate has not decreased more than 5% of the ramp rate of the original base line signal traces supplied with the unit.

Jate / Technician

6.5.12 If diagnostic self-test is satisfactory, produce another dual trace as in step 5.5.11.8. Use this trace to compute the response time of the transmitter. Record this response time in the data collection table at the back of this procedure. Figure A-5 shows calculation method for time delay (response time). Also record on the chart "Low SG-2 Pressure Sensor," "PT-1023-2"

Date / Technician

6.5.13

Disconnect all test leads and reconnect the normal signal leads at the process transmitter.

Technician Date

SAN ONOFRE NUCLEAR GENERATING STATION INSTRUMENT AND TEST PROCEDURE S023-II-3.2 UNITS 2 AND 3 REVISION 0 PAGE 47

- 6.0 PROCEDURE
  - 6.5.14 Ensure the hydraulic signal generator is vented and disconnect it from the process transmitter.

6.5.15 Following appropriate procedures, return process transmitter to service.

- 6.6 Response Time Testing of Low SG-1 Level Sensor LT-1113-2
  - NOTE: REFERENCE TRANSDUCER AND PROCESS TRANSMITTER OUTPUT ADJUSTMENT. The electrical outputs of the reference transducer and the process transmitter must be adjusted prior to any test sequence. The following steps provide a means of achieving maximum vertical deflection of the recorder within the required pressure range.
  - 6.5.1 Line up valves as shown below on ID-100:

Gas Isolation	CLOSED
Gauge Isolation	OPEN
Pressurize	INITIAL
Signal Isolation	OPEN
Pressure Bleed	CLOSED
Vent/Drain	CLOSED
Sight Gauge/Fill	CLOSED
Drain	CLOSED

6.6.2

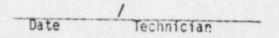
Open the PRESSURE BLEED valve to ensure system pressure is at zero. Place DVM MONITOR switch in the REFERENCE XMTR position. Adjust the SPAN control to the fully counterclockwise position. Note the reading on the DVM.

	/
Date	Technician

REVISION O PAGE 43

6.0 PROCEDURE

> 5.5.3 Adjust the SPAN control to the fully clockwise position. Adjust the ZERO control until the DVM indicates the voltage noted in paragraph 5.6.2 and with the same polarity (e.g., if the voltage in 6.6.2 was -15MV, adjust the ZERO control for a reading of -15MV).



Use EXTREME CAFF IN PRESSURIZING THE UNIT CAUTION ====== to avoid exceeding the pressure range of the reference transducer diaphragm and causing possible damage. It is good practice to set the gas supply regulator to a pressure slightly above the highest to be used in the test.

NOTE: Use the definitions and equations below to help perform the following steps:

Definitions

- PSEIDT The pressure at which the response time is to be determined (usually the pressure at which the sensor output causes a specific action).
- PINITIAL The pressure on the hydraulic accumulator, reference transducer, and process sensor at the beginning of the test.
- The pressure in the pneumatic PDRIVE accumulator at the beginning of the test.

Span - The absolute range of the pressure senor.

UP-RAMP

PINITIAL = PSETPT - .05 span

PDRIVE = PINITIAL + .5 span

NOTE: Should the set point be close to the upper limit of the sensor range, the value for PDRIVE should be kept within the limits of a safe overrange for the sensor.

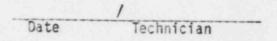
REVISION O PAGE 49

- 6.0 PROCEDURE .
  - 6.5.3 DOWN-RAMP

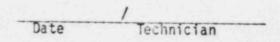
PINITIAL = PSETPT + .05 span

PDRIVE = PINITIAL - .5 span

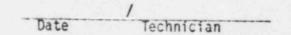
6.5.4 Close the PRESSURE BLEED valve and pressurize the unit by slowly opening the GAS ISOLATION valve. Pressurize to PSETPI or PINITIAL, whichever is greater. Table I of Appendix C lists the specific values for each transmitter.



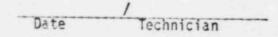
6.6.5 Adjust the SPAN control for maximum output or null point + 10 VDC, whichever is less.



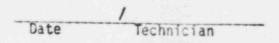
Pressurize the unit to PINITIAL. 5.6.6



6.6.7 Operate REFERENCE XMTR BIAS and PROCESS XMTR BIAS controls to place the recorder traces in an appropriate position on the recorder chart. For an up-ramp test, the traces should appear on the bottom quarter of the chart. For a down-ramp test, the traces should appear on the top quarter of the chart. The process trace should always be slightly below the reference trace.



Vary unit pressure between PINITIAL and PSETPT while adjusting the recorder amplifier and TRTS BIAS controls to maintain the traces on the recorder chart and in the same relative position. Repeat until no further adjustments are necessary.



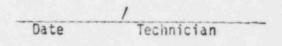
5.6.3

REVISION O PAGE 50

8.0 PROCEDURE

6.6.9

Adjust the signal rate to the value specified in Table 1 of Appendix C.



- NOTE: The signal rate is a function of four variables; pressure, differential pressure. fluid level in the hydraulic accumulator, and the setting on the SIGNAL RATE metering valve. The SIGNAL RATE valve has been sized to provide the range of signal rates most frequently required with the fluid level at 8 on the sight gauge (approximate hydraulic accumulator level). Turning the SIGNAL RATE control in a clockwise direction will decrease the rate. turning in a counterclockwise direction will increase the rate. If higher rates are desired, fully depressurize the unit and add fluid. In a similar manner, if slower signal rates are required, fully depressurize the unit and drain the appropriate amount of fluid by opening the DRAIN valve.
- NOTE: Opening the PRESSURE BLEED valve provides a vent for filling or draining.

By adding or removing fluid from the unit, the range of signal rates may be varied from approximately one inch of water per second to over 1000 pounds per second without loss of signal linearity. Extremely high signal rates are attained at higher pressures. For those applications requiring high rates at low pressures, optional equipment is available from the manufacturer. Figure A-5 shows how signal rate is determined from sample trace.

- 6.6.10 Diagnostic Self-Test of ID-100
  - .1 Line up the valves on the hydraulic signal generator as follows:

Gas Isolation CLOSED Gauge Isolation OPEN Pressurize DRIVE Signal Isolation CLOSED

REVISION O PAGE 51

5.0 PROCEDURE

6.5.10.1

Pressure Bleed CLOSED

Drain/Vent CLOSED

Sight Gauge/Fill CLOSED

Drain CLOSED

Date / Technician

6.6.11

### Down-Ramp Generation

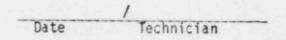
Determine the initial, driving, and set point .1 pressures for the transmitter to be tested from Table 1 of Appendix C.

Date Technician

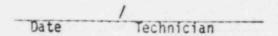
.2 Slowly open the "signal isolation" valve.

Date / Technician

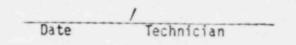
Slowly open the GAS ISOLATION valve and pressurize .3 the unit to the driving pressure (PDRIVE). Close the GAS ISOLATION valve.



.4 Once the pressure has stabilized, turn the PRESSURIZE valve to the INITIAL position. Slowly open the GAS ISOLATION valve and bring the pressure up to PSETPT.



Run the recorder at a slow chart drive speed to .5 record a short reference trace at this pressure. Be sure there is a separation between the reference trace and the process transmitter trace. Verify both traces are in appropriate relative positions.



SAN ONOFRE NUCLEAR GENERATING STATION UNITS 2 AND 3

INSTRUMENT AND TEST PROCEDURE S023-II-3.2 REVISION 0 PAGE 52

# 6.0 PROCEDURE

- 6.5.11.6 Slowly open the GAS ISOLATION valve and pressurize the unit to the initial pressure (PINITIAL).
  - NOTE: Make sure the SIGNAL INITIATE switch is off during the set up. P emature opening of this valve will invalidate the test. Verify both traces are in appropriate positions.

Technician Date

.7 The unit is ready to generate the appropriate down-ramp. Check the recorder to make sure the proper chart drive speed has been selected.

Technician Date

- NOTE: The record chart drive speed selection has a strong bearing on how well the data can be evaluated. The chart drive speed should be slowest at which adequate resolution of desired timing marks is attained. The greater the angle the signal trace makes with the horizontal, the more clearly defined is the point of intersection with the reference trace. As a rough guide, the chart drive speed should be proportional to the ramp rate.
- .8 To run the test, start the recorder chart drive then depress the signal initiate switch. Record the appropriate data on the recorder chart. Include PINITIAL, PDRIVE, PSETPT, signal rate setting, fluid level, timing mark interval, date, chart drive speed, and the words: "diagnostic self-test."

Technician Date

REVISION O PAGE 53

### 6.0 PROCEDURE

6.6.11.9 Perform the diagnostic self-test twice and compare the results with the signal traces for the same tests supplied with the unit.

	/	
Date	Technician	

- Examine the trace of each signal for the following .10 qualitative waveform characteristics. Varify the results are acceptable as follows:
  - (a) Linear within a visual "best fit" from PINITIAL to PSETPT.
  - (b) Complete absence of high frequency components (noise).
  - (c) Sharp and clearly defined "knee" on leading edge of test signal.
  - (d) The signal ramp rate has not decreased are than 5% of the ramp rate of the original base line signal traces supplied with the unit.

Date / Technician

If diagnostic self-test is satisfactory, produce another 6.5.12 dual trace as in step 6.6.11.8. Use this trace to compute the response time of the transmitter. Record this response time in the data collection table at the back of this procedure. Figure A-5 shows calculation method for time delay (response time). Also record on the chart "Low SG-1 Level Sensor," "LT-1113-2"

> Technician Date

6.6.13 Disconnect all test leads and reconnect the normal signal leads at the process transmitter.

Date / Technician

SAN ONOFRE NUCLEAR GENERATING STATION UNITS 2 AND 3

INSTRUMENT AND TEST PROCEDURE S023-11-3.2 REVISION 0 PAGE 54

- 6.0 PROCEDURE
  - 6.6.14 Ensure the hydraulic signal generator is vented and disconnect it from the process transmitter.



6.6.15 Following appropriate procedures, return process transmitter to service.

Date Technician

- 5.7 Response Time Testing of Low SG-2 Level Sensor LT-1123-2
  - NOTE: REFERENCE TRANSDUCER AND PROCESS TRANSMITTER OUTPUT ADJUSTMENT. The electrical outputs of the reference transducer and the process transmitter must be adjusted prior to any test sequence. The following steps provide a means of achieving maximum vertical deflection of the recorder within the required pressure range.
  - 6.7.1 Line up valves as shown below on ID-100:

Gas Isolation CLOSED Gauge Isolation OPEN Pressurize INITIAL Signal Isolation OPEN Pressure Bleed CLOSED Vent/Drain CLOSED Sight Gauge/Fill CLOSED

Drain CLOSED

6.7.2

Open the PRESSURE BLEED valve to ensure system pressure is at zero. Place DVM MONITOR switch in the REFERENCE XMTR position. Adjust the SPAN control to the fully counterclockwise position. Note the reading on the DVM.

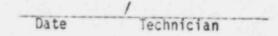
and the second	/
Date	Technician

SAN ONOFRE NUCLEAR GENERATING STATION UNITS 2 AND 3

INSTRUMENT AND TEST PROCEDURE S023-11-3.2 REVISION 0 PAGE 55

6.0 PROCEDURE '

6.7.3 Adjust the SPAN control to the fully clockwise position. Adjust the ZERO control until the DVM indicates the voltage noted in paragraph 5.7.2 and with the same polarity (e.g., if the voltage in 6.7.2 was -15MV, adjust the ZERO control for a reading of -15MV).



- CAUTION Use EXTREME CARE IN PRESSURIZING THE UNIT to avoid exceeding the pressure range of the reference transducer diaphragm and causing possible damage. It is good practice to set the gas supply regulator to a pressure slightly above the highest to be used in the test.
  - NOTE: Use the definitions and equations below to help perform the following steps:

Definitions

- PSETPT The pressure at which the response time is to be determined (usually the pressure at which the sensor output causes a specific action).
- PINITIAL The pressure on the hydraulic accumulator, reference transducer, and process sensor at the beginning of the test.
- PDRIVE The pressure in the pneumatic accumulator at the beginning of the test.

Span - The absolute ange of the pressure senor.

UP-RAMP

PINITIAL = PSETPT - .05 span

PDRIVE = PINITIAL + .5 span

NOTE: Should the set point be close to the upper limit of the sensor range, the value for PDRIVE should be kept within the limits of a safe overrange for the sensor.

SAN ONDFRE NUCLEAR GENERATING STATION UNITS 2 AND 3

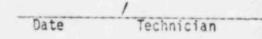
INSTRUMENT AND TEST PROCEDURE S023-II-3.2 REVISION 0 PAGE 55

- 6.0 PROCEDURE
  - 6.7.3 DOWN-RAMP

PINITIAL = PSETPT + .05 span

PDRIVE = PINITIAL - .5 span

6.7.4 Close the PRESSURE BLEED valve and pressurize the unit by slowly opening the GAS ISOLATION valve. Pressurize to PSEIPT or PINITIAL, whichever is greater. Table 1 of Appendix C lists the specific values for each transmitter.



6.7.5 Adjust the SPAN control for maximum output or null point + 10 VDC, whichever is less.

Date Technician

5.7.5 Pressurize the unit to PINITIAL.

Date / Technician

6.7.7 Operate REFERENCE XMTR BIAS and PROCESS XMTR BIAS controls to place the recorder traces in an appropriate position on the recorder chart. For an up-ramp test, the traces should appear on the bottom quarter of the chart. For a down-ramp test, the traces should appear on the top quarter of the chart. The process trace should always be slightly below the reference trace.

Date / Technician

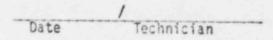
6.7.8 Vary unit pressure between PINITIAL and PSETPT while adjusting the recorder amplifier and TRTS BIAS controls to maintain the traces on the recorder chart and in the same relative position. Repeat until no further adjustments are necessary.

Technician Date

6.0 PROCEDURE

5.7.9

Adjust the signal rate to the value specified in Table 1 of Appendix C.



PAGE 57

- NOTE: The signal rate is a function of four variables; pressure, differential pressure. fluid level in the hydraulic accumulator, and the setting on the SIGNAL RATE metering valve. The SIGNAL RATE valve has been sized to provide the range of signal rates most frequently required with the fluid level at 8 on the sight gauge (approximate hydraulic accumulator level). Turning the SIGNAL RATE control in a clockwise direction will decrease the rate, turning in a counterclockwise direction will increase the rate. If higher rates are desired, fully depressurize the unit and add fluid. In a similar manner, if slower signal rates are required, fully depressurize the unit and drain the appropriate amount of fluid by opening the DRAIN valve.
- NOTE: Opening the PRESSURE BLEED valve provides a vent for filling or draining.

By adding or removing fluid from the unit, the range of signal rates may be varied from approximately one inch of water per second to over 1000 pounds per second without loss of signal linearity. Extremely high signal rates are attained at higher pressures. For those applications requiring high rates at low pressures, optional equipment is available from the manufacturer. Figure A-6 shows how signal rate is determined from sample trace.

- 5.7.10 Diagnostic Self-Test of ID-100
  - .1 Line up the valves on the hydraulic signal generator as follows:

Gas Isolation CLOSED Gauge Isolation OPEN Pressurize DRIVE Signal Isolation CLOSED

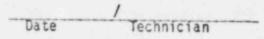
5.0 PROCEDURE

> 6.7.10.1 Pressure Bleed CLOSED

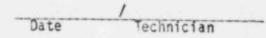
> > Drain/Vent CLOSED

Sight Gauge/Fill CLOSED

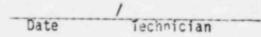
Drain CLOSED



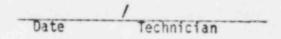
- 6.7.11 Down-Ramp Generation
  - Determine the initial, driving, and set point 1 pressures for the transmitter to be tested from Table 1 of Appendix C.



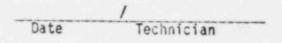
Slowly open the "signal isolation" valve. .2



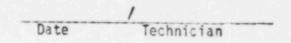
.3 Slowly open the GAS ISOLATION valve and pressurize the unit to the driving pressure (PDRIVE). Close the GAS ISOLATION valve.



Once the pressure has stabilized, turn the FRESSURIZE valve to the INITIAL position. Slowly open the GAS .4 ISOLATION valve and bring the pressure up to PSETPT.



.5 Run the recorder at a slow chart drive speed to record a short reference trace at this pressure. Be sure there is a separation between the reference trace and the process transmitter trace. Verify both traces are in appropriate relative positions.



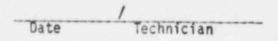
REVISION O PAGE 59

#### 6.0 PROCEDURE

- 6.7.11.5 Slowly open the GAS ISOLATION valve and pressurize the unit to the initial pressure (PINITIAL).
  - NOTE: Make sure the SIGNAL INITIATE switch is off during the set up. Premature opening of this valve will invalidate the test. Verify both traces are in appropriate positions.



.7 The unit is ready to generate the appropriate down-ramp. Check the recorder to make sure the proper chart drive speed has been selected.



- NOTE: The record chart drive speed selection has a strong bearing on how well the data can be evaluated. The chart drive speed should be slowest at which adequate resolution of desired timing marks is attained. The greater the angle the signal trace makes with the horizontal, the more clearly defined is the point of intersection with the reference trace. As a rough guide, the chart drive speed should be proportional to the ramp rate.
- .8 To run the test, start the recorder chart drive then depress the signal initiate switch. Record the appropriate data on the recorder chart. Include PINITIAL, PORIVE, PSETPT, signal rate setting, fluid level, timing mark interval, date, chart drive speed, and the words: "diagnostic self-test."

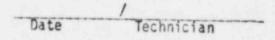
Date / Technician

REVISION O PAGE 50

### 5.0 PROCEDURE

6.7.11.9

Perform the diagnostic self-test twice and compare the results with the signal traces for the same tests supplied with the unit.



- .10 Examine the trace of each signal for the following qualitative waveform characteristics. Verify the results are acceptable as follows:
  - (a) Linear within a visual "best fit" from PINITIAL to PSETPT.
  - (b) Complete absence of high frequency components (noise).
  - (c) Sharp and clearly defined "knee" on leading edge of test signal.
  - (d) The signal ramp rate has not decreased more than 5% of the ramp rate of the original base line signal traces supplied with the unit.

Date / Technician

If diagnostic self-test is satisfactory, produce another dual trace as in step 5.7.11.8. Use this trace to compute the response time of the transmitter. Record 6.7.12 this response time in the data collection table at the back of this procedure. Figure A-5 shows calculation method for time delay (response time). Also record on the chart "Lo SG-2 Level Sensor," "PT-1123-2"

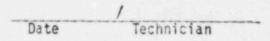
Date Technician

6.7.13 Disconnect all test leads and reconnect the normal signal leads at the process transmitter.

Date / Technician

6.0 PROCEDURE

6.7.14 Ensure the hydraulic signal generator is vented and disconnect it from the process transmitter.



6.7.15 Following appropriate procedures, return process transmitter to service.

Date Technician

6.8 Response Time Testing of Hi Containment Pressure Sensor PT-0351-2

NOTE: REFERENCE TRANSDUCER AND PROCESS TRANSMITTER OUTPUT ADJUSTMENT. The electrical outputs of the reference transducer and the process transmitter must be adjusted prior to any test sequence. The following steps provide a means of achieving maximum vertical deflection of the recorder within the required pressure range.

6.8.1 Line up valves as shown below on ID-100:

Gas Isolation CLOSED Gauge Isolation OPEN Pressurize INITIAL Signal Isolation OPEN Pressure Bleed CLOSED Vent/Drain CLOSED Sight Gauge/Fill CLOSED Drain CLOSED

6.8.2 Open the PRESSURE BLEED valve to ensure system pressure is at zero. Place DVM MONITOR switch in the REFERENCE XMTR position. Adjust the SPAN control to the fully counterclockwise position. Note the reading on the DVM.

	/
Date	Technician

REVISION O PAGE 52

#### 6.0 PROCEDURE

5.8.3

Adjust the SPAN control to the fully clockwise position. Adjust the ZERO control until the DVM indicates the voltage noted in paragraph 5.8.2 and with the same polarity (e.g., if the voltage in 5.8.2 was -15MV, adjust the ZERO control for a reading of -15MV).

Technician Date

CAUTION: Use EXTREME CARE IN PRESSURIZING THE UNIT to \*\*\*\*\*\* avoid exceeding the pressure range of the reference transducer diaphragm and causing possible damage. It is good practice to set the gas supply regulator to a pressure slightly above the highest to be used in the test.

> NOTE: Use the definitions and equations below to help perform the following steps:

## Definitions

- PSETPT - The pressure at which the response time is to be determined (usually the pressure at which the sensor output causes a specific action).
- The pressure on the hydraulic accumulator, PINITIAL reference transducer, and process sensor at the beginning of the test.
- PORIVE - The pressure in the pneumatic accumulator at the beginning of the test.
- Span - The absolute range of the pressure senor.

UP-RAMP

PINITIAL = PSETPT - .05 span

PDRIVE = PINITIAL + .5 span

NOTE: Should the set point be close to the upper limit of the sensor range, the value for PORIVE should be kept within the limits of a safe overrange for the sensor.

SAN ONOFRE NUCLEAR GENERATING STATION IN UNITS 2 AND 3 RE

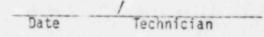
INSTRUMENT AND TEST PROCEDURE S023-II-3.2 REVISION 0 PAGE 63

- 5.0 PROCEDURE
  - 6.8.3 DOWN-RAMP

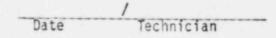
PINITIAL = PSETPT + .05 span

PORIVE = PINITIAL - .5 span

6.8.4 Close the PRESSURE BLEED valve and pressurize the unit by slowly opening the GAS ISOLATION valve. Pressurize to PSEIPT or PINITIAL, whichever is greater. Table 1 of Appendix C lists the specific values for each transmitter.



6.3.5 Adjust the SPAN control for maximum output or null point + 10 VDC, whichever is less.



6.8.6 Pressurize the unit to PINITIAL.

6.8.7 Operate REFERENCE XMTR BIAS and PROCESS XMTR BIAS controls to place the recorder traces in an appropriate position on the recorder chart. For an up-ramp test, the traces should appear on the bottom quarter of the chart. For a down-ramp test, the traces should appear on the top quarter of the chart. The process trace should always be slightly below the reference trace.

Date Technician

6.8.8 Vary unit pressure between PIVITIAL and PSETPT while adjusting the recorder amplifier and TRTS BIAS controls to maintain the traces on the recorder chart and in the same relative position. Repeat until no further adjustments are necessary.

REVISION D PAGE 64

### 6.0 PROCEDURE

6.8.9

Adjust the signal rate to the value specified in Table 1 of Appendix C.

Date / Technician

- NOTE: The signal rate is a function of four variables; pressure, differential pressure. fluid level in the hydraulic accumulator, and the setting on the SIGNAL RATE metering valve. The SIGNAL RATE valve has been sized to provide the range of signal rates most frequently required with the fluid level at 8 on the sight gauge (approximate hydraulic accumulator level). Turning the SIGNAL RATE control in a clockwise direction ill decrease the rate, turning in a counterclockwise direction will increase the rate. If higher rates are desired, fully depressurize the unit and add fluid. In a similar manner, if slower signal rates are required, fully depressurize the unit and drain the appropriate amount of fluid by opening the DRAIN valve.
- NOTE: Opening the PRESSURE BLEED valve provides a vent for filling or draining.

By adding or removing fluid from the unit, the range of signal rates may be varied from approximately one inch of water per second to over 1000 pounds per second without loss of signal linearity. Extremely high signal rates are attained at higher pressures. For those applications requiring high rates at low pressures, optional equipment is available from the manufacturer. Figure A-6 shows how signal rate is determined from sample trace.

- 6.8.10 Diagnostic Self-Test of ID-100
  - Line up the valves on the hydraulic signal generator .1 as follows:

Gas Isolation CLOSED Gauge Isolation OPEN Pressurize DRIVE Signal Isolation CLOSED

REVISION O PAGE 65

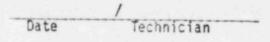
5.0 PROCEDURE

> 6.8.10.1 Pressure Bleed CLOSED

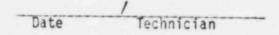
> > Drain/Vent CLOSED

Sight Gauge/Fill CLOSED

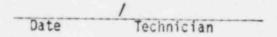
Drain CLOSED



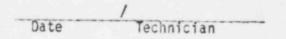
- 6.8.11 Up-Ramp Generation
  - Determine the initial, driving, and set point .1 pressures for the transmitter to be tested from Table 1 of Appendix C.



.2 Slowly open the "signal isolation" valve.



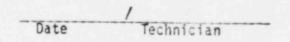
Slowly open the GAS ISOLATION valve and pressurize .3 the unit to the driving pressure (PDRIVE). Close the GAS ISOLATION valve.



Once the pressure has stabilized, turn the PRESSURIZE .4 valve to the INITIAL position. Slowly open the GAS ISOLATION valve and bring the pressure up to PSETPT.



Run the recorder at a slow chart drive speed to .5 record a short reference trace at this pressure. Be sure there is a separation between the reference trace and the process transmitter trace. Verify both traces are in appropriate relative positions.



SAN ONOFRE NUCLEAR GENERATING STATION UNITS 2 AND 3

INSTRUMENT AND TEST PROCEDURE S023-II-3.2 REVISION 0 PAGE 65

6.0 PROCEDURE

6.8.11.5

Slowly open the GAS ISOLATION valve and pressurize the unit to the initial pressure (PINITIAL).

NOTE: Make sure the SIGVAL INITIATE switch is off during the set up. Premature opening of this valve will invalidate the test. Verify both traces are in appropriate positions.

/ Technician Date

.7 The unit is ready to generate the appropriate up-ramp. Check the recorder to make sure the proper chart drive speed has been selected.

Technician Date

- NOTE: The record chart drive speed selection has a strong bearing on how well the data can be evaluated. The chart drive speed should be slowest at which adequate resolution of desired timing marks is attained. The greater the angle the signal trace makes with the horizontal, the more clearly defined is the point of intersection with the reference trace. As a rough guide, the chart drive speed should be proportional to the ramp rate.
- .8 To run the test, start the recorder chart drive then depress the signal initiate switch. Record the appropriate data on the recorder chart. Include PINITIAL, PDRIVE, PSETPT, signal rate setting, fluid level, timing mark interval, date, chart drive speed, and the words: "diagnostic self-test."

Technician Date

REVISION O PAGE 57

- 6.0 PROCEDURE
  - 5.8.11.9 Perform the diagnostic self-test twice and compare the results with the signal traces for the same tests supplied with the unit.

- .10 Examine the trace of each signal for the following qualitative waveform characteristics. Verify the results are acceptable as follows:
  - (a) Linear within a visual "best fit" from PINITIAL to PSFTPT
  - (b) Complete absence of high frequency components (noise)
  - (c) Sharp and clearly defined "knee" on leading edge of test signal
  - (d) The signal ramp rate has not decreased more than 5% of the ramp rate of the original base line signal traces supplied with the unit.

Date / Technician

6.8.12 If diagnostic self-test is satisfactory, produce another dual trace as in step 6.8.11.8. Use this trace to compute the response time of the transmitter. Record this response time in the data collection table at the back of this procedure. Figure A-5 shows calculation method for time delay (response time). Also record on the chart "Hi Containment Pressure Sensor," "PT-0351-1"

> Technician Date

6.8.13 Disconnect all test leads and reconnect the normal signal leads at the process transmitter.

Date / Technician

REVISION O PAGE 58

6.0 PROCEDURE

> 6.8.14 Ensure the hydraulic signal generator is vented and disconnect it from the process transmitter.

	/	
Date	Technician	

6.8.15 Following appropriate procedures, return process transmitter to service.

Response Time Testing of Hi-Hi Containment Pressure Sensor 6.9 PT-0352-1

NOTE: REFERENCE TRANSDUCER AND PROCESS TRANSMITTER OUTPUT ADJUSTMENT. The electrical outputs of the reference transducer and the process transmitter must be adjusted prior to any test sequence. The following steps provide a means of achieving maximum vertical deflection of the recorder within the required pressure range.

5.9.1 Line up valves as shown below on ID-100:

> Gas Isolation CLOSED

Gauge Isolation OPEN

Pressurize INITIAL

Signal Isolation OPEN

Pressure Bleed CLOSED

Vent/Drain CLOSED

Sight Gauge/Fill CLOSED

Drain CLOSED

6.9.2

Open the PRESSURE BLEED valve to ensure system pressure is at zero. Place DVM MONITOR switch in the REFERENCE XMTR position. Adjust the SPAN control to the fully counterclockwise position. Note the reading on the DVM.

	/
Date	Technician

UNITS 2 AND 3

SAN ONOFRE NUCLEAR GENERATING STATION INSTRUMENT AND TEST PROCEDURE S023-11-3.2 PAGE 53 REVISION O

6.0 PROCEDURE

4

5.9.3

Adjust the SPAN control to the fully clockwise position. Adjust the ZERO control until the DVM indicates the voltage noted in paragraph 5.9.2 and with the same polarity (e.g., if the voltage in 6.9.2 was -15MV, adjust the ZERO control for a reading of -15MV).



- USE EXTREME CARE IN PRESSURIZING THE UNIT CAUTION: to avoid exceeding the pressure range of \*\*\*\*\*\* the reference transducer diaphragm and causing possible damage. It is good practice to set the gas supply regulator to a pressure slightly above the highest to be used in the test.
- NOTE: Use the definitions and equations below to help perform the following steps:

Definitions

- The pressure at which the response time is PSETPT to be determined (usually the pressure at which the sensor output causes a specific action).
- The pressure on the hydraulic accumulator, PINITIAL reference transducer, and process sensor at the beginning of the test.
- The pressure in the pneumatic accumulator PDRIVE at the beginning of the test.
- The absolute range of the pressure senor. Span

UP-RAMP

- PINITIAL = PSETPT .05 span
- PDRIVE = PINITIAL + .5 span
  - NOTE: Should the set point be close to the upper limit of the sensor range, the value for PORIVE should be kept within the limits of a safe overrange for the sensor.

REVISION O PAGE 70

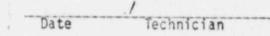
5.0 PROCEDURE

> 6.9.3 DOWN-RAMP

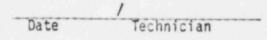
> > PINITIAL = PSETPT + .05 span

PDRIVE = PINITIAI - .5 span

6.9.4 Close the PRESSURE BLEED valve and pressurize the unit by slowly opening the GAS ISOLATION valve. Pressurize to PSETPT or PINITIAL, whichever is greater. Table 1 of Appendix C lists the specific values for each transmitter.



5.9.5 Adjust the SPAN control for maximum output or null point + 10 VDC, whichever is less.



Pressurize the unit to PINITIAL. 6.9.6

6.9.7 Operate REFERENCE XMTR BIAS and PROCESS XMTR BIAS controls to place the recorder traces in an appropriate position on the recorder chart. For an up-ramp test, the traces should appear on the bottom quarter of the chart. For a down-ramp test, the traces should appear on the top quarter of the chart. The process trace should always be slightly below the reference trace.

> Technician Date

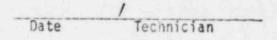
Vary unit pressure between PINITIAL and PSETPT while adjusting the recorder amplifier and TRTS BIAS controls 5.9.8 to maintain the traces on the recorder chart and in the same relative position. Repeat until no further adjustments are necessary.

SAN ONOFRE NUCLEAR GENERATING STATION INSTRUMENT AND TEST PROCEDURE S023-II-3.2 UNITS 2 AND 3 REVISION 9 PAGE 71

6.0 PROCEDURE

5.9.9

Adjust the signal rate to the value specified in Table 1 of Appendix C.



- NOTE: The signal rate is a function of four variables; pressure, differential pressure, fluid level in the hydraulic accumulator, and the setting on the SIGNAL RATE metering valve. The SIGNAL RATE valve has been sized to provide the range of signal rates most frequently required with the fluid level at 8 on the sight gauge (approximate hydraulic accumulator level). Turning the SIGNAL RATE control in a clockwise direction will decrease the rate, turning in a counterclockwise direction will increase the rate. If higher rates are desired, fully depressurize the unit and add fluid. In a similar manner, if slower signal rates are required, fully depressurize the unit and drain the appropriate amount of fluid by opening the DRAIN valve.
- NOTE: Opening the PRESSURE BLEED valve provides a vent for filling or draining.

By adding or removing fluid from the unit, the range of signal rates may be varied from approximately one inch of water per second to over 1000 pounds per second without loss of signal linearity. Extremely high signal rates are attained at higher pressures. For those applications requiring high rates at low pressures, optional equipment is available from the manufacturer. Figure A-5 shows how signal rate is determined from sample trace.

6.9.10

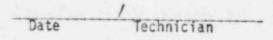
- Diagnostic Self-Test of ID-100
- .1 Line up the valves on the hydraulic signal generator as follows:

Gas Isolation	CLOSED
Gauge Isolation	OPEN
Pressurize	DRIVE
Signal ion	CLOSED

REVISION O PAGE 72

6.0 PROCEDURE

> 6.9.10.1 Pressure Bleed CLOSED Drain/Vent CLOSED Sight Gauge/Fill CLOSED Drain CLOSED

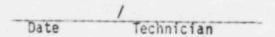


6.9.11 Up-Ramp Generation

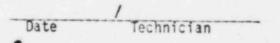
> Determine the initial, driving, and set point .1 pressures for the transmitter to be tested from Table 1 of Appendix C.



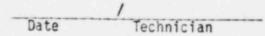
.2 Slowly open the "signal isolation" valve.



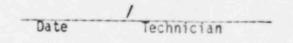
.3 Slowly open the GAS ISOLATION valve and pressurize the unit to the driving pressure (PDRIVE). Close the GAS ISOLATION valve.



Once the pressure has stabilized, turn the PRESSURIZE .4 valve to the INITIAL position. Slowly open the GAS ISOLATION valve and bring the pressure up to PSETPT.



.5 Run the recorder at a slow chart drive speed to record a short reference trace at this pressure. Be sure there is a separation between the reference trace and the process transmitter trace. Verify both traces are in appropriate relative positions.



REVISION O PAGE 73

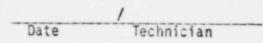
6.0 PROCEDURE

> Slowly open the GAS ISOLATION valve and pressurize 6.9.11.6 the unit to the initial pressure (PINITIAL).

> > NOTE: Make sure the SIGNAL INITIATE switch is off during the set up. Premature opening of this valve will invalidate the test. Verify both traces are in appropriate positions.

Date / Technician

.7 The unit is ready to generate the appropriate up-ramp. Check the recorder to make sure the proper chart drive speed has been selected.



- NOTE: The record chart drive speed selection has a strong bearing on how well the data can be evaluated. The chart drive speed should be slowest at which adequate resolution of desired timing marks is attained. The greater the angle the signal trace makes with the horizontal, the more clearly defined is the point of intersection with the reference trace. As a rough guide, the chart drive speed should be proportional to the ramp rate.
- .8 To run the test, start the recorder chart drive then depress the signal initiate switch. Record the appropriate data on the recorder chart. Include PINITIAL, PORIVE, PSETPT, signal rate setting, fluid level, timing mark interval, date, chart drive speed, and the words: "diagnostic self-test."

	1
Date	Technician

SAN ONOFRE NUCLEAR GENERATING STATION UNITS 2 AND 3

INSTRUMENT AND TEST PROCEDURE S023-II-3.2 REVISION 0 PAGE 74

## 6.0 PROCEDURE

6.9.11.9 Perform the diagnostic self-test twice and compare the results with the signal traces for the same tests supplied with the unit.



- .10 Examine the trace of each signal for the following qualitative waveform characteristics. Verify the results are acceptable as follows:
  - (a) Linear within a visual "best fit" from PINITIAL to PSETPT.
  - (b) Complete absence of high frequency components (noise).
  - (c) Sharp and clearly defined "knee" on leading edge of test signal.
  - (d) The signal ramp rate has not decreased more than 5% of the ramp rate of the original base line signal traces supplied with the unit.

/ Date Technician

6.9.12 If diagnostic self-test is satisfactory, produce another dual trace as in step 5.9.11.8. Use this trace to compute the response time of the transmitter. Record this response time in the data collection table at the back of this procedure. Figure A-6 shows calculation method for time delay (response time). Also record on the chart "HI-HI Containment Sensor," "PT-0352-2"

Date / Technician

6.9.13 Disconnect all test leads and reconnect the normal signal leads at the process transmitter.

Date / Technician

REVISION O PAGE 75

5.0 PROCEDURE

> 6.9.14 Ensure the hydraulic signal generator is vented and disconnect it from the process transmitter.

/ Technician Date

6.9.15 Following appropriate procedures, return process transmitter to service.

- 5.10 Response Time Testing of Low Refueling Water Tank Level Sensor LT-0305-2
  - NOTE: REFERENCE TRANSDUCER AND PROCESS TRANSMITTER OUTPUT ADJUSTMENT. The electrical outputs of the reference transducer and the process transmitter must be adjusted prior to any test sequence. The following steps provide a means of achieving maximum vertical deflection of the recorder within the required pressure range.
  - 6.10.1 Line up valves as shown below on ID-100:

Gas Isolation CLOSED Gauge Isolation OPEN Pressurize INITIAL Signal Isolation OPEN Pressure Bleed CLOSED Vent/Drain CLOSED Sight Gauge/Fill CLOSED Drain CLOSED

0.10.2 Open the PRESSURE BLEED valve to ensure system pressure is at zero. Place DVM MONITOR switch in the REFERENCE XMTR position. Adjust the SPAN control to the fully counterclockwise position. Note the reading on the DVM.

	/
Date	Technician

REVISION O PAGE 76

#### 6.0 PROCEDURE

6.10.3

Adjust the SPAN control to the fully clockwise position. Adjust the ZERO control until the DYM indicates the voltage noted in paragraph 5.10.2 and with the same polarity (e.g., if the voltage in 5.10.2 was -15MV, adjust the ZERO control for a reading of -15MV).



Use EXTREME CARE IN PRESSURIZING THE UNIT to CAUTION: \*\*\*\*\*\*\* avoid exceeding the pressure range of the reference transducer diaphragm and causing possible damage. It is good practice to set the gas supply regulator to a pressure slightly above the highest to be used in the test.

NOTE: Use the definitions and equations below to help perform the following steps:

### Definitions

- PSETPT - The pressure at which the response time is to be determined (usually the pressure at which the sensor output causes a specific action).
- The pressure on the hydraulic accumulator, PINITIAL reference transducer, and process sensor at the beginning of the test.
- PDRIVE - The pressure in the pneumatic accumulator at the beginning of the test.
- Span - The absolute range of the pressure senor.

#### UP-RAMP

PINITIAL = PSETPT - .05 span

- PDRIVE = PINITIAL + .5 span
- NOTE: Should the set point be close to the upper limit of the sensor range, the value for PORIVE should be kept within the limits of a safe overrange for the sensor.

REVISION O PAGE 77

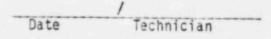
6.0 PROCEDURE

> 6.10.3 DOWN-RAMP

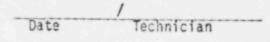
> > PINITIAL = PSETPT + .05 span

PDRIVE = PINITIAI - .5 span

6.10.4 Close the PRESSURE BLEED valve and pressurize the unit by slowly opening the GAS ISOLATION valve. Pressurize to PSEIPT or PINITIAL, whichever is greater. Table 1 of Appendix C lists the specific values for each transmitter.



6.10.5 Adjust the SPAN control for maximum output or null point + 10 VDC, whichever is less.



Pressurize the unit to PINITIAL. 6.10.5

> Date Technician

5.10.7 Operate REFERENCE XMTR BIAS and PROCESS XMTR BIAS controls to place the recorder traces in an appropriate position on the recorder chart. For an up-ramp test, the traces should appear on the bottom quarter of the chart. For a down-ramp test, the traces should appear on the top quarter of the chart. The process trace should always be slightly below the reference trace.

Vary unit pressure between PINITIAL and PSEIPI while adjusting the recorder amplifier and TRTS BIAS 6.10.8 controls to maintain the traces on the recorder chart and in the same relative position. Repeat until no further adjustments are necessary.

Date / Technician

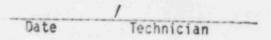
SAN ONOFRE NUCLEAR GENERATING STATION UNITS 2 AND 3

6.10.9

INSTRUMENT AND TEST PROCEDURE S023-II-3.2 REVISION 0 PAGE 78

6.0 PROCEDURE

Adjust the signal rate to the value specified in Table 1 of Appendix C.



- NOTE: The signal rate is a function of four variables; pressure, differential pressure, fluid level in the hydraulic accumulator, and the setting on the SIGNAL RATE metering valve. The SIGNAL RATE valve has been sized to provide the range of signal rates most frequently required with the fluid level at 3 on the sight gauge (approximate hydraulic accumulator level). Turning the SIGNAL RATE control in a clockwise direction will decrease the rate, turning in a counterclockwise direction will increase the rate. If higher rates are desired, fully depressurize the unit and add fluid. In a similar manner, if slower signal rates are required, fully depressurize the unit and drain the appropriate amount of fluid by opening the DRAIN valve.
- NOTE: Opening the PRESSURE BLEED valve provides a vent for filling or draining.

By adding or removing fluid from the unit, the range of signal rates may be varied from approximately one inch of water per second to over 1000 pounds per second without loss of signal linearity. Extremely high signal rates are attained at higher pressures. For those applications requiring high rates at low pressures, optional equipment is available from the manufacturer. Figure A-6 shows how signal rate is determined from sample trace.

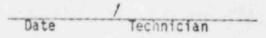
- 6.10.10 Diagnostic Self-Test of ID-100
  - .1 Line up the valves on the hydraulic signal generator as follows:

Gas Isolation CLOSED Gauge Isolation OPEN Pressurize DRIVE Signal Isolation CLOSED

REVISION O PAGE 73

5.0 PROCEDURE

> 6.10.10.1 Pressure Bleed CLOSED Drain/Vent CLOSED Sight Gauge/Fill CLOSED Drain CLOSED

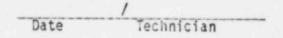


6.10.11 Down-Ramp Generation

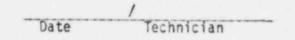
> .1 Determine the initial, driving, and set point pressures for the transmitter to be tested from Table 1 of Appendix C.



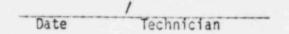
.2 Slowly open the "signal isolation" valve.



Slowly open the GAS ISOLATION valve and pressurize .3 the unit to the driving pressure (Poplyr). Close the GAS ISOLATION valve.



Once the pressure has stabilized, turn the PRESSURIZE valve to the INITIAL position. Slowly open the GAS .4 ISOLATION valve and bring the pressure up to PSETPT.



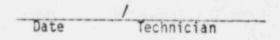
.5 Run the recorder at a slow chart drive speed to record a short reference trace at this pressure. Be sure there is a separation between the reference trace and the process transmitter trace. Verify both traces are in appropriate relative positions.

Technician Date

REVISION O PAGE SO

- 6.0 PROCEDURE
  - 5.10.11.6 Slowly open the GAS ISOLATION valve and pressurize the unit to the initial pressure (PINITIAL).
    - NOTE: Make sure the SIGNAL INITIATE switch is off during the set up. Premature opening of this valve will invalidate the test. Verify both traces are in appropriate positions.

The unit is ready to generate the appropriate .7 down-ramp. Check the recorder to make sure the proper chart drive speed has been selected.



- NOTE: The record chart drive speed selection has a strong bearing on how well the data can be evaluated. The chart drive speed should be slowest at which adequate resolution of desired timing marks is attained. The greater the angle the signal trace makes with the horizontal, the more clearly defined is the point of intersection with the reference trace. As a rough glide, the chart drive speed should be proportional to the ramp rate.
- .8 To run the test, start the recorder chart drive then depress the signal initiate switch. Record the appropriate data on the recorder chart. Include PINITIAL, PORIVE, PSETPT, signal rate setting, fluid level, timing mark interval, date, chart drive speed, and the words: "diagnostic self-test."

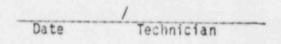
Date Technician

SAN ONOFRE NUCLEAR GENERATING STATION UNITS 2 AND 3

INSTRUMENT AND TEST PROCEDURE S023-11-3.2 REVISION 0 PAGE 81

## 6.0 PROCEDURE

6.10.11.9 Perform the diagnostic self-test twice and compare the results with the signal traces for the same tests supplied with the unit.



- .10 Examine the trace of each signal for the following qualitative waveform characteristics. Verify the results are acceptable as follows:
  - (a) Linear within a visual "best fit" from PINITIAL to PSETPT
  - (b) Complete absence of high frequency components (noise).
  - (c) Sharp and clearly defined "knee" on leading edge of test signal.
  - (d) The signal ramp rate has not decreased more than 5% of the ramp rate of the original base line signal traces supplied with the unit.

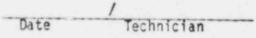
Date / Technician

6.10.12 If diagnostic self-test is satisfactory, produce another dual trace as in step 6.10.11.8. Use this trace to compute the response time of the transmitter. Record this response time in the data collection table at the back of this procedure. Figure A-5 shows calculation method for time delay (response time). Also record on the chart "Low RWT Level Sensor," "LT-0305-2"



6.10.13

Disconnect all test leads and reconnect the normal signal leads at the process transmitter.



REVISION O PAGE 82

5.0 PROCEDURE

> 6.10.14 Ensure the hydraulic signal generator is vented and disconnect it from the process transmitter.

	1	
Date	Technician	-

5.10.15 Following appropriate procedures, return process transmitter to service.

> Date Technician

5.11 Response Time Testing of LOW SG-1 Flow Sensor PDT-0978-2

NOTE: REFERENCE TRANSDUCER AND PROCESS TRANSMITTER OUTPUT ADJUSTMENT. The electrical outputs of the reference transducer and the process transmitter must be adjusted prior to any test sequence. The following steps provide a means of achieving maximum vertical deflection of the recorder within the required pressure range.

6.11.1 Line up valves as shown below on ID-100:

> Gas Isolation CLOSED Gauge Isolation OPEN Pressurize INITIAL Signal Isolation OPEN Pressure Bleed CLOSED Vent/Drain CLOSED Sight Gauge/Fill CLOSED Drain CLOSED

6.11.2

Open the PRESSURE BLEED valve to ensure system pressure is at zero. Place DVM MONITOR switch in the REFERENCE XMTR position. Adjust the SPAN control to the fully counterclockwise position. Note the reading on the DVM.

	/
Date	Technician

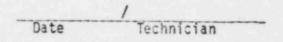
REVISION O PAGE 93

6.0 PROCEDURE

8

6.11.3

Adjust the SPAN control to the fully clockwise position. Adjust the ZERO control until the DVM indicates the voltage noted in paragraph 5.11.2 and with the same polarity (e.g., if the voltage in 5.11.2 was -151V, adjust the ZERO control for a reading of -15MV).



CAUTION: Use EXTREME CARE IN PRESSURIZING THE UNIT to avoid exceeding the pressure range of the ...... reference transducer diaphragm and causing possible damage. It is good practice to set the gas supply regulator to a pressure slightly above the highest to be used in the test.

NOTE: Use the definitions and equations below to help perform the following steps:

Definitions

- The pressure at which the response time is PSETPT to be determined (usually the pressure at which the sensor output causes a specific action).
- PINITIAL - The pressure on the hydraulic accumulator. reference transducer, and process sensor at the beginning of the test.
- PDRIVE - The pressure in the pneumatic accumulator at the beginning of the test.
- Span - The absolute range of the pressure senor.

UP-RAMP

PINITIAL = PSETPT - .05 span

PDRIVE = PINITIAL + .5 span

NOTE: Should the set point be close to the upper limit of the sensor range the value for PDRIVE should be ken e lim ts of a safe overrange 564. ·

REVISION O PAGE 34

5.0 PROCEDURE

6.11.3 DOWN-RAMP

PINITIAL = PSETPT + .05 span

PERIVE = PINITIAL - .5 span

6.11.4 Close the PRESSURE BLEED valve and pressurize the unit by slowly opening the GAS ISOLATION valve. Pressurize to PSETPT or PINITIAL, whichever is greater. Table 1 of Appendix C lists the specific values for each transmitter.

Date Technician

6.11.5 Adjust the SPAN control for maximum output or null point + 10 VDC, whichever is less.

6.11.6 Pressurize the unit to PINITIAL.

5.11.7 Operate REFERENCE XMTR BIAS and PROCESS XMTR BIAS controls to place the recorder traces in an appropriate position on the recorder chart. For an up-ramp test, the traces should appear on the bottom guarter of the chart. For a down-ramp test, the traces should appear on the top quarter of the chart. The process trace should always be slightly below the reference trace.

Date Technician

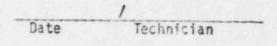
Vary unit pressure between PINITIAL and PSETPT while 6.11.8 adjusting the recorder amplifier and TRTS BIAS controls to maintain the traces on the recorder chart and in the same relative position. Repeat until no further adjustments are necessary.

REVISION O PAGE 85

5.0 PROCEDURE

5.11.9

Adjust the signal rate to the value specified in Table 1 of Appendix C.



- NOTE: The signal rate is a function of four variables; pressure, differential pressure. fluid level in the hydraulic accumulator, and the setting on the SIGNAL RATE metering valve. The SIGNAL RATE valve has been sized to provide the range of signal rates most frequently required with the fluid level at 8 on the sight gauge (approximate hydraulic accumulator level). Turning the SIGNAL RATE control in a clockwise direction will decrease the rate, turning in a counterclockwise direction will increase the rate. If higher rates are desired, fully depressurize the unit and add fluid. In a similar manner, if slower signal rates are required, fully depressurize the unit and drain the appropriate amount of fluid by opening the DRAIN valve.
- NOTE: Opening the PRESSURE BLEED valve provides a vent for filling or draining.

By adding or removing fluid from the unit, the range of signal rates may be varied from approximately one inch of water per second to over 1000 pounds per second without loss of signal linearity. Extremely high signal rates are attained at higher pressures. For those applications requiring high rates at low pressures, optional equipment is available from the manufacturer. Figure A-6 shows how signal rate is Catermined from sample trace.

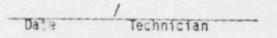
- 6.11 10 Diagnostic Self-Test of ID-100
  - .1 Line up the valves on the hydraulic signal generator as follows:

Gas Isolation CLOSED Gauge Isolation OPEN Pressurize DRIVE Signal Isolation CLOSED

5.0 PROCEDURE

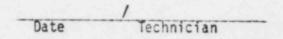
> 6.11.10.1 Pressure Bleed CLOSED Drain/Vent CLOSED Sight Gauge/Fill CLOSED

> > Drain CLOSED

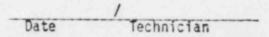


5.11.11 Down-Ramp Generation

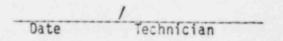
> Determine the initial, driving, and set point .1 pressures for the transmitter to be tested from Table 1 of Appendix C.



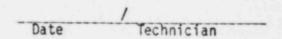
.2 Slowly open the "signal isolation" valve.



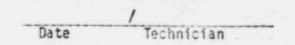
.3 Slowly open the GAS ISOLATION valve and pressurize the unit to the driving pressure (PDRIVE). Close the GAS ISOLATION valve.



.4 Once the pressure has stabilized, turn the PRESSURIZE valve to the INITIAL position. Slowly open the GAS ISOLATION valve and bring the pressure up to PSETPT.

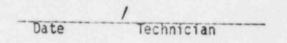


Run the recorder at a slow chart drive speed to .5 record a short reference trace at this pressure. Be sure there is a separation between the reference trace and the process transmitter trace. Verify both traces are in appropriate relative positions.

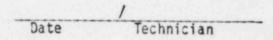


REVISION O PAGE 97

- 6.0 PROCEDURE
  - 6.11.11.6 Slowly open the GAS ISOLATION valve and pressurize the unit to the initial pressure (PINITIAL).
    - NOTE: Make sure the SIGNAL INITIATE switch is off during the set up. Premature opening of this valve will invalidate the test. Verify both traces are in appropriate positions.



.7 The unit is ready to generate the appropriate down-ramp. Check the recorder to make sure the proper chart drive speed has been selected.



- NOTE: The record chart drive speed selection has a strong bearing on how well the data can be evaluated. The chart drive speed should be slowest at which adequate resolution of desired timing marks is attained. The greater the angle the signal trace makes with the horizontal, the more clearly defined is the point of intersection with the reference trace. As a rough guide, the chart drive speed should be proportional to the ramp rate.
- To run the test, start the recorder chart drive then .8 depress the signal initiate switch. Record the appropriate data on the recorder chart. Include PINITIAL, PDRIVE, PSETPT, signal rate setting, fluid level, timing mark interval, date, chart drive speed, and the words: "diagnostic self-test."

Technician Date

REVISION O PAGE 83

#### 5.0 PROCEDURE

6.11.11.9 Perform the diagnostic self-test twice and compare the results with the signal traces for the same tests supplied with the unit.



- Examine the trace of each signal for the following .10 qualitative waveform characteristics. Verify the results are acceptable as follows:
  - (a) Linear within a visual "best fit" from PINITIAL to PSETPT
  - (b) Complete absence of high frequency components (noise).
  - (c) Sharp and clearly defined "knee" on leading edge of test signal.
  - (d) The signal ramp rate has not decreased more than 5% of the ramp rate of the original base line signal traces supplied with the unit.

Date / Technician

If diagnostic self-test is satisfactory, produce another 5.11.12 dual trace as in step 6.11.11.8. Use this trace to compute the response time of the transmitter. Record this response time in the data collection table at the back of this procedure. Figure A-5 shows calculation method for time delay (response time). Also record on the chart "LOW SG-1 Flow Sensor 2PDT-0378-2"

Date / Technician

6.11.13 Disconnect all test leads and reconnect the normal signal leads at the process transmitter.



SAN ONOFRE NUCLEAR GENERATING STATION UNITS 2 AND 3

INSTRUMENT AND TEST PROCEDURE S023-II-3.2 REVISION 0 PAGE 89

6.0 PROCEDURE

6.11.14 Ensure the hydraulic signal generator is vented and disconnect it from the process transmitter.

	/
Date	Technician

6.11.15 Following appropriate procedures, return process transmitter to service.

Date Technician

5.12 Response Time Testing of LOW SG-2 Flow Sensor PDT-0979-1

NOTE: REFERENCE TRANSDUCER AND PROCESS TRANSMITTER OUTPUT ADJUSTMENT. The electrical outputs of the reference transducer and the process transmitter must be adjusted prior to any test sequence. The following steps provide a means of achieving maximum vertical deflection of the recorder within the required pressure range.

5.12.1 Line up valves as shown below on ID-100:

Gas Isolation CLOSED Gauge Isolation OPEN Pressurize INITIAL Signal Isolation OPEN Pressure Bleed CLOSED Vent/Drain CLOSED Sight Gauge/Fill CLOSED Drain CLOSED

6.12.2 Open the PRESSURE BLEED valve to ensure system pressure is at zero. Place DVM MONITOR switch in the REFERENCE XMTR position. Adjust the SPAN control to the fully counterclockwise position. Note the reading on the DVM.

	/
Date	Technician

REVISION O PAGE 90

6.0 PROCEDURE

> 6.12.3 Adjust the SPAN control to the fully clockwise position. Adjust the ZERO control until the DVM indicates the voltage noted in paragraph 6.12.2 and with the same polarity (e.g., if the voltage in 5.12.2 was -15MV, adjust the ZERO control for a reading of -15MV).

CAUTION: Use EXTREME CARE IN PRESSURIZING THE UNIT to ...... avoid exceeding the pressure range of the reference transducer diaphragm and causing possible damage. It is good practice to set the gas supply regulator to a pressure slightly above the highest to be used in the test.

NOTE: Use the definitions and equations below to help perform the following steps:

## Definitions

- The pressure at which the response time is PSETPT to be determined (usually the pressure at which the sensor output causes a specific action).
- The pressure on the hydraulic accumulator. PINITIAL reference transducer, and process sensor at the beginning of the test.
- The pressure in the pneumatic accumulator PDRIVE at the beginning of the test.
- The absolute range of the pressure senor. Span

#### UP-RAMP

2

PINITIAL = PSETPT - .05 span

- PDRIVE = PINITIAL + .5 span
- NOTE: Should the set point be close to the upper limit of the sensor range, the value for PDRIVE should be kept within the limits of a safe overrange for the sensor.

SAN ONOFRE NUCLEAR GENERATING STATION UNITS 2 AND 3

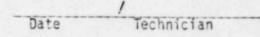
INSTRUMENT AND TEST PROCEDURE S023-11-3.2 REVISION 0 PAGE 91

- 5.0 PROCEDURE
  - 6.12.3 DOWN-RAMP

PINITIAL = PSETPT + .05 span

PDRIVE = PINITIAL - .5 span

6.12.4 Close the PRESSURE BLEED valve and pressurize the unit by slowly opening the GAS ISOLATION valve. Pressurize to PSETPI or PINITIAL, whichever is greater. Table I of Appendix Clists the specific values for each transmitter.



6.12.5 Adjust the SPAN control for maximum output or null point + 10 VDC, whichever is less.

6.12.6 Pressurize the unit to PINITIAL.

6.12.7 Operate REFERENCE XMTR BIAS and PROCESS XMTR BIAS controls to place the recorder traces in an appropriate position on the recorder chart. For an up-ramp test, the traces should appear on the bottom quarter of the chart. For a down-ramp test, the traces should appear on the top quarter of the chart. The process trace should always be slightly below the reference trace.

Date Technician

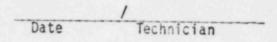
6.12.8 Vary unit pressure between PINITIAL and PSEIPT while adjusting the recorder amplifier and TRTS BIAS controls to maintain the traces on the recorder chart and in the same relative position. Repeat until no further adjustments are necessary.

REVISION O PAGE 92

6.0 PROCEDURE

5.12.9

Adjust the signal rate to the vilue specified in Table 1 of Appendix C.



- NOTE: The signal rate is a function of four variables; pressure, differential pressure, fluid level in the hydraulic accumulator, and the setting on the SIGNAL RATE metering valve. The SIGNAL RATE valve has been sized to provide the range of signal rates most frequently required with the fluid level at 8 on the sight gauge (approximate hydraulic accumulator level). Turning the SIGNAL RATE control in a clockwise direction will decrease the rate, turning in a counterclockwise direction will increase the rate. If nigher rates are desired, fully depressurize the unit and add fluid. In a similar manner, if slower signal rates are required, fully depressurize the unit and drain the appropriate amount of fluid by opening the DRAIN valve.
- NOTE: Opening the PRESSURE BLEED valve provides a vent for filling or draining.

By adding or removing fluid from the unit, the range of signal rates may be varied from approximately one inch of water per second to over 1000 pounds per second without loss of signal linearity. Extremely high signal rates are attained at higher pressures. For those applications requiring high rates at low pressures, optional equipment is available from the manufacturer. Figure A-5 shows how signal rate is determined from sample trace.

- 6.12.10 Diagnostic Self-Test of ID-100
  - Line up the valves on the hydraulic signal generator .1 as follows:

Gas Isolation CLOSED Gauge Isolation OPEN Pressurize DRIVE Signal Isolation CLOSED SAN ONOFRE NUCLEAR GENERATING STATION UNITS 2 AND 3

INSTRUMENT AND TEST PROCEDURE S023-11-3.2 REVISION 0 PAGE 93

6.0 PROCEDURE

6.12.10.1 Pressure Bleed CLOSED Drain/Vent CLOSED

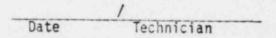
Sight Gauge/Fill CLOSED

Drain CLOSED

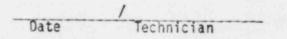
Date / Technician

- 6.12.11 Down-Ramp Generation
  - .1 Determine the initial, driving, and set point pressures for the transmitter to be tested from Table 1 of Appendix C.

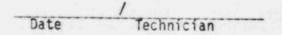
.2 Slowly open the "signal isolation" valve.



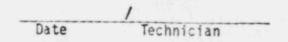
.3 Slowly open the GAS ISOLATION valve and pressurize the unit to the driving pressure (PDRIVE). Close the GAS ISOLATION valve.



.4 Once the pressure has stabilized, turn the PRESSURIZE valve to the INITIAL position. Slowly open the GAS ISOLATION valve and bring the pressure up to PSETPT.



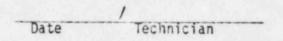
.5 Run the recorder at a slow chart drive speed to record a short reference trace at this pressure. Be sure there is a separation between the reference trace and the process transmitter trace. Verify both traces are in appropriate relative positions.



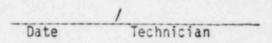
UNITS 2 AND 3

SAN ONOFRE NUCLEAR GENERATING STATION INSTRUMENT AND TEST PROCEDURE \$023-11-3.2 REVISION O PAGE 94

- 5.0 PROCEDURE
  - 6.12.11.6 Slowly open the GAS ISOLATION valve and pressurize the unit to the initial pressure (PINITIAN).
    - NOTE: Make sure the SIGNAL INITIATE switch is off during the set up. Premature opening of this valve will invalidate the test. Verify both traces are in appropriate positions.



.7 The unit is ready to generate the appropriate down-ramp. Check the recorder to make sure the proper chart drive speed has been selected.

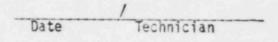


- NOTE: The record chart drive speed selection has a strong bearing on how well the data can be evaluated. The chart drive speed should be slowest at which adequate resolution of desired timing marks is attained. The greater the angle the signal trace makes with the horizontal, the more clearly defined is the point of intersection with the reference trace. As a rough guide, the chart drive speed should be proportional to the ramp rate.
- .8

To run the test, start the recorder chart drive then depress the signal initiate switch. Record the appropriate data of the recorder chart. Include Pinitial, Pdrive, Psetpt, signal rate setting, fluid level, timing mark interval, date, chart drive speed, and the words: "diagnostic self-test."

Technician Date

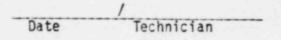
- PROCEDURE 6.0
  - 6.12.11.9 Perform the diagnostic self-test twice and compare the results with the signal traces for the same tests supplied with the unit.



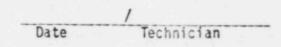
- .10 Examine the trace of each signal for the following qualitative waveform characteristics. Verify the results are acceptable as follows:
  - Linear within a visual "best fit" from (a)to PSETPT
  - (b) Complete absence of high frequency components (noise).
  - Sharp and clearly defined "knee" on leading (c) edge of test signal.
  - (d) The signal ramp rate has not decreased more than 5% of the ramp rate of the original base line signal traces supplied with the unit.

Date / Technician

.11 If diagnostic self-test is satisfactory, produce another dual trace as in step 6.12.11.8. Use this trace to compute the response time of the transmitter. Record this response time in the data collection table at the back of this procedure. Figure A-5 shows calculation method for time delay (response time). Also record on the chart "LOW SG-2 Flow Sensor 2PDT-0979-2"



.12 Disconnect all test leads and reconnect the normal signal leads at the process transmitter.



## REVISION O PAGE 96

# 6.0 PROCEDURE

6.12.11.13 Ensure the hydraulic signal generator is vented and disconnect it from the process transmitter.

	/
Date	Technician

.14 Following appropriate procedures, return process transmitter to service.

Date Technician

- 6.13 Test Equipment Set Up for Loop Current Step Response Testing of Resistance Temperature Detectors
  - NOTE: The LCSR Analyzer and Response Test Instrument which SCE has purchased from AMS will be used to perform this portion of the test. Some of the following steps will be performed using this equipment and the analyzer will produce the appropriate response times. Refer to AMS technical manuals if necessary.
  - NOTE: Each temperature element (RTD) channel will have five (5) connection points in the Spec. 200 cabinet. Two are the leads from the RTD resistance element, two are referred to as dummy leads and the fifth is a cable shield ground.
  - NOTE: For best results, this test should be performed only when the plant is at normal operating temperature and primary coolant flow rate.
  - Position the front controls on the ERT-1 as follows: 6.13.1
    - .1 Voltmeter selector switch to position "D".
    - .2 Trim switch in UP position.
    - Power Supply internal-external switch in the "INT" .3 position.

VJS:19425/js/mr Continued to 1943b SAN ONOFRE NUCLEAR GENERATING STATION INSTRUMENT AND TEST PROCEDURE S023-II-3.2 UNITS 2&3 REVISION 0 PAGE 97

5.0 PROCEDURE

6.13.1.4 "Voltage Adjustment" fully counterclockwise.

.5 Current selector switch in LOW position.

- .6 Range selector to "20" VDC.
- .7 Voltmeter internal/external switch in "INT" position.

Date Technician

6.13.2 Ensure ERT-1 power switch, located in back, is in the OFF position, then connect 115 VAC power to the ERT-1 and the ELC-1.

/ Date Technician

NOTE: Refer to Figure A-5 for the following steps:

5.13.3 Connect a cable from the ERT-1 "OUTPUT" BNC connector to the ELC-1B "ANALOG IN" BNC connector.

Date / Technician

6.13.4 Connect a cable from ELC-18 "TRIGGER BNC" connector to the ERT-1 "CONTROL IN" BNC connector.

/ Date Technician

6.13.5 Place ERT-1 power ON/OFF toggle switch to the "ON" position and verify "POWER" LED energized.

Date / Technician

5.13.6 Press ELC-1B "ON/OFF" pushbutton and verify that the light energizes. The "START" light, "TEST/DUMP" light, and "READY" LED should also energize.

Date / Technician

SAN ONOFRE NUCLEAR GENERATING STATION UNITS 283

INSTRUMENT AND TEST PROCEDURE S023-II-3.2 REVISION 0 PAGE 93

6.0 PROCEDURE

6.13.7 Allow 10 minutes for equipment to warm up.

Date / Technician

- 6.14 Loop Current Step Response Testing of Hot Leg Temperature Sensor TE-0112-2
  - NOTE: For most consistent results, the temperature of the reactor coolant should be approximately 5400F.
  - 6.14.1 In Spec. 200 cabinet L-125, remove the RTD leads from terminals 7 and 8 of TB-1 and connect them to the sensor connector strip on the EPT-1.

Date Technician

6.14.2 Adjust the "TRIM" pot on ERT-1 until the amplifier offset voltage is zero. (Trim switch UP).

NOTE: The amplifier offset voltage must be checked and set to zero whenever the gain is changed.

Date Technician

6.14.3 Place the "TRIM" switch in the DOWN position.

Date Technician

6.14.4 Place the current selector switch in the "HIGH" position.

Date / Technician

REVISION O PAGE 99

#### 6.0 PROCEDURE

Balance the wheatstone bridge by adjusting the coarse 6.14.5 resistor network switches and the fine decade resistors until the bridge output reads zero.

- NOTE: Bridge output is only indicated on the voltmeter when the voltmeter selector switch is in the "D" position. Allow at least three minutes for the reading to stabilize.
- 6.14.5 Move the voltmeter selector switch on ERT-1 to the "B" or "C" position and adjust the supply voltage to approximately 50 VDC. This provides 50 made through the RTD assuming the bridge is still balanced. Allow three minutes for stabilization time.

Date / Technician

Repeat steps 6.14.5 and 6.14.5 until no further 6.14.7 adjustments are necessary. Allow at least three minutes for the readings to stabilize.

Date / Technician

6.14.8 Move the current selector switch to the "LOW" position and repalance the bridge. Allow three minutes for stabilization time.

\_\_\_\_/ Date Technician

6.14.9 Place the current selector switch to "HIGH." Allow reading to st bilize. Do not rebalance the bridge.

Date Technician

REVISION O PAGE 100

### 6.0 PROCEDURE

- 5.14.10 Adjust the amplifier gain of ERT-1 to obtain as close as possible to 5.0 VDC on the voltmeter with the voltmeter selector switch in position "D." With this 5.0 VDC to the analog input BNC of the ELC-1B, the ELC-1B digital indicator should read approximately 4095 when ELC-1B is in "READY" mode with "TEST/PUMP" pushbutton pressed.
  - NOTE: The amplifier offset voltage must be checked and set to zero whenever the GAIN is changed. Trim switch must be up to adjust the offset and down at all other times.

Date / Technician

6.14.11 Place current selector switch in "LOW" position and ensure bridge returns to a balanced condition. A slight adjustment of the decade resistors may be necessary.

6.14.12 Ensure the "AVERAGE/SINGLE SHOT" selector switch on the ELC-1B is in the "AVERAGE" position.

Date / Technician

6.14.13 With the ELC-1B in the "READY" mode, press the "START" pushbutton. The ELC-18 should go the "SAMPLE" mode for 20 seconds during which time the analog output of the ERT-1 should rise. Then the ELC-1B should return to the "READY" mode.

/ Date Technician

6.14.14 Allow the bridge to return to a balanced condition.

Date / Technician

SAN ONOFRE NUCLEAR GENERATING STATION UNITS 2&3

INSTRUMENT AND TEST PROCEDURE S023-II-3.2 REVISION 0 PAGE 101

## 6.0 PROCEDURE

6.14.15 Repeat steps 6.14.13 and 6.14.14 nine additional times. On the tenth sample the ELC-1B should go to the "SAMPLE" mode for 20 seconds, then "ANALYZE" mode until the calculations are complete. Then the ELC-1B will go to the "DISPLAY" mode.

Date / Technician

6.14.16 With the ELC-1B selector switch in position "D", the digital indicator should read the average total time constant for all ten samples.

NOTE: This value represents the amount of time, in seconds, that it takes for the RTD resistance to reach 53.2% of the step change. Record this response time in the "DATA COLLECTION TABLE" at the back of this procedure.

Date / Technician

6.14.17 In Spec. 200 cabinet L-121, replace the RTD leads on terminals 18 and 17 of TB-1.

Date / Technician

6.14.18 Turn the "VOLTAGE ADJUSTMENT" on the ERT-1 fully counterclockwise.

/ Date Technician

6.14.19 Press the "RESET" pushbutton on the ELC-IB and verify that the analyzer returns to the "READY" mode.

/ Technician Date

SAN ONOFRE NUCLEAR GENERATING STATION UNITS 2&3

INSTRUMENT AND TEST PROCEDURE S023-II-3.2 REVISION 0 PAGE 102

### 6.0 PROCEDURE

- 6.15 Loop Current Step Response Testing of Cold Leg Temperature Sensor TE-9178-2
  - NOTE: For most consistent results, the temperature of the reactor coolant should be approximately 540°F.
  - 6.15.1 In Spec 200 cabinet L-125, remove the RTD leads from terminals 17 and 18 of TB-1 and connect them to the sensor connector strip on the ERT-1.

Date Technician

- 6.15.2 Adjust the "TRIM" pot on ERT-1 until the amplifier offset voltage is ZERO. (Trim switch UP).
  - NOTE: The amplifier offset voltage must be checked and set to zero whenever the GAIN is changed.

Date / Technician

6.15.3 Place the "TRIM" switch in the DOWN position.

Date / Technician

5.15.4 Place current selector switch in the "HIGH" position.

Date / Technician

6.15.5 Balance the Wheatstone bridge by adjusting the coarse resistor network switches and the fine decade resistors until the bridge output reads ZERO.

Date / Technician

NOTE: Bridge output is only indicated on the voltmeter when the voltmeter selector switch is in the "D" position. Allow at least three minutes for the reading to stabilize. SAN ONOFRE NUCLEAR GENERATING STATION INSTRUMENT AND TEST PROCEDURE \$023-11-3.2 UNITS 283

REVISION O PAGE 103

- 6.0 PROCEDURE
  - 6.15.6 Move the voltmeter selector switch on ERT-1 to the "B" or "C" position and adjust the supply voltage to approximately 60 Vdc. This provides 60 made through the RTD assuming the bridge is still balanced. Allow three minutes for stabilization time.

	/
Date	Technician

Repeat steps 6.15.5 and 5.15.6 until no further 6.15.7 adjustments are necessary. Allow at least three minutes for the readings to stabilize.

Technician Date

6.15.8 Move the current selector switch to the "LOW" position and rebalance the bridge. Allow three minutes for stabilization time.

Place the current selector switch to "HIGH". Allow 6.15.9 reading to stabilize. Do NOT rebalance the bridge.

- Adjust the amplifier gain of ERT-1 to obtain as close as 6.15.10 possible to 5.0 Vdc on the voltmeter with the voltmeter selector switch in position "D". With this 5.0 Vdc to the analog input BNC of the ELC-18, the ELC-18 digital indicator should read approximately 4095 when ELC-18 is in "READY" mode with "Test/Dump" pushbutton pressed.
  - NOTE: The amplifier offset voltage must be checked and set to zero whenever the GAIN is changed. Trim switch must be up to adjust the offset and down at all other times.

/ Technician Date

SAN ONOFRE NUCLEAR GENERATING STATION UNITS 2&3

INSTRUMENT AND TEST PROCEDURE S023-II-3.2 REVISION 0 PAGE 104

#### 6.0 PROCEDURE

6.15.11 Place current selector switch in "LOW" position and ensure bridge returns to a balanced condition. A slight adjustment of the decade resistors may be necessary.

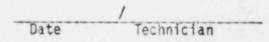
5.15.12 Ensure the "AVERAGE/SINGLE SHOT" selector switch on the ELC-1B is in the "AVERAGE" position.

5.15.13 With the ELC-1B in the "READY" mode, press the "START" pushbutton. The ELC-1B should go the "SAMPLE" mode for 20 seconds during which time the analog output of the ERT-1 should rise. Then the ELC-1B should return to the "READY" mode.

6.15.14 Allow the bridge to return to a balanced condition.

Date Technician

6.15.15 Repeat steps 6.15.13 and 6.15.14 nine additional times. On the tenth sample the ELC-1B should go to the "SAMPLE" mode for 20 seconds, then "ANALYZE" mode until the calculations are complete. Then the ELC-1B will go the "DISPLAY" mode.



- 6.15.16 With the ELC-1B selector switch in position "D", the digital indicator should read the average total time constant for all ten samples.
  - NOTE: This value represents the amount of time, in seconds, that it takes for the RTD to reach 63.2% of the step change. Record this response time in the "DATA COLLECTION TABLE" at the back of this procedure.

Date / Technician

SAN ONOFRE NUCLEAR GENERATING STATION UNITS 2&3

# INSTRUMENT AND TEST PROCEDURE S023-II-3.2 REVISION 0 PAGE 105

#### 6.0 PROCEDURE

6.15.17 In Spec 200 cabinet L-125, replace the RTD leads on terminals 17 and 18 of TB-1.

Date Technician

6.15.18 Turn the "VOLTAGE ADJUSTMENT" on the ERT-1 fully counterclockwise.

Date Technician

6.15.19 Press the "RESET" pushbutton on the ELC-1B and verify that the analyzer returns to the "READY" mode.

/ Technician

- 6.16 Loop Current Step Response Testing of Hot Leg Temperature Sensor TE-0122-2
  - NOTE: For most consistent results, the temperature of the reactor coolant should be approximately 540°F.
  - 6.16.1 In Spec 200 cabinet L-125, remove the RTD leads from terminals 2 and 3 of TB-1 and connect them to the sensor connector strip on the ERT-1.

Date / Technician

6.16.2 Adjust the "TRIM" pot on ERT-1 until the amplifier offset voltage is zero. (Trim switch up).

NOTE: The amplifier offset voltage must be checked and set to zero whenever the GAIN is changed.

Technician Date

SAN ONOFRE NUCLEAR GENERATING STATION INSTRUMENT AND TEST PROCEDURE \$023-II-3.2 UNITS 2&3 PAGE 105

6.0 PROCEDURE

зł,

6.16.3 Place the "TRIM" switch in the DOWN position.

Date / Technician

6.16.4 Place current selector switch in the "HIGH" position.

Date Technician

6.16.5 Balance the Wheatstone bridge by adjusting the coarse resistor network switches and the fine decade resistors until the bridge output reads zero.

Date Technician

- NOTE: Bridge output is only indicated on the voltmeter when the voltmeter selector switch is in the "D" position. Allow at least three minutes for the reading to stabilize.
- 6.16.6 Move the voltmeter selector switch on ERT-1 to the "B" or "C" position and adjust the supply voltage to approximately 60 Vdc. This provides 60 made through the RTD assuming the bridge is still balanced. Allow three minutes for stabilization time.

Date Technician

6.16.7 Repeat steps 6.18.6 and 6.18.7 until no further adjustments are necessary. Allow at least three minutes for the readings to stabilize.

Date Technician

6.16.8 Move the current selector switch to the "LOW" position and rebalance the bridge. Allow three minutes for stabilization time.

Date / Technician

SAN ONOFRE NUCLEAR GENERATING STATION UNITS 283

INSTRUMENT AND TEST PROCEDURE S023-II-3.2 REVISION 0 PAGE 107

#### 6.0 PROCEDURE

6.15.9 Place the current selector switch to "HIGH". Allow reading to stabilize. Do NOT rebalance the bridge.

Date Technician

- 6.16.10 Adjust the amplifier gain of ERT-1 to obtain as close as possible to 5.0 Vdc on the voltmeter with the voltmeter selector switch in position "D". With this 5.0 Vdc to the analog input BNC of the ELC-18, the ELC-1B digital indicator should read approximately 4095 when ELC-1B is in "READY" mode with "Test/Dump" pushbutton pressed.
  - NOTE: The amplifier offset voltage must be checked and set to zero whenever the GAIN is changed. Trim switch must be up to adjust the offset and down at all other times.

Date / Technician

6.16.11 Place current selector switch in "LOW" position and ensure bridge returns to a balanced condition. A slight adjustment of the decade resistors may be necessary.

Date / Technician

6.16.12 Ensure the "AVERAGE/SINGLE SHOT" selector switch on the ELC-1B is in the "AVERAGE" position.

Date / Technician

6.16.13 With the ELC-1B in the "READY" mode, press the "START" pushbutton. The ELC-1B should go the "SAMPLE" mode for 20 seconds during which time the analog output of the ERT-1 should rise. Then the ELC-1B should return to the "READY" mode.

Date / Technician

SAN ONOFRE NUCLEAR GENERATING STATION UNITS 2&3

INSTRUMENT AND TEST PROCEDURE S023-II-3.2 REVISION 0 PAGE 108

6.0 PROCEDURE

6.16.14 Allow the bridge to return to a balanced condition.

Date Technician

6.16.15 Repeat steps 6.15.13 and 5.16.14 nine additional times. On the tenth sample the ELC-1B should go to the "SAMPLE" mode for 20 seconds, then "ANALYZE" mode until the calculations are complete. Then the ELC-1B will go the "DISPLAY" mode.

Date / Technician

- 6.16.16 With the ELC-1B selector'switch in position "D", the digital indicator should read the average total time constant for all ten samples.
  - NOTE: This value represents the amount of time, in seconds, that it takes for the RTD to reach 63.2% of the step change. Record this response time in the "DATA COLLECTION TABLE" at the back of this procedure.

6.15.17 In Spec 200 cabinet L-125, replace the RTD leads on terminals 2 and 3 of TB-1.

6.16.18 Turn the "VOLTAGE ADJUSTMENT" on the ERT-1 fully counterclockwise.

6.16.19 Press the "RESET" pushbutton on the ELC-13 and verify that the analyzer returns to the "READY" mode.

Date Technician

SAN ONOFRE NUCLEAR GENERATING STATION INSTRUMENT AND TEST PROCEDURE S023-11-3.2 UNITS 2&3

REVISION O PAGE 109

### 5.0 PROCEDURE

- 6.17 Loop Current Step Response Testing of Cold Leg Temperature Sensor 2TE-9179-2
  - NOTE: For most consistent results, the temperature of the reactor coolant should be approximately 540°F.
  - 6.17.1 In Spec 200 cabinet L-125, remove the RTD leads from terminals 12 and 13 of TB-1 and connect them to the sensor connector strip on the ERT-1.

Date / Technician

- 6.17.2 Adjust the "TRIM" pot on ERT-1 until the amplifier offset voltage is zero. (Trim switch up).
  - NOTE: The amplifier offset voltage must be checked and set to zero whenever the GAIN is changed.

6.17.3 Place the "TRIM" switch in the DOWN position.

Place current selector switch in the "HIGH" position. 6.17.4

> / Technician Date

5.17.5 Salance the Wheatstone bridge by adjusting the coarse resistor network switches and the fine decade resistors until the bridge output reads zero.

Date / Technician

NOTE: Bridge output is only indicated on the voltmeter when the voltneter selector switch is in the "D" position. Allow at least three minutes for the reading to stabilize.

SAN ONOFRE NUCLEAR GENERATING STATION INSTRUMENT AND TEST PROCEDURE S023-II-3.2 UNITS 2&3 REVISION 0 PAGE 110

- 6.0 PROCEDURE
  - 6.17.6 Move the voltmeter selector switch on ERT-1 to the "B" or "C" position and adjust the supply voltage to approximately 50 Vdc. This provides 60 made through the RTD assuming the bridge is still balanced. Allow three minutes for stabilization time.

Date / rechnician

6.17.7 Repeat steps 6.17.5 and 6.17.7 until no further adjustments are necessary. Allow at least three minutes for the readings to stabilize.

Date / Technician

6.17.8 Move the current selector switch to the "LOw" position and rebalance the bridge. Allow three minutes for stabilization time.

Date lechnician

6.17.9 Place the current selector switch to "HIGH". Allow reading to stabilize. Do NOT rebalance the bridge.

Date / Technician

- 6.17.10 Adjust the amplifier gain of ERT-1 to obtain as close as possible to 5.0 Vdc on the voltmeter with the voltmeter selector switch in position "D". With this 5.0 Vdc to the analog input BNC of the ELC-1B, the ELC-1B digital indicator should read approximately 4095 when ELC-1B is in "READY" mode with "TEST/DUMP" pushbutton pressed.
  - NOTE: The amplifier offset voltage must be checked and set to zero whenever the GAIN is changed. Trim switch must be up to adjust the offset and down at all other times.

Date / Technician

UNITS 263

SAN ONOFRE NUEAR GENERATING STATION INSTRUMENT AND TEST PROCEDURE S023-11-3.2 REVISION O PAGE 111

- 6.0 PROCEDIE
  - Place current selector switch in "LOW" position and 27.11 ensure bridge returns to a balanced condition. A slight adjustment of the decade resistors may be necessary.

Ensure the "AVERAGE/SINGLE SHOT" selector switch on the 17.12 ELC-1B is in the "AVERAGE" position.

\$17.13 With the ELC-1B in the "READY" mode, press the "START" pushbutton. The ELC-18 should go the "SAMPLE" mode for 20 seconds during which time the analog output of the ERT-1 should rise. Then the ELC-1B should return to the "READY" mode.

5.17.14 Allow the bridge to return to a balanced condition.

Technician Date

\$17.15 Repeat steps 6.17.13 and 6.17.14 nine additional times. On the tenth sample the ELC-18 should go to the "SAMPLE" mode for 20 seconds, then "ANALYZE" mode until the calculations are complete. Then the ELC-1B will go the "DISPLAY" mode.

	1		
Date	Tech	nnician	

SAN ONOFRE NUCLEAR GENERATING STATION UNITS 2&3

INSTRUMENT AND TEST PROCEDURE S023-II-3.2 REVISION O PAGE 112

- 5.0 PROCEDURE
  - 6.17.16 With the ELC-13 selector switch in position "D", the digital indicator should read the average total time constant for all ten samples.
    - NOTE: This value represents the amount of time, in seconds, that it takes for the RTD to reach 53.2% of the step change. Record this response time in the "DATA COLLECTION TABLE" at the back of this procedure.

Date Technician

6.17.17 In Spec 200 cabinet L-125, replace the RTD leads on terminals 12 and 13 of TB-1.

Date / Technician

6.17.18 Turn the "VOLTAGE ADJUSTMENT" on the ERT-1 fully counterclockwise.

Technician Date

6.17.19 Press the "RESET" pushbutton on the ELC-1B and verify that the analyzer returns to the "READY" mode.

Date Technician

- NOTE: While equipment is set up and access is being made to the Spec 200 cabinets, it would be convenient to do the CPC LPD/DNBR calculator tests which use temperature input.
- NOTE: Position 1 High Linear Power, Position 3 High Local Power Density, and Position 4 Low Departure from Nucleate Boiling Ratio will use an external signal during the Response Time Test. Since the setup will be different for the performance of these sections, it is recommended that they be performed before the other sections of the Response Time Test.

SAN ONOFRE NUCLEAR GENERATING STATION UNITS 283

INSTRUMENT AND TEST PROCEDURE S023-II-3.2 REVISION 0 PAGE 113

#### 6.0 PROCEDURE

CAUTION Detector power supply voltages up to 1000 volts are present within the safety channel. Use extreme caution when working beneath the chassis or near rear panel high voltage connectors. The 1000 volt power supply may be deenergized for this portion of the test.

Always discharge DC signal cables before CAUTION connecting to the input jack. During reactor ----operation, normal chamber current can charge the distributed capacity of an unterminated coaxial cable to levels thay may destroy the input stages of this equipment. This charge buildup may be prevented by maintaining a short circuit across input signal cables when they are not attached to the input of the channel. Always switch the associated input rotary switch (S5) to the zero position before reconnecting the signal cables to J8. J9. or J10. DO NOT short circuit the log signal lead from the PA-501 preamplifier to J5 of the safety channel drawer.

# 5.18 Reactor Trip Switchgear Response Time Uncorrected

- NOTE: This section of the Response Time Test measures the response time from the intitiation of a trip signal to the tripping of the RTSG breakers. The time measured for the tripping of the rotary relays will be subtracted from this value later to represent the response time of the RTSG alone. The trip function to be used for this measurement may be chosen at the discretion of the technician. However, it is recommended that "High Linear Power" be used since the equipment will be set up for section 6.21.
- NOTE: Any trips initiated after this section will be performed with the RTSG breakers open to prevent unnecessary cycling of the RTSG breakers.

SAN ONOFRE NUCLEAR GENERATING STATION INSTRUMENT AND TEST PROCEDURE S023-II-3.2 UNITS 283 REVISION 0 PAGE 114

# 5.0 PROCEDURE

6.18.1 The following part of the test requires that an LED jumper wire (a length of wire with an LED in the middle) be connected across some terminals in the trip status panel. For convenience, eight LED jumper wires should be preconnected in accordance with the following table.

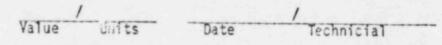
RTT Test	LED(+) Connection	Connection	
TCB-1 (GRN)	TB1301-6	TB1305-1	Date Completed/ Technician
TCB-2 (GRN)	TB1301-3	TB1305-1	Date Completed/ Technician
TCB-3 (GRN)	TB1302-13	TB1307-1	
TCB-4 (GRN)	TB1302-16	TE1 307-1	Date Completed/ Technician
TCB-5 (GRN)	TB1302-3	TB1305-1	Date Completed/ Technician
TCB-6 (GRN)	TB1301-17	TB1305-1	Date Completed/ Technician
TCB-7 (GRN)	TB1303-10	TB1307-1	Date Completed/ Technician
			Date Completed/ Technician
TCB-8 (GRN)	TB1303-13	TB1 307 -1	Date Completed/ Technician

SAN ONOFRE NUCLEAR GENERATING STATION UNITS 2&3

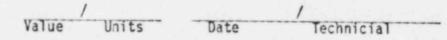
INSTRUMENT AND TEST PROCEDURE S023-II-3.2 REVISION 0 PAGE 115

### 6.0 PROCEDURE

6.18.2 Perform any response time section between 6.19. and 6.39.29 (at the discretion of the technician) step by step as written with the following exception: Instead of connecting the "STOP" optical pickups to the temporary LED's across the contacts of the rotary relays, connect the "STOP" optical pickups over the LED's installed in step 6.18.1 for TCB 1, 2. The 3 and 4 RTSG breakers should be reset prior to tripping for response time measurement. Record the response time in this space.



5.18.3 Repeat step 6.13.2 substituting TCB 5, 5, 7 and 8.



6.18.4 Record the longest time measured in steps 5.18.2 and 6.18.3 in the data collection table at the back of this procedure.

Date Technician

6.18.5 Remove the temporary LED's that were installed in step 6.18.1.

/ Date Technician

- 6.19 High Linear Power to RTSG Response Time
  - NOTE: The following section of the test measures the response time from the initiation of a signal using the CE test box to the tripping of the rotary relays. The safety channel preamp should be available to be located near the rear of the PPS cabinet.

SAN ONOFRE NUCLEAR GENERATING STATION INSTRUMENT AND TEST PROCEDURE S023-II-3.2 UNITS 2&3 REVISION 0 PAGE 116

### 6.0 PROCEDURE

- 6.19.1 Isolate the RTSG leads from the following terminals located in the back of each PPS cabinet.
  - Bay A: TBA2 terminals 20, 21 .1 Technican Date .2 Bay B: TBB2 terminals 20, 21 Technican Date Bay C: TBC2 terminals 20, 21 .3 Technican Date Bay D: TBD2 terminals 20, 21 .4 / Technican Date
- 5.19.2 Connect an LED (5 volt, 20 ma) in series with a 5 Vdc power supply across the terminals listed in 6.19.1 for bay A on the cabinet side of the terminal board.

Date Technician

6.19.3 Repeat step 6.19.2 for bays B, C, and D.

Date / Technician

6.19.4 In the channel to be tested, place the "AC POWER" switch of the safety channel drawer in the "OFF" position.

Date Technician

5.19.5 Verify the "POWER ON" Lamp DS-1 is extinguished on the channel to be tested.

Date Technician

SAN ONOFRE NUCLEAR GENERATING STATION INSTRUMENT AND TEST PROCEDURE \$023-11-3.2 UNITS 283

REVISION O PAGE 117

- 6.0 PROCEDURE
  - 5.19.6 At the rear of the safety channel, disconnect the high voltage cable from J-3 and connect this cable to the high voltage discharge J-4.

6.19.7 Disconnect plug P-8 from J-8 and place a grouding cap on the plug.

6.19.8 Connect one end plug of a coaxial cable to BNC number 1 in the "Function Signal Outputs" section of the C-E test box and the other end plug to the input jack J-8 of the safety channel drawer.

6.19.9 Connect a ground wire at the chassis J-7 plug and the other end to the ground connection at the C-E test box.

6.19.10 Disconnect plug P-9 from J-9 of the safety channel drawer and place a grounding cap on the plug.

6.19.11 Connect one end plug of a coaxial cable to BNC jack number 2 in the "Function Signal Outputs" section of the C-E test box and the other end plug to the "signal in" jack (JS) of the PASO1 preamp.

> / Technician Date

Connect another coaxial cable between the "DC return 2" 5.19.12 jack (J7) of the preamp and J9 of the safety channel drawer.

> / Technician Date

SAN ONOFRE NUCLEAR GENERATING STATION UNITS 2&3

# INSTRUMENT AND TEST PROCEDURE S023-II-3.2 REVISION 0 PAGE 113

#### 6.0 PROCEDURE

6.19.13 Connect a ground wire at the chassis J-9 plug and the other end to the ground connector at the C-E test box.

Date Technician

5.19.14 Disconnect plug P-10 from J-10 of the safety channel drawer and place a grounding cap on the plug.

Date / Technician

6.19.15 Connect one end plug of a coaxial cable to BNC jack number 3 in the "Function Signal Outputs" section of the C-E test box and the other end plug to input jack J-10 on safety channel drawer.

Date / Technician

6.19.16 Connect a ground wire at the chassis J-10 plug and the other end to the ground connector at the C-E test box

Date / Technician

5.19.17 Place the linear calibrate switch of the safety drawer to the "operate" position.

Date Technician

6.19.18 Place the "AC POWER" switch of safety channel drawer to "ON" position.

Date Technician

6.19.19 Attach the optical detector pickups over the four temporary LED's installed in steps 5.19.2 and 6.19.3.

Date / Technician

SAN ONOFRE NUCLEAR GENERATING STATION INSTRUMENT AND TEST PROCEDURE S023-11-3.2 UNITS 283

.4 "L4" - "ON"

.5

"L5" - "OFF"

.6 "L5" - "OFF"

### REVISION O PAGE 119

5.0 PROCEDURE

6

6.19.20 Connect the double banana plug end of the LED pickup leads to L1, L2, L3 and L4 or the "STOP LAMPS" section of the C-E test box.

		Date	Technician	
5.19.21	Position the stop lamp box as follows:	toggle switches	s of the C-E test	
.1	"L1" - "ON"		1	
		Date	Technician	
.2	"L2" - "ON"		1	
		Date	Technician	
.3	"L3" - "ON"		1	
		Date	Technician	

Date

Date

Date

NOTE: The source current has been preadjusted in the C-E test box to provide a trip. Adjust if necessary.

On channel 'B' SAFETY CHANNEL DRAWER, place the "LINEAR CALIBRATE" switch in the "200%" position. This should cause the "High Linear Power" trip light to energize on channel 'B' bistable control panel. 6.19.22

Date Technician

Technician

Technician

Technician

SAN ONOFRE NUCLEAR GENERATING STATION INSTRUMENT AND TEST PROCEDURE S023-II-3.2 UNITS 2&3 REVISION 0 PAGE 120

6.0 PROCEDURE

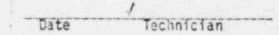
6.19.23 Energize the test equipment and allow it to stabilize.

Date Technician

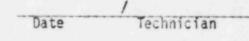
6.19.24 Ensure the start and stop "TIMER MODES" switches are selected to the step up (increasing) position.

Date / Technician

5.19.25 Ensure timer on the C-E test box is reset.



6.19.26 Push the "STEP" toggle switch to the "START" position, then release the switch. The start LED should energize.



5.19.27 Record the elapsed time as indicated on the C-E test box timer digital indicator.

value / units

Date Tecnnician

6.19.28 Push the "STEP" toggle switch to the "RESET" position, then release the switch. The RESET LED should energize.

Date / Technician

6.19.29 On channel 'B' SAFETY CHANNEL DRAWER, place the "LINEAR CALIBRATE" switch in the "OPERATE" POSITION AND RESET THE "HIGH LINEAR POWER" bistable in Channel 'B'.

Date / Technician

SAN ONOFRE NUCLEAR GENERATING STATION INSTRUMENT AND TEST PROCEDURE S023-11-3.2 UNITS 2&3 REVISION 0 PAGE 121

### 6.0 PROCEDURE

6.19.30 On channel 'C' SAFETY CHANNEL DRAWER, place the "LINEAR CALIBRATE" switch in the "200%" position. Verify channel 'C' "HIGH LINEAR POWER" trip light is energized on the bistable control panel.

5.19.31 Repeat steps 6.19.24 through 6.19.27.

6.19.32 On channel 'C' SAFETY CHANNEL DRAWER, place the "LINEAR CALIBRATE" switch in the "OPERATE" position and reset the "HIGH LINEAR POWER" bistable in Channel 'C'.

6.19.33 On channel 'D' SAFETY CHANNEL DRAWER, place the "LINEAR CALIBRATE" switch in the "200%" position. Verify channel 'D' "HIGH LINEAR POWER" trip light is energized on the bistable control panel.

6.19.34 Repeat steps 6.19.24 through 6.19.27.

1	/		/
Value	Units	Date	Technicial

5.19.35 Record the largest value of steps 5.19.27, 6.19.31, 6.19.34 in the "DATA COLLECTION TABLE".

Date Technician

5.19.36 Disconnect the preamp from the (safety channel drawer) and replace the preamp in its normal location.

Technician Date

SAN ONOFRE NUCLEAR GENERATING STATION INSTRUMENT AND TEST PROCEDURE S023-II-3.2 UNITS 2&3 REVISION 0 PAGE 122

#### 6.0 PROCEDURE

6.19.37 Disconnect the C-E test box from the safety channel drawer and return all four safety channel drawers to normal operation.

Date / Technician

5.19.38 Reset all bistables from the bistable control panels.

- 6.20 High Log PWR Level to RTSG Response Time Test
  - NOTE: The following section of the test measures the response time from the depression of the bistable pushbutton (S603) on the bistable control panel through the tripping of the rotary relays.
  - 6.20.1 On the bistable control panel being tested, rotate the bistable selector switch to position number 2.

Date / Technician

6.20.2 Rotate the meter input selector switch to "TRIP SP" position and record the indicated SP voltage.

1	Volts		1
Value	Units	Date	Technicial

6.20.3 Remove plug P-13 from J-13 at rear of the safety channel drawer being tested.

Date Technician

6.20.4 Rotate the Meter Input Selector switch to the "Input" position.

Date / Technician

SAN ONOFRE NUCLEAR GENERATING STATION INSTRUMENT AND TEST PROCEDURE S023-11-3.2 UNITS 283

REVISION O PAGE 123

## 6.0 PROCEDURE

6.20.5

Rotate the coarse potentiometer (RSO1) on the bistable control panel while holding down the bistable pushbutton until the digital voltage indicator reads approxi-mately .IV on the tripped side of the setpoint recorded in step 6.22.2. Then release the bistable pushbutton and record the adjusted voltage.

1.1.1	/ Volts		1
Value	Units	Date	Technicial

6.20.6 Turn on the power to the C-E test box and line up the switches as follows:

									nician
.1	L1	"STOP	LAMPS"	toggle	switch	"ON"		1	Technician
							Date		Technician
.2	L2	"STOP	LAMPS"	toggle	switch	"ON"		1	Technician
							Date		Technician
.3	L3	"STOP	LAMPS"	toggle	switch	"ON"		1	Technician
							Date		Technician
.4	L4	"STOP	LAMPS"	toggle	switch	"ON"		1	Technician
							Date		Technician
.5	L5	"STOP	LAMPS"	toggle	switch	"OFF"	_	1	Technician
.6	L6	"STOP	LAMPS"	toggle	switch	"OFF"		1	Technician
							Date		Technician

6.20.7 Connect the four optical detector pickup cables to the "STOP LAMPS" section at "L1, L2, L3 and L4".

Technician Date

SAN ONOFRE NUCLEAR GENERATING STATION UNITS 2&3

INSTRUMENT AND TEST PROCEDURE S023-II-3.2 REVISION 0 PAGE 124

- 6.0 PROCEDURE
  - 6.20.8 Attach these four optical pickups over the temporary LED's installed in steps 6.21.1 through 6.21.3.

6.20.9 Ensure the START and STOP "TIMER MODE" switches are in the step up or increasing mode.

6.20.10 Insert an extender card into the Test and Calibration card slot and place a hook probe from pin 61 of the Test and Calibration connector to the red (+) jack of the "EXT TOV START" in the "TIMER INPUTS" section of the C-E test box. Place another hook probe from pin 59 to the black (-) jack of the same section.

6.20.11 Ensure the timer is reset on the C-E test box.

Date Technician

6.20.12 Depress the bistable pushbutton until the timer stops incrementing.

Date Technician

6.20.13 Record the response time (as indicated on the timer digital indicator or the C-E test box) in the DATA COLLECTION TABLE.

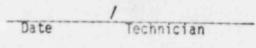
Date Technician

SAN ONOFRE NUCLEAR GENERATING STATION INSTRUMENT AND TEST PROCEDURE S023-11-3.2 UNITS 283

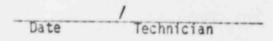
REVISION O PAGE 125

6.0 PROCEDURE

6.20.14 Reset the bistable.



6.20.15 Reconnect the plug P-13 to J-13 at the rear of the safety channel drawer.

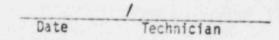


- NOTE: The remainder of this section of the test may be conducted any time it is convenient to setup the required equipment. The Nuclear Instrumentation CPC-LPD/DNBR calculators response time test (sections 6.23 and 6.24) may be conducted while the test equipment is set up at the nuclear instrumentation drawer.
- DETECTOR POWER SUPPLY VOLTAGES UP TO 1000 V CAUTION ARE PRESENT WITHIN THIS UNIT. USE EXTREME \*\*\*\*\*\* CAUTION WHEN WORKING BENEATH THE CHASSIS OR NEAR REAR PANEL HIGH VOLTAGE CONNECTORS.
- CAUTION THIS TEST DOES NOT REQUIRE DISCONNECTING INPUT -----SIGNAL CABLES. HOWEVER, THIS CAUTION IS RESTATED HERE SO THAT PERSONS ARE AWARE OF DAMAGE THAT COULD RESULT FROM IMPROPER PROCEDURES. ALWAYS DISCHARGE DC SIGNAL CABLES BEFORE CONNECTING TO THE INPUT JACK. DURING REACTOR OPERATION, NORMAL CHAMBER CURRENT CAN CHARGE THE DISTRIBUTED CAPACITY OF AN UNTERMINATED COAXIAL CABLE TO LEVELS THAT MAY DESTROY THE INPUT STAGES OF THIS EQUIPMENT. THIS CHARGE BUILDUP MAY BE PREVENTED BY MAINTAINING A SHORT CIRCUIT ACROSS INPUT SIGNAL CABLES WHEN THEY ARE NOT ATTACHED TO THE INPUT OF THE CHANNEL. ALWAYS SWITCH THE ASSOCIATED INPUT ROTARY SWITCH (SS) TO THE ZERO POSITION BEFORE RECONNECTING THE SIGNAL CABLES TO JACKS J8, J9, or J10. DO NOT SHORT CIRCUIT THE LOG SIGNAL LEAD FROM THE PA-501 PREAMPLIFIER TO J5.
- CAUTION Make certain to use a variable attenuator ----network to interface between the PPS and the high speed recorder. Failure to attenuate the test inputs to the high speed recorder damage the unit.

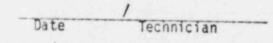
SAN ONOFRE NUCLEAR GENERATING STATION INSTRUMENT AND TEST PROCEDURE S023-II-3.2 REVISION 0 PAGE 125

# 6.0 PROCEDURE

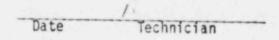
6.20.16 In the channel to be tested, place the "AC POWER" switch of the safety channel drawer in the OFF position.



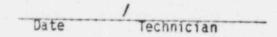
6.20.17 Verify the "POWER ON" 1amp DS-1 is extinguished.



5.20.13 Connect a test jumper from the "Log Calibrate" switch SIM-1 to SIM-5 per Appendix A, Figure A-3.



5.20.19 Connect pen 1 of the recorder to SIM-C and chassis ground.



6.20.20 Turn the linear calibrate switch to "ZERO" position.

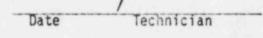
6.20.21 Place the "AC POWER" switch of the safety channel drawer to the "ON" position.

SAN ONOFRE NUCLEAR GENERATING STATION INSTRUMENT AND TEST PROCEDURE S023-II-3.2 UNITS 2&3 REVISION O PAGE 127

#### 6.0 PROCEDURE

6.20.22 Attach a second channel of the high speed recorder to terminals 1 and 2 of terminal strip TBA2 in LO32B. This is a signal that is sent to the log power meter. Adjust this pen for 0.10 Vdc full scale. Adjust pen 1 for a resonable trace when the "LOG CALIBRATE" switch is transferred from position 5 to position 6. (approximately 10 Vdc change)

5.20.23 On the safety channel drawer front, turn the "LOG CALIBRATE" switch to position number 5. This position should produce a 5 microsecond square wave pulse with an amplitude of 0.9 volts for a frequency of 10 KHz.



- NOTE: This will produce a trip signal. When the switch is moved from operate, an 8.2 volt signal is sent to the trip circuit.
- 5.20.24 Set the high speed recorder chart speed at approximately 20 inches per second (IPS) or more as required to provide an analyzable chart trace.

Date / Technician

5.20.25 Start the high speed recorder and quickly turn the log calibrate switch from position 5 to position 5. Position 6 should produce a 5 microsecond square wave pulse with an amplitude of 10 volts for a frequency of 10 KHz.

Technician Date

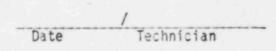
SAN ONOFRE NUCLEAR GENERATING STATION UNITS 283

INSTRUMENT AND TEST PROCEDURE S023-II-3.2 REVISION 0 PAGE 123

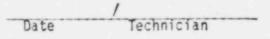
- 6.0 PROCEDURE
- NOTE: The pulse change is sent to the preamplifier and returned to the processing drawer where it is sent through a buffer to the connector J-13 and then to the terminal strip.
- 6.20.25 After the high speed recorder trace indicates that the new pulse has been received, turn off the high speed recorder.

Date / Technician

- 6.20.27 Record the following data on the high speed recorder strip chart:
  - .1 Procedure number
  - .2 Step number
  - .3 Date, initials
  - .4 Pen numbers
  - .5 Pen range
  - .6 Input parameter
  - .7 Recorder no.
  - .8 Chart speed



6.20.23 Record the response time in the DATA COLLECTION TABLE.

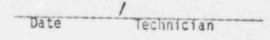


NOTE: The response time is the time necessary for the signal initiated at the PPS cabinet terminal strip to go through 63.2% of its total increase after moving the switch from position 5 to position 6.

SAN ONOFRE NUCLEAR GENERATING STATION INSTRUMENT AND TEST PROCEDURE S023-II-3.2 UNITS 2&3 REVISION 0 PAGE 129

# 5.0 PROCEDURE

6.20.29 Return all connections and switches to the normal operate position. Place the channel into normal operating mode. Leave the bistables of Ch "A" bypassed. Do not disconnect the PPS input simulator box.



- 6.21 Positions 3 and 4 High LPD and Low DNBR
  - NOTE: The High Local Power Density and Low Departure from Nucleate Boiling Ratio functions are contact inputs from the core protection calculators (CPC) and do not include a bistable card. These functions shall be tested in section 6.22.
- 5.22 CPC/CEAC Response Time Testing
  - NOTE: This section checks the response time of the CPC/CEAC System from the time that it receives an input signal until the time the system outputs a trip signal. This portion of the test requires that special test software be loaded into the computer system. External signals are provided by the CE RTT Test Equipment box.
  - 5.22.1 Initialization of CPC/CEAC for Testing
    - .1 Set the CALCULATOR SELECT switch on the operator's module to load the CPC (CEAC) calculator.

Technician Date

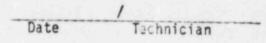
NOTE: When one calculator is selected, in channels B and C, the other calculator is memory protected. No changes can be made to the protected calculator. SAN ONOFRE NUCLEAR GENERATING STATION INSTRUMENT AND TEST PROCEDURE S023-11-3.2 UNITS 283

### REVISION O PAGE 130

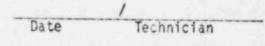
6.0 PROCEDURE

6.22.2 Set up the AED 2500 Floppy Disk Drive, as follows:

.1 Turn ON the AED Floppy Disk Drive.

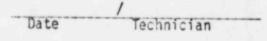


.2 Set the drive select switches so that drive A is unit O, drive B is unit 1 and drive C is unit 2.



CAUTION NEVER TURN THE AED 2500 POWER ON OR OFF WITH A ....... DISK IN THE DRIVE.

.3 Place the floppy disk containing the test software into the AED 2500 Floppy Disk Drive.



.4 Set the INIT and WP switches UP.

Technician Date

.5 Lift the IPL switch.

Technician Date

Place the CPC Coldstart Loader paper tape into the 5.22.3 teletypewriter (TTY) paper tape reader and connect the TTY to the CPC calculator A cable connector.

	/
Date	Technician

SAN ONOFRE NUCLEAR GENERATING STATION INSTRUMENT AND TEST PROCEDURE SO23-11-3.2 UNITS 283

### REVISION O PAGE 131

- 6.0 PROCEDURE
  - 5.22.4 Hit the "FUNCTION" button, then hit the "LOCATION" button to stop the calculator.

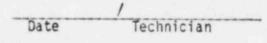
	1
Date	Technician

6.22.5 Set up the following memory locations via the Interdata Hexidecimal Panel.

Location	Contents
30	0000
32	0000
34	0000
36	0050
50	D500
52	OOCF
54	4300
56	0080
78	0294

Date Technician

Read through these same locations to verify the correct 6.22.5 contents.



Start the processor at location 30. 5.22.7

> Technician Date

Start the teletype paper tape reader by setting the READER/PUNCH switch to the "MANUAL START" position. 6.22.8

> / Technician Date

6.22.9 Respond to the TEST TRACK prompt with 55.

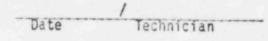
> / Technician Date

SAN ONOFRE NUCLEAR GENERATING STATION UNITS 2%3

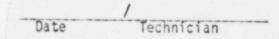
INSTRUMENT AND TEST PROCEDURE S023-II-3.2 REVISION O PAGE 132

#### 6.0 PROCEDURE

6.22.10 Turn the MEMORY PROTECT key switch on the operators module to "OFF". The MEMORY PROTECT switch must remain in OFF during the part 1 Interactive I/O System Test. Other switches will protect memory when appropriate.



6.22.11 Respond to the calculator request prompt with CPCC or CEAC depending upon the calculator to be loaded.



6.22.12 Verify that the TRIP BYPASS switch is OFF.

Date / Technician

6.22.13 Remove the disk from the AED 2500 disk drive to prevent damage to the disk.

/ Date Technician

6.22.14 Display the LOWTOD Point ID on the operators module. The point ID is 40.

Date / Technician

6.22.15 While synchronizing with the second hand of a watch press the "INIT" button on the hexadecimal display panel of the processor to be checked.

Date Technician

NOTE: This results in a system auto-restart which resets LOWTOD to zero.

SAN ONOFRE NUCLEAR GENERATING STATION INSTRUMENT AND TEST P UNITS 2&3 REVISION O

INSTRUMENT AND TEST PROCEDURE S023-II-3.2 REVISION 0 PAGE 133

5.0 PROCEDURE

5.22.15 Press the "FN" button on the hexadecimal display panel.

Date Technician

6.22.17 Press the "LOC" button on the hexadecimal display panel in synchronization with the ending of a five (5) minute interval on the watch.

Date Technician

- NOTE: This halts the processor which in turn stops the LOWTOD.
- 6.22.18 Read LOWTOD from the operator's module. The display should read 6000 + 40.

Date / Technician

- NOTE: The following steps will be used to load the Interactive I/O System CPC/CEAC System Response Time Test software. The disk will be referred to as the Part 1 disk.
- 6.22.19 Set the CALCULATOR SELECT rotary switch on the OPERATOR'S MODULE to load the CPC (CEAC) calculator. The calculator not selected is memory protected.

Dale Technician

6.22.20 Set up the AED 2500 Floppy Disk Drive as follows:

.1 Turn ON the AED Floppy Disk Drive.

Date / Technician

SAN ONOFRE NUCLEAR GENERATING STATION INSTRUMENT AND TEST PROCEDURE S023-11-3.2 UNITS 2&3 REVISION O

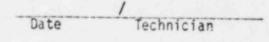
PAGE 134

# 6.0 PROCEDURE

6.22.20.2 Set the drive select switches so that drive A is unit 0, drive B is unit 1 and drive C is unit 2.

Date Technician

.3 Place the floppy disk containing the Part 1 RTT software into the AED 2500 Floppy Disk Drive.



.4 Set the INIT and WP switches UP.

Technician Date

.5 Lift the IPL switch.

/ Technician Date

5.22.21 Place the CPC Coldstart Leader paper tape into the teletypewriter (TTY) paper tape reader and connect the TTY to the CPC calculator A cable connection point indicated.

/ Date Technician

Hit the "FUNCTION" button, then hit the "LOCATION" 5.22.22 button.

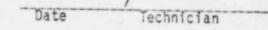
	1
Date	Technician

SAN ONOFRE NUCLEAR GENERATING STATION INSTRUMENT AND TEST PROCEDURE S023-II-3.2 UNITS 2&3 REVISION 0 PAGE 135

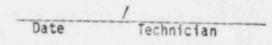
5.0 PROCEDURE

6.22.23 Set up the following memory locations via the Interdata Hexidecimal Pasel.

Location	Contents
30	0000
32	0000
34	0000
36	0050
50	D500
52	OOCF
54	4300
56	0030
78	0294
	1



5.22.24 Read through these same locations to verify the correct contents.



6.22.25 Start the processor at location 30.

Date / Technician

6.22.26 Start the teletype paper tape reader by setting the READER/PUNCH switch to the "MANUAL START" position.

Date Technician

6.22.27 Respond to the TEST TRACT prompt with 55.

Date Technician

SAN ONOFRE NUCLEAR GENERATING STATION INSTRUMENT AND TEST PROCEDURE SO23-II-3.2 UNITS 2&3 REVISION O PAGE 135

6.0 PROCEDURE

5.22.23 Verify that the MEMORY PROTECT keyswitch is OFF

Date Technician

5.22.29 Respond to the calculator request prompt with CPCC (CEAC).

Date Technician

6.22.30 Remove the disk from the AED 2500 disk drive.

Date Technician

6.23 RTD-CPC I/O RTT

6.23.1 Reset the CPC calculator by pushing the white (SPARE) pushbutton on the Operator's Module.

Date Technician

6.23.2 Enter the following on the TTY keyboard to check the operation of the TTY-CPCP interface:

\*EX TC1

\*EX TC2

\*EX THI

\*EX TH2

The resultant printout is as indicated in Table Fl of Appendix F.

Date Technician

NOTE: For convenience, the following tests should be run concurrently with or immediately after the Loop Current Step Response (LCSR) test of the RTD's. SAN ONDFRE NUCLEAR GENERATING STATION UNITS 2&3

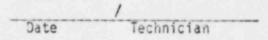
INSTRUMENT AND TEST PROCEDURE S023-11-3.2 REVISION 0 PAGE 137

### 6.0 PROCEDURE

6.23.3 On the C-E test box, set the "FUNCTION SELECT" switch to RESISTANCE to prepare to run the response time test for loop 1 cold leg temperature (TCl).

Date Technician

6.23.4 On the C-E test box, plug the meter into the "VOLTAGE, HIGH CURRENT, FREQUENCY, RESISTANCE" jacks in the "FUNCTION SIGNAL OUTPUT" section.



- NOTE: In the following steps, whenever it is required that an initial value or a final value be set using the DVM, this value as read on the DVM should be recorded below the applicable step.
- 6.23.5 Using the potentiometers under "RESISTANCE" in the "STEPPED FUNCTIONS" section, adjust the initial resistance in the C-E test box so that the resistance value is 420 ohms as read on the DVM when the STEPPED FUNCTIONS GTEP toggle switch is in the RESET position. Note the value.

	Volts		/
Value	Units	Date	Technicial

6.23.6

Adjust the final resistance in the C-E test box so that the value is 432 ohms as read on the DVM when the STEPPED FUNCTIONS STEP toggle switch is in the START position. Note the value.

	/ Volts		1
Value	Units	Date	Technicial

5.23.7

Disconnect the meter and return the STEPPED FUNCTIONS STEP toggle switch to the RESET position.

	/
Date	Technician

SAN ONOFRE NUCLEAR GENERATING STATION INSTRUMENT AND TEST PROCEDURE S023-II-3.2 UNITS 2&3 PAGE 138

#### 6.0 PROCEDURE

1

6.23.8 At the Foxboro Spec. 200 cabinet L-121, remove the leads that go to the temperature transmitter from terminals 17 and 18 on terminal strip TB-1.

Date / Technician

- NOTE: These are the leads on the other side of the terminal strip that were removed for the LCSR test. A check should be made to ascertain whether the correct two leads to the temperature transmitter are being used. If leads other than those specified are used, note the appropriate numbers here.
- 6.23.9 Connect the resistance test leads from the C-E RTT test box to the leads removed in the step above.

Date / Technician

6.23.10 Place three optical pickups over the three LED's in column 3 and three optical pickups over the three LED's in column 4 (Hi Local Power and Low DN3R respectively) on the Bistable Control Panel. Leave in place for the remainder of the channel test.

Date / Technician

6.23.11 Place the other end of the optical pickups cables to all six STOP LAMP jacks on the C-E RTT test box.

Date / Technician

5.23.12 Turn the switches next to these lamp jacks to ON.

Date / Technician

NOTE: If the base line data is desired, turn three switches to OFF and run the test twice.

SAN ONOFRE NUCLEAR GENERATING STATION INSTRUMENT AND TEST PROCEDURE S023-11-3.2 UNITS 283

REVISION O PAGE 139

## 6.0 PROCEDURE

6.23.13 Ensure that the STOP TIMER MODE switch is in the increasing or low to high mode.

Date / Date Technician

- NOTE: The following section of the test measures the response time from an externally produced signal in the Spec. 200 cabinets through the tripping of the bistable relays by a signal produced in the CPC calculators.
- CAUTION THIS TEST, IF NOT PROPERLY CONDUCTED, MAY CAUSE A TRIP OF THE RPS REACTOR TRIP -----SWITCHGEAR. FOR THIS PREOPERATIONAL TEST, WITH THE CEA M-G SETS NOT RUNNING, THE ONLY PORTION OF THE PPS THAT NEED BE ENERGIZED IS THAT PART BEING TESTED.
- 5.23.14 At the CPC/CEAC TTY, enter the command LI TC1,569, IN, BOTH CR to make the parameter TC1 (Loop 1 Cold Leg Temperature) live input.

Date / Technician

5.23.15 At the CPC/CEAC TTY, enter the live input status command ST CR . The TTY should respond with the data entered in the step above (the setpoint number may be rounded off).

> / Technician Date

6.23.15 On the C-E RTT Test Box, reset the timer to ZERO.

Date / Technician

SAN ONOFRE NUCLEAR GENERATING STATION INSTRUMENT AND UNITS 283 REVISION O

INSTRUMENT AND TEST PROCEDURE S023-II-3.2 REVISION 0 PAGE 140

## 6.0 PROCEDURE

5.23.17 At the CPC/CEAC TIY, enter the command GO CR. Verify that the point I.D. displayed is 043 and the valve is +33.000.

6.23.18 On the RPS section of the PPS, clear any LPD or DNR trip conditions.

5.23.19 Move the STEPPED FUNCTIONS STEP toggle switch to START.

5.23.20 When the timer stops incrementing, note the value in the "DATA COLLECTION TABLE."

Date Technician

6.23.21 Return the STEPPED FUNCTIONS STEP toggle switch to the RESET position.

Date / Technician

NOTE: Leave the test setup unchanged except as follows:

6.23.22 Reconnect all the leads in the Spec. 200 cabinets that were removed for the above test.

Date Technician

6.23.23 On the C-E test box, verify that the "FUNCTION SELECT" switch is set to RESISTANCE.

Date / Technician

INSTRUMENT AND TEST PROCEDURE S023-11-3.2 REVISION 0 PAGE 141

## 6.0 PROCEDURE

6.23.24 On the C-E test box, plug the meter into the "VOLTAGE, HIGH CURRENT, FREQUENCY, RESISTANCE" jacks in the "FUNCTION SIGNAL OUTPUT" section.

6.23.25 Using the potentiometers under "RESISTANCE" in the "STEPPED FUNCTIONS" section, adjust the initial resistance in the C-E test box so that the resistance value is 420 ohms as read on the DVM when the STEPPED FUNCTION toggle switch is in the RESET position. Note the value.

6.23.25 Adjust the final resistance in the C-E test box so that the value is 432 ohms as read on the DVM when the START switch is actuated. Note the value.

6.23.27 Disconnect the meter and return the STEPPED FUNCTIONS STEP toggle switch to the RESET position.

6.23.23 At the Foxboro Spec. 200 cabinet L-125, remove the leads that go to the temperature transmitter from terminals 12 and 13 on terminal strip TB-1.

NOTE: These are the leads on the other side of the terminal strip that were removed for the LCSR test. A check should be made to ascertain whether the correct two leads to the temperature transmitter are being used. If leads other than those specified are used, note the appropriate numbers here.

INSTRUMENT AND TEST PROCEDURE S023-II-3.2 REVISION 0 PAGE 142

## 6.0 PROCEDURE

6.23.29 Connect the resistance test leads from the C-E RIT test box to the leads removed in the step above.

/ Technician Date

6.23.30 Place three optical pickups over the three LED's in column 3 and three optical pickups over the three LED's in column 4 (Hi Local Power and Low DNBR respectively) on the Bistable Control Panel.

Date / Technician

5.23.31 Verify that the switches next to the six step lamp jacks are ON.

Date / Technician

6.23.32 Ensure that the STOP TIMER MODE switch is in the increasing or low to high mode.

Date / Technician

- NOTE: The following section of the test measures the response time from an externally produced signal in the Spec. 200 cabinets through the tripping of the bistable relays by a signal produced in the CPC calculators.
- CAUTION THIS TEST, IF NOT PROPERLY CONDUCTED, MAY CAUSE A TRIP OF THE RPS REACTOR TRIP SWITCHGEAR. FOR THIS TEST, WITH THE CEA M-G SETS NOT RUNNING, THE ONLY PORTION OF THE PPS THAT NEED BE ENERGIZES IS THAT PART BEING TESTED.

INSTRUMENT AND TEST PROCEDURE S023-II-3.2 REVISION 0 PAGE 143

## 5.0 FROCEDURE

6.23.33 Reset the CPC calculator trip by pushing the white (SPARE) pushbutton on the Operator's Module and entering an R (for Restart) when prompted by the TTY.

5.23.34 At the CPC/CEAC TTY, enter the command LI TC2,568, IN, BOTH CR to make the parameter TC2 (Loop 2 Cold Leg Temperature) a live input.

Date Technician

6.23.35 At the CPC/CEAC TTY, enter the command NOP TC1 to revert the live input to a constant input.

6.23.35 At the CPC/CEAC TTY, enter the command ST CR. Only TC2 should be a live input.

6.23.37 Reset the C-E RTT test box timer to zero.

5.23.38 At the CPC/CEAC TTY, enter the command "GO" to start the program. Verify that the point ID displayed is 043 and the value is +33.000.

Date Technician

6.23.39 Reset all DNBR/LPD trip conditions on the Bistable Control Panel of the PPS.

Technician Date

INSTRUMENT AND TEST PROCEDURE S023-II-3.2 REVISION 0 PAGE 144

# 6.0 PROCEDURE

5.23.40 Toggle the "STEP" switch to "START." When the timer stops incrementing, note the value and enter in the "DATA COLLECTION TABLE."

6.23.41 Return the STEPPED FUNCTIONS STEP toggle switch to the RESET position.

Date Technician

NOTE: Leave the test setup unchanged except as follows:

5.23.42 Reconnect all the leads in the Spec. 200 cabinets that were removed for the above test.

6.23.43 On the C-E test box, verify that the "FUNCTION SELECT" switch is set to RESISTANCE.

6.23.44 On the C-E test box, plug the meter into the "VOLTAGE, HIGH CURRENT, FREQUENCY, RESISTANCE" jacks in the "FUNCTION SIGNAL OUTPUT" section.

6.23.45 Using the potentiometers under "RESISTANCE" in the "STEPPED FUNCTIONS" section, adjust the initial resistance in the C-E test box so that the resistance value is 440 ohms as read on the DVM when the STEP switch is in the RESET position. Note the value.

/ Volts Value Units Pate Technicial

INSTRUMENT AND TEST PROCEDURE S023-II-3.2 REVISION 0 PAGE 145

#### 6.0 PROCEDURE

6.23.45 Adjust the final resistance in the C-E test box so that the value is 452 ohms as read on the DVM when the START switch is actuated. Note the value.

6.23.47 Disconnect the meter and return the STEPPED FUNCTIONS STEP toggle switch to the RESET position.

6.23.48 At the Foxboro Spec. 200 cabinet L-125, remove the leads that go to the temperature transmitter from terminals 7 and 8 on terminal strip TB-1.

- NOTE: These are the leads on the other side of the terminal strip that were removed for the LCSR test. A check should be made to ascertain whether the correct two leads to the temperature transmitter are being used. If leads other than those specified are used, note the appropriate numbers here.
- 6.23.49 Connect the resistance test leads from the C-E RTT test box to the leads removed in the step above.

5.23.50 Place three optical pickups over the three LED's in column 3 and three optical pickups over the three LED's in column 4 (Hi Local Power and Low DNBR respectively) on the Bistable Control Panel.

Date Technician

INSTRUMENT AND TEST PROCEDURE S023-II-3.2 REVISION 0 PAGE 145

## 5.0 PROCEDURE

6.23.51 Verify that the switches next to the six step lamp jacks are ON.

/ Date Technician

6.23.52 Ensure that the STOP TIMER MODE switch is in the increasing or low to high mode.

Date / Technician

- NOTE: The following section of the test measures the response time from an externally produced signal in the Spec. 200 cabinets through the tripping of the bistable relays by a signal produced in the CPC calculators.
- CAUTION THIS TEST, IF NOT PROPERLY CONDUCTED, MAY CAUSE A TRIP OF THE RPS REACTOR TRIP SWITCHGEAR. FOR THIS TEST, WITH THE CEA M-G SETS NOT RUNNING, THE ONLY PORTION OF THE PPS THAT NEED BE ENERGIZED IS THAT PART BEING TESTED.
- 5.23.53 Reset the CPC calculator trip by pushing the white (SPARE) pushbutton on the Operator's Module and entering an "R" (for Restart) when prompted by the TTY.

/ Technician Date

6.23.54 At the CPC/CEAC TTY, enter the command LI TH1,618, IN, BOTH CR to make the parameter TH1 (Loop 1 Hot Leg Temperature) a live input.

	1
Date	Technician

SAN ONDFRE NUCLEAR GENERATING STATION INSTRUMENT AND TEST PROCEDURE S023-II-3.2 UNITS 2&3 REVISION 0 PAGE 147

- 6.0 PROCEDURE
  - 6.23.55 At the CPC/CEAC TTY, enter the command NOP TC2 to revert the live input to a constant input.

Date / Technician

6.23.56 At the CPC/CEAC TTY, enter the command ST CR. Only THI should be a live input.

Date Technician

5.23.57 Reset the C-E RTT test box timer.

Date / Technician

6.23.58 At the CPC/CEAC TTY, type in the command GO to start the program. Verify that the point I.D. displayed is 043 and the value is +33.000.

Date / Technician

6.23.59 Reset all DNBR/LPD trip conditions on the Bistable Control Panel of the PPS.

Date Technician

6.23.50 Toggle the "STEP" switch to "START." When the timer stops incrementing, note the value and enter in the "DATA COLLECTION TABLE."

Date Technician

6.23.61 Return the STEPPED FUNCTIONS STEP toggle switch to the RESET position.

Date / Technician

NOTE: Leave the test setup unchanged except as follows:

INSTRUMENT AND TEST PROCEDURE S023-II-3.2 REVISION 0 PAGE 143

#### 5.0 PROCEDURE

6.23.62 Reconnect all the leads in the Spec. 200 cabinets that were removed for the above test.

Date Technician

6.23.63 On the C-E test box, verify that the "FUNCTION SELECT" switch is set to RESISTANCE.

6.23.64 On the C-E test box, plug the meter into the "VOLTAGE, HIGH CURRENT, FREQUENCY, RESISTANCE" jacks in the "FUNCTION SIGNAL OUTPUT" section.

6.23.65 Using the potentiometers under "RESISTANCE" in the "STEPPED FUNCTIONS" section, adjust the initial resistance in the C-E test box so that the resistance value is 440 ohms as read on the DVM when the STEP switch is in the RESET position. Note the value.

6.23.65 Adjust the final resistance in the C-E test box so that the value is 452 ohms as read on the DVM when the START switch is actuated. Note the value.

/ Volts / Value Units Date Technicial

6.23.67 Disconnect the mater and return the STEPPED FUNCTIONS STEP toggle switch to the RESET position.

Date / Technician

6.23.68 At the Foxboro Spec. 200 cabinet L-125, remove the leads that go to the temperature transmitter from terminals 2 and 3 on terminal strip TB-1.

	1
Date	Technician

INSTRUMENT AND TEST PROCEDURE S023-II-3.2 REVISION 0 PAGE 149

6.0 PROCEDURE

6.23.63

- NOTE: These are the leads on the other side of the terminal strip that were removed for the LCSR test. A check should be made to ascertain whether the correct two leads to the temperature transmitter are being used. If leads other than those specified are used, note the appropriate numbers here.
- 6.23.69 Connect the resistance test leads from the C-E RTT test box to the leads removed in the step above.

/ Technician Date

6.23.70 Place three optical pickups over the three LED's in column 3 and three optical pickups over the three LED's in column 4 (Hi Local Power and Low DNBR respectively) on the Bistable Control Panel.

6.23.71 Verify that the switches next to the six step lamp jacks are ON.

6.23.72 Ensure that the STOP TIMER MODE switch is in the increasing or low to high move.

NOTE: The following section of the test measures the response time from the externally produced signal in the Spec. 200 cabinets through the tripping of the bistable relays by a signal produced in the CPC calculators. UNITS 2&3

SAN ONDERE NUCLEAR GENERATING STATION INSTRUMENT AND TEST PROCEDURE S023-11-3.2 REVISION O PAGE 150

6.0 PROCEDURE

6.23.72

- THIS TEST. IF NOT PROPERLY CONDUCTED. MAY CAUTION CAUSE A TRIP OF THE RPS REACTOR TRIP \*\*\*\*\*\* SWITCHGEAR. FOR THIS TEST, WITH THE CEA M-G SETS NOT RUNNING, THE ONLY PORTION OF THE PPS THAT NEED BE ENERGIZED IS THAT PART BEING TESTED.
- Reset the CPC calculator trip by pushing the white 6.23.73 (SPARE) pushbutton on the Operator's Module and entering an R (for Restart) when prompted by the TTY.

Date Technician

6.23.74 At the CPC/CEAC TTY, enter the command LI TH2,618, IN, BOTH CR to make the parameter TH2 (Loop 2 Hot Leg Temperature) a live input.

At the CPC/CEAC TTY, enter the command NOP TH1 to revert 6.23.75 the live input to a constant input.

6.23.76 At the CPC/CEAC TTY, enter the command ST CR . Only TH2 should be a live input.

5.23.77 Reset the C-E RTT test box timer to zero.

Date / Technician

6.23.78 At the CPC/CEAC TTY, enter the command GO to start the program. Verify that the point 1.D. displayed is 043 and the value is +33.00.

Date Technician

SAN ONOFRE NUCLEAR GENERATING STATION INSTRUMENT AND TEST PROCEDURE S023-11-3.2 UNITS 283

REVISION O PAGE 151

- 6.0 PROCEDURE
  - 6.23.79 Reset all DNBR/LPD trip conditions on the Bistable Control Panel of the PPS.

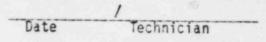
/ Technic an Date

Toggle the "STEP" switch to "START." When the timer 6.23.80 stops incrementing, note the value and enter in the "DATA COLLECTION TABLE."

Return the STEPPED FUNCTIONS STEP toggle switch to the 5.23.81 RESET position.

NOTE: Leave the test setup unchanged except as follows:

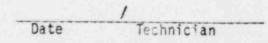
5.23.82 Reconnect all the leads in the Spec. 200 cabinets that were removed for the above test.



- 6.23.83 Pressurizer Pressure - CPC I/O RTT
- On the C-E RTT box, rotate the function select switch 6.23.83.1 to the HIGH CURRENT position. Output from the box will now be at the "VOLTAGE, HIGH CURRENT, FREQUENCY. RESISTANCE" banana jacks in the FUNCTION SIGNAL OUTPUTS section.

Technician Date

.2 Short circuit the output at the jacks.



INSTRUMENT AND TEST PROCEDURE S023-II-3.2 REVISION 0 PAGE 152

- 6.0 PROCEDURE
  - 6.23.83.3 Connect the ma meter (DC range) to the HIGH CURRENT jacks in the CALIBRATION section and move the calibration switch to C (calibrate). The meter should indicate current.

.4 Move the momentary contact STEP switch in the STEPPED FUNCTIONS section to RESET and release. The RESET light should turn ON.

.5 Set the initial high current value to a current of 15 milliamperes. Note the value.

.6 Move the momentary contact STEP switch to START and release. The START light should illuminate and the timer should start incrementing. Stop the timer.

.7 Set the final high current value to a current of 12 milliamperes. Note the value.

> / Volts / Value Units Date Technicial

- .8 Move the momentary contact STEP toggle switch to RESET and release.
- .9 Repeat above steps as necessary, then disconnect the meter and turn the HIGH CURRENT switch to N (normal).

Technician Date

SAN ONOFRE NUCLEAR GENERATING STATION INSTRUMENT AND TEST PROCEDURE S023-11-3.2 UNITS 243

REVISION O PAGE 153

# 6.0 PROCEDURE

6.23.83.10 At the Foxboro Spec. 200 cabinet L-126, remove the leads that go to the pressurizer pressure I/E converter (PY-0101-B2) input terminals nest 3, slot 3A (+ and -).

/ Date Technician

.11 Connect the high current test output jacks to the I/E terminals (+ and -).

/ Date Technician

.12 Place three optical pickups from the first three STOP LAMPS jacks on the C-E RTT box over the three LED's in column 4 (low DNBR) on the bistable control panel.

Date / Technician

- NOTE: The following section of the test measures the response time from an externally produced signal in the Spec. 200 cabinets through the tripping of the bistable relays by a signal produced in the CPC calculators.
- CAUTION THIS TEST, IF NOT PROPERLY CONDUCTED. MAY -----CAUSE A TRIP AT THE RPS REACTOR TRIP SWITCHGEAR. FOR THIS TEST, WITH THE CEA M-G SETS NOT RUNNING, THE ONLY PORTION OF THE PPS THAT NEED BE ENERGIZED IS THAT PART BEING TESTED.

## INSTRUMENT AND TEST PROCEDURE S023-II-3.2 REVISION 0 PAGE 154

#### 6.0 PROCEDURE

6.23.83.13 Arrange the test equipment so that a signal will not be produced until the three LED's are illuminated. Turn the switches to OFF at the unused STOP LAMPS terminal jacks L4, L5, and L6.

Date / Technician

.14 Reset the CPC calculator trip by puhing the white (SPARE) pushbutton on the Operator's Module and entering an R (for Restart) when prompted by the TTY.

/ Date Technician

.15 At the CPC/CEAC TTY, enter the command LI PR,2100, DE, DNBR CR to make the parameter PR (pressurizer pressure) a live input.

.15 At the CPC/CEAC TTY, enter the command NOP TH2 to revert the live input to a constant input.

Date Technician

.17 At the CPC/CEAC TTY, enter the command ST CR. Only the parameter PR should be a live input.

Date / Technician

.18 Reset the C-E RTT box timer to zero.

Date / Technician

.19 At the CPC/CEAC TTY, enter the command GO to start the test. Verify that the POINT I.D. displayed is 043 and the value is +33.000.

/ Technician Date

# INSTRUMENT AND TEST PROCEDURE S023-II-3.2 REVISION 0 PAGE 155

#### 5.0 PROCEDURE

6.23.83.20 Reset all low DNBR trip conditions on the Bistable Control Panel at the PPS.

Date Technician

.21 Toggle the "STEP" switch to "START." When the timer stops incrementing, note the value and enter in the "DATA COLLECTION TABLE."

Date / Technician

.22 Move the momentary contact STEP switch to RESET and release. The RESET light should turn ON.

Date / Technician

6.23.84 Ex-Core Power - CPC I/O RTT

.1 Verify that the "CPC TEST" indicator lamp on the Operator's Module is illuminated.

Date / Technician

.2 On the C-E RTT box, rotate the function select switch to the LOW CURRENT position. Output from the box will now be at the "LOW CURRENT" BNC jacks in the FUNCTION SIGNAL OUTPUTS section.

Date Technician

.3 Short circuit the output at jack number 1.

Date Technician

.4 Connect the mA meter (DC range) to LOW CURRENT banana jack number 1 in the CALIBRATION section.

Date / Technician

# INSTRUMENT AND TEST PROCE JRE S023-II-3.2 REVISION 0 PAGE 155

- 6.0 PROCEDURE
  - 5.24.84.5 Turn the switch at jack number 1 to "C" (calibrate). The meter should indicate current.

.6 Move the momentary contact STEP switch in the SiEPPED FUNCTIONS section to RESET and release. The RESET light should turn ON.

.7 Set the initial current value to 0.65 milliamperes by adjusting the VOLTAGE CURRENT, FREQUENCY "INITIAL" potentiometer until the mA meter reads the desired value. Note the value.

.8 Move the momentary contact STEP switch to START and release. The START light should illuminate and the timer should start incrementing. Stop the timer.

.9 Set the final current value to 0.91 milliamperes by adjusting the VOLTAGE, CURRENT, FREQUENCY "FINAL" potentiometer until the mA meter reads the desired value. Note the value.

,	/ Volts		1
Value	Units	Date	Technicial

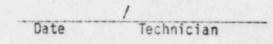
.10 Move the momentary contact STEP toggle switch to RESET and release.

Technician Date

SAN ONOFRE NUCLEAR GENERATING STATION INSTRUMENT AND TEST PROCEDURE S023-11-3.2 UNITS 2&3 REVISION 0 PAGE 157

#### 6.0 PROCEDURE

5.23.84.11 Repeat the above steps as necessary for jack number 1. then return the LOW CURRENT switch for the position to N (normal).



.12 Remove the short circuit plugs from jack number 1 and insert in jack number 2.

Date Technician

.13 Repeat all steps from 6.23.4.4 through 6.23.4.11 inclusive for jack number 2.

The initial value is \_\_\_\_\_ amperes.

The final value is \_\_\_\_\_ amperes.

Date / Technician

.14 Remove the short circuit plugs from jack number 2 and insert in jack number 3.

Date / Technician

.15 Repeat all steps from 5.23.4.4 through 6.23.4.11 inclusive for jack number 3.

The initial value is amperes.

The final value is \_\_\_\_\_ amperes.

Date Technician

NOTE: The following section of the test measures the response time from three externally produced current signals in the C-E test box through connections in the rear of the nuclear instrumentation safety drawer, through the CPC to the PPS bistable trip units. It is recommended that this test be performed immediately after the RPS High linear Power response time test to reduce set up time.

INSTRUMENT AND TEST PROCEDURE S023-II-3.2 REVISION 0 PAGE 158

6.0 PROCEDURE

6.23.84.15

- CAUTION THIS TEST, IF NOT PROPERLY CONDUCTED, MAY CAUSE A TRIP OF THE RPS REACTOR TRIP SWITCHGEAR. FOR THIS TEST, WITH THE CEA M-G SETS NOT RUNNING, THE ONLY PORTION OF THE PPS THAT NEED BE ENERGIZED IS THAT PART BEING TESTS.
- .15 Place the optical pickups from the six STOP LAMPS jacks on the C-E RTT box over the three LED's in column 3 and the three LED's in column 4 (Hi Local Power and Low DNBR respectively) on the bistable control panel.

Technician Date

.17 Arrange the test equipment so that a signal will not be produced until all six LED's are illuminated. All switches at the jacks should be turned to ON.

.18 Reset the CPC calculator trip by pushing the white (SPARE) pushbutton on the Operator's Module and entering on R (for Restart) when prompted by the TTY.

.19 At the CPC/CEAC TTY enter the command LI D1,124,IN, BOTH CR to make the parameter D1 (Upper Excore Neutron Flux Detector) a live input.

Date Technician

.20 At the CPC/CEAC TTY enter the command LI D2,124,IN, BOTH CR to make the parameter D2 (Middle Excore Neutron Flux Detector) a live input.

Technician Date

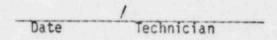
INSTRUMENT AND TEST PROCEDURE S023-II-3.2 REVISION 0 PAGE 159

#### 5.0 PROCEDURE

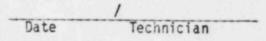
6.23.84.21 At the CPC/CEAC TTY enter the command LI D3,124,IN, BOTH CR to make the parameter D3 (Lower Excore Neutron Flux Detector) a live input.

Date / Technician

- NOTE: In the above three steps, all three simulated detector signals are made live. If it is required that only one signal at a time be made live, the test will have to be run three times. In addition the Hi Local Power and Low DNBR trip functions could be run as separate tests by turning only three STOP LAMPS switches on at one time.
- .22 Enter the command NOP PR at the CPC/CEAC TTY to revert the live input to a constant input.



.23 At the CPC/CEAC TTY, enter the command ST CR. The TTY should list out the three parameters with the data entered for each. Only these three parameters should be live.



.24 Perform all steps of Appendix E Power Range Safety Channel Setup for Testing.

Date / Technician

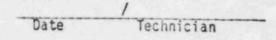
.25 Reset the C-E RTT box timer to zero.

Technician Date

INSTRUMENT AND TEST PROCEDURE S023-II-3.2 REVISION 0 PAGE 160

## 6.0 PROCEDURE

6.23.84.26 At the CPC/CEAC TTY, enter the command GO to start the test. Verify that the point I.D. displayed is 043 and the value is +33.000.



.27 Reset all Low DNBR and Hi LPD trip conditions on the Bistable Control Panel of the PPS.

Date / Technician

.23 Toggle the "STEP" switch to "START." When the timer stops incrementing, note the value and enter in the "DATA COLLECTION TABLE."

Date Technician

.29 Move the momentary contact STEP switch to RESET and release. The RESET light should turn ON.

Date Technician

.30 Place the "AC POWER" switch in the safety channel drawer in the OFF position.

Date / Technician

.31 Verify that the "POWER ON" lamp DS-1 is extinguished.

Date / Technician

.32 Disconnect the test cable from jack J-10 and reconnect the system cable.

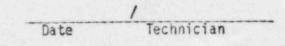
Date / Technician

UNITS 2&3

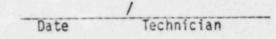
SAN ONOFRE NUCLEAR GENERATING STATION INSTRUMENT AND TEST PROCEDURE S023-11-3.2 PAGE 161 REVISION O

#### 6.0 PROCEDURE

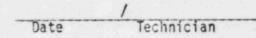
6.23.84.33 Disconnect the test cable from jack J-9 and reconnect the system cable.



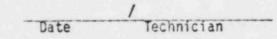
.34 Disconnect the test cable from jack J-9 and reconnect the system cable.



.35 Disconnect the high voltage cable from jack J-4 and reconnect to jack J-3.



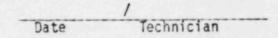
.36 Disconnect the ground wires from the chassis at the J-8, J-9 and J-10 plugs.



.37 Return all caps and other equipment to the condition in which found before the start of the test.

Date / Technician

.33 Place the "AC POWER" switch in the safety channel drawer to the ON position.



#### Reactor Coolant Pump Speed - CPC I/O RTT 6.23.85

On the C-E RTT box, rotate the function select switch to the FREQUENCY position. Output from the C-E RTT .1 box is now available at the Fl and F2 jacks in the CALIBRATION section and at the "VOLTAGE, HIGH CURRENT, FREQUENCY, RESISTANCE" banana jacks in the FUNCTION SIGNAL OUTPUTS section.

> / Technician Date

INSTRUMENT AND TEST PROCEDURE S023-II-3.2 REVISION O PAGE 162

6.0 PROCEDURE

6.23.85.1

- NOTE: It is recommended that reference be made to the Operation and Maintenance Instructions for Response Time Test Equipment for a description of the arrangement for frequency outputs. Note that the output from the banana jack on the FUNCTION SIGNAL OUTPUTS section is tied directly to the FI test jack when the FUNCTION SELECT switch is in the FREQUENCY position.
- NOTE: Steps 5.23.5.2, 5.23.5.3, 5.23.5.4 and 5.23.5.10 need not be performed if the equipment has been recently calibrated. If skipping the steps sign below.

Date Calibrated Signature

.2 Place a 30K (or open circuit) local impedance across the "VOLTAGE, HIGH CURRENT, FREQUENC", RESISTANCE" banana jacks in the FUNCTION SIGNAL CUTPUTS section.

Date Technician

.3 Connect an oscilloscope across the F2 test jacks and measure the pulse width. The pulse width shall be between 200 seconds and 550 seconds, but the width is not significant to the test.

Date / Technician

.4 Check the pulse amplitude. It must be between 9 and 10 volts with the 30K local impedance connected. If it is not, refer to the technical manual for the C-E RIT box and correct.

Date Technician

.5 Move the momentary contact STEP switch in the STEPPED FUNCTIONS section to RESET and release. The RESET light should turn ON.

/ Technician Date

INSTRUMENT AND TEST PROCEDURE S023-II-3.2 REVISION 0 PAGE 153

## 6.0 PROCEDURE

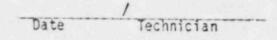
6.23.85.6 Using the FREQUENCY meter on the front panel, adjust the initial frequency by using the INITIAL potentiometer in the VOLTAGE, CURRENT, FREQUENCY section to a value of 869 Hz. Note the value.

.7 Move the STEP switch to START position and release. The START light should illuminate and the timer should start incrementing. Stop the timer.

.8 Using the FREQUENCY meter on the front panel, adjust the final frequency by using the FINAL potentiometer in the VOLTAGE, CURRENT, FREQUENCY section to a value of 782 Hz. Note the value.

.9 Verify that the TIMER MODE STOP switch is in the increasing or low to high move.

.10 Disconnect the dummy load and the oscilloscope.



- .11 Insert the test cable plug for the "frequency test" in the "VOLTAGE, HIGH CURRENT, FREQUENCY, RESISTANCE" banana jack in the FUNCTION SIGNAL OUTPUTS section on the RTT.
  - NOTE: The stepped input signal will be connected inside the Reliance-Custom Controls Auxiliary Protective Cabinet L-91. The connection will be made to a terminal strip on the probe side of the pulse shaper. Since the pulse shaper will be utilized for this test, it will be necessary to maintain the +15 volt power supply to each pulse shaper unit.

INSTRUMENT AND TEST PROCEDURE S023-II-3.2 REVISION 0 PAGE 154

## 6.0 PROCEDURE

6.23.85.12 In the Auxiliary Protective Cabinet (L-91) on terminal strip OT x 4, check the voltage between terminal 37 and ground using any portable voltmeter. The voltage should be +15 volts DC Record the voltage Vdc.

/ Technician Date

.13 In the cabinet L-91, remove transmitter cables on terminals 33 and 39 from terminal strip OT x 4. Connect the C-E RTT box cable signal lead to terminal 39 and the other cable to terminal 33.

Date / Technician

.14 Place three optical pickups from the first three STOP LAMPS jacks on the C-E RTT box over the three LED's in column 4 (Low DNBR) on the bistable control panel. Turn STOP LAMPS switches for L1, L2, and L3 ON and L4, L5, and L6 OFF. Leave this setup unchanged for the pump speed tests.

Date / Technician

- CAUTION THIS TEST, IF NOT PROPERLY CONDUCTED, MAY CAUSE A TRIP OF THE RPS REACTOR TRIP SWITCHGEAR. FOR THIS PREOPERATIONAL TEST, WITH THE CEA M-G SETS NOT RUNNING, THE ONLY SECTION OF THE PPS THAT NEED BE ENERGIZED IS THAT PART BEING TESTED.
- .15 Reset the CPC calculator trip by pushing the white (SPARE) pushbutton on the Operator's Module and entering an R (for Restart) when prompted by the TTY.

Date Technician

SAN ONOFRE NUCLEAR GENERATING STATION INSTRUMENT AND TEST PROCEDURE S023-11-3.2 UNITS 2&3

REVISION O PAGE 155

#### 5.0 PROCEDURE . .

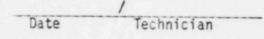
6.23.85.15 At the CPC/CEAC TTY, enter the commands NOP D1, NOP D2 and NOP D3 to return these parameters to constant input.

Date Technician

.17 At the CPC/CEAC TTY, enter the command LI W1, 2699, IN. DNBR CR to make the parameter W1, Reactor Coolant Pump 1 Speed (in counts per second) a live input. See Response Time Test Software User's Manual for explanation.

Date Technician

.13 At the CPC/CEAC TTY enter the command ST CR . The only input that should be live is parameter W1.



.19 Reset the FREQUENCY meter to zero.

Date / Technician

.20 Reset the C-E RTT box timer to zero. At the CPC/CEAC TTY, enter the command GO to start the test. Verify that the point I.D. displayed is 043 and the value is +33.000.

.21 Reset all Low DNBR trip conditions on the Bistable Control Panel of the PPS.

Date / Technician

.22 Move the STEP toggle switch on the C-E RTT box to START, then release.

/ Technician Date

INSTRUMENT AND TEST PROCEDURE S023-II-3.2 REVISION 0 PAGE 155

#### 6.0 PROCEDURE

6.23.85.23 When the timer stops incrementing, note the value and enter in the "DATA COLLECTION TABLE."

Date Technician

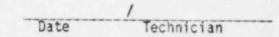
.24 Disconnect the test leads in cabinet L-91 and reconnect the normal system leads.

Date / Technician

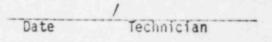
.25 Move the momentary contact STEPPED FUNCTIONS STEP switch to RESET and release. The RESET light should be turned ON.

/ Date Technician

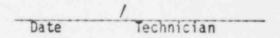
.26 In the Auxiliary Protective Cabinet (L-91) on terminal strip OT x 4, check the voltage between terminal 41 and ground using any portable voltmeter. The voltage should be +15 volts DC. Record the voltage. Vdc.



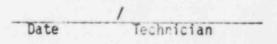
.27 In the cabinet L-91, remove the transmitter cables (but leave the pulse shaper cables) from terminal strip OT x 4. Connect the C-E RTT box cable signal lead to terminal 43 and the other cable to terminal 42.



.23 Reset the CPC calculator trip by pushing the white (SPARE) pushbutton on the Operator's Module and entering an R (fcr Restart) when prompted by the TTY.



.29 At the CPC/CEAC TTY enter the command NOP W1 to return that parameter to constant input.



SAN ONOFRE NUCLEAR GENERATING STATION INSTRUMENT AND TEST PROCEDURE S023-II-3.2 UNITS 2&3 REVISION 0 PAGE 157

#### 6.0 PROCEDURE

6.23.85.30 At the CPC/CEAC TTY enter the command LI W2,2599, IN DNBR CR to make the parameter live.

Date Technician

.31 At the CPC/CEAC TTY, enter the command ST CR. The only input that should be live is parameter W2.

Date Technician

.32 Reset the FREQUENCY meter and the timer on the C-E RTT box to zero.

Date / Technician

.33 At the CPC/CEAC TTY, enter the command GO to start the program. Verify that the point I.D. is 043 and the value is +33.000.

Date Technician

.34 Reset all Low DNBR trip conditions on the RPS.

Date Technician

.35 Toggle the "STEP" switch to "START." When the timer stops incrementing, note the value and enter in the "DATA COLLECTION TABLE."

Date Technician

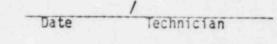
.36 Disconnect the test leads in cabinet L-91 and reconnect the normal system leads.

Technician Date

INSTRUMENT AND TEST PROCEDURE S023-II-3.2 REVISION 0 PAGE 168

## 6.0 PROCEDURE

5.23.85.37 In the Auxiliary Protective Cabinet (L-91) on terminal strip OT x 4, check the voltage between terminal 45 and ground using any portable voltmeter. The voltage should be +15 volts dc. Record the voltage. Vdc



.38 In the cabinet L-91, remove the transmitter cables (but leave the pulse shaper cables) from terminal strip OT x 4. Connect the C-E RTT box cable signal lead to terminal 47 and the other cable to terminal 46.

Date Technician

.39 Reset the CPC calculator trip by pushing the white (SPARE) pushbutton on the Operator's Module and entering an R (for Restart) when prompted by the TTY.

Date / Technician

.40 At the CPC/CEAC TTY enter the command NOP W2 to return that parameter to constant input.

Date / Technician

.41 At the CPC/CEAC TTY enter the command LI W3,2699, IN, DNBR CR to make the parameter live.

Date / Technician

.42 At the CPC/CEAC TTY, enter the COMMAND ST CR. The only input that should be live is parameter W3.

Date / Technician

.43 Reset the FREQUENCY meter and the timer on the C-E RTT box to zero.

Date Technician

INSTRUMENT AND TEST PROCEDURE S023-II-3.2 REVISION 0 PAGE 159

#### 6.0 PROCEDURE

6.23.35.44 At the CPC/CEAC TTY, enter the command GO to start the program. Verify that the point I.D. is 043 and the value is +33.000.

echnician Date

.45 Reset all Low DNBR trip conditions on the RPS.

.46 Toggle the "STEP" switch to "START." When the timer stops incrementing, note the value and enter in the "DATA COLLECTION TABLE."

.47 Disconnect the test leads in cabinet L-91 and reconnect the normal system leads.

.43 Move the momentary contact STEPPED FUNCTIONS STEP switch to RESET and release. The RESET light should be turned ON.

.49 In the Auxiliary Protective Cabinet (L-91) on terminal strip OT x 4, check the voltage between terminal 49 and ground using any portable voltmeter. The voltage should be +15 volts DC. Record the voltage. Vdc

.50 In the cabinet L-91, remove the transmitter cables (but leave the pulse shaper cables) from terminal strip OT x 4. Connect the C-E RTT box cable signal lead to terminal 51 and the other cable to terminal 50.

Date Technician

INSTRUMENT AND TEST PROCEDURE S023-II-3.2 REVISION 0 PAGE 170

#### 6.0 PROCEDURE

6.23.85.51 Reset the CPC calculator trip by pushing the white (SPARE) pushbutton on the Operator's Module and entering an R (for Restart) when prompted by the TTY.

Date / Technician

.52 At the CPC/CEAC TTY enter the command NOP W3 to return that parameter to constant input.

Date / Technician

.53 At the CPC/CEAC TTY enter the command LI W4,2699, IN DNBR CR to make the parameter live.

Date Technician

.54 At the CPC/CEAC TTY, enter the command ST CR. The only input that should be live is parameter W4.

/ Date Technician

.55 Reset the FREQUENCY meter and the timer on the C-E RTT box to zero.

/ Date Technician

.55 At the CPC/CEAC TTY, emter the command GO to start the program. Verify that the point I.D. is 043 and the value is +33.000.

Date Technician

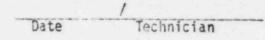
.57 Reset all Low DNBR trip conditions on the RPS.

Date Technician

SAN ONOFRE NUCLEAR GENERATING STATION INSTRUMENT AND TEST PROCEDURE S023-II-3.2 UNITS 2&3 REVISION 0 PAGE 171

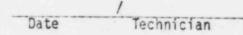
## 6.0 PROCEDURE

6.23.85.53 Toggle the step switch to "START." When the timer stops incrementing, note the value and enter in the "DATA COLLECTION TABLE."



.59 Disconnect the test leads in cabinet L-91 and reconnect the normal system leads.

.50 Do not break down test equipment if the next section is to follow immediately.



5.23.85 Target CEA Positions - CPC I/O RTT

- NOTE: In this part of the test, the C-E Response Time Test Equipment will produce a voltage step which will simulate a change in a CEA position. This change will be detected directly by the core protection calculator which will in turn produce a trip signal. For convenience and to perform the test expeditiously, it is recommended that two or more persons be assigned stations for the test.
- .1 Move the momentary contact STEPPED FUNCTIONS STEP switch to RESET and release. The RESET light should be turned ON.

Date / Technician

.2 On the C-E RTT box, rotate the FUNCTION SELECT switch to the VOLTAGE position. Output will now be at the "VOLTAGE, HIGH CURRENT, FREQUENCY, RESISTANCE" banana jacks in the FUNCTION SIGNAL OUTPUTS section. The black terminal is reference.

Date Technician

# INSTRUMENT AND TEST PROCEDURE S023-II-3.2 REVISION 0 PAGE 172

#### 6.0 PROCEDURE

6.23.85.3 Connect the C-E RTT box digital voltmeter (DVM) across the output jacks.

	/
Date	Technician

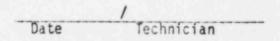
.4 Set the initial voltage value to a voltage of 10.0 volts by adjusting the "VOLTAGE, CURRENT, FREQUENCY" INITIAL potentiometer until the desired voltage is obtained. This value is equivalent to 150 inches withdrawn. Note the value.

.5 Place the START switch in the TIMER MODE section in the low to high position.

.6 Move the momentary contact STEP switch to START and release. The START light should illuminate and the timer should start incrementing. Stop the timer.

.7 Set the final voltage value to a voltage of 8.333 volts by adjusting "VOLTAGE, CURRENT, FREQUENCY" FINAL potentiometer until the desired voltage is obtained. This value is equivalent to 100.0 inches withdrawn. Note the value.

.8 Repeat the above steps as necessary to obtain the voltages desired, then disconnect the meter and remove the leads.



INSTRUMENT AND TEST PROCEDURE S023-II-3.2 REVISION 0 PAGE 173

### 6.0 PROCEDURE

6.23.86.9 Move the momentary contact STEP toggle switch to reset and release, and place STOP switch in the TIMER MODE section in the low to high position.

Date / Technician

- NOTE: The simulated input signal will be connected to a terminal strip in the Auxiliary Protective Cabinet (L-91). For this CEA position test, it will not be necessary to disconnect the normally attached wires.
- NOTE: In the following sections, it is assumed that the most expeditious way to perform the test is to leave the C-E RIT box set up in front of one calculator and move the input signal probes until all CEA's in that channel and calculator are tested. Actual field experience may determine a more expeditious method.
- .10 Attach one end of the test probes to the "VOLTAGE, CURRENT, FREQUENCY, RESISTANCE" banana jacks in the FUNCTION SIGNAL OUTPUTS section of the C-E RTT box.

.11 Use six optical pickups. Place the optical pickups ends over the LED's in Channel A column 3 (Hi Local Power) and columm 4 (Low DNBR). Insert other ends in the six STOP LAMPS banana jacks and turn ON all stop lamp switches.

> / Date Technician

.12 Reset the CPC calculator by pushing the white (SPARE) pushbutton on the Operator's Module and entering an R (for Restart) when prompted by the TTY.

Technician Date

SAN ONOFRE NUCLEAR GENERATING STATION INSTRUMENT AND TEST PROCEDURE S023-11-3.2 UNITS 233

REVISION O **PAGE 174** 

#### 6.0 PROCEDURE

6.23.86.13 Connect a TTY to the channel B CPC calculator and enter the command ST CR . If there are any live inputs, made them constant by entering the command NOP x CR .

Date / Technician

.14 Inside Channel B of cabinet L-91, the Auxiliary Protection cabinet, connect the signal lead to terminal 3 and the reference lead to terminal 4 on terminal strip OTAL.

Date Technician

.15 At the CPC/CEAC TTY type in the command LI SG01,120,DE, BOTH CR to make parameter SGO1, CEA subgroup 1 position a live input.

Date Technician

.16 At the CPC/CEAC TTY, enter the command GO to start the program. Verify that the point I.D. is 043 and the value is +33.000.

Date / Technician

.17 Reset the C-E RTT box digital timer to zero.

.13 Reset the low DNBR and Hi LPD trips on the Bistable Control Panel of the PPS.

Date / Technician

.19 Toggle the "STEP" switch to "START." When the timer stops incrementing, note the value and enter in the "DATA COLLECTION TABLE."

	/
Date	Technician

SAN ONOFRE NUCLEAR GENERATING STATION INSTRUMENT AND TEST PROCEDURE S023-II-3.2 UNITS 2&3 REVISION 0 PAGE 175

#### 6.0 PROCEDURE

Parameter

# 6.23.85.20 Repeat steps 5.23.5.12 through 6.23.5.19 for the following parameters"

### CHANNEL B

#### OTB1

Number	CEA	Signal	Reference		
XX	Number	X	<u> </u>		
SG01	3	3	4	P	erformed
SG02	6	7	8		1
				Date	Technician
SG03	10	11	12		1
				Date	Technician
SG04	16	15	16	-D-+	
				Date	Technician
SG05	17	19	20	Date	/ Technician
		4 - 1 Pr		Date	rechnician
SG05	22	23	24	Date	/ Technician
SG07	25	27	28	0100	/
5607	25	27	20	Date	Technician
SG08	32	31	32		/
			영상 그 전문 방법	Date	Technician
SG09	33	35	36		1
				Date	Technician
SG10	39	39	40		1
				Date	Technician
SG1 1	40	43	44		1
				Date	Technician
SG12	46	47	48		1
				Date	Technician
SG13	52	51	52	Data	/ Toobalaisa
				Date	Technician

SAN ONOFRE NUCLEAR GENERATING STATION INSTRUMENT AND TEST PROCEDURE S023-II-3.2 UNITS 2&3 REVISION 0 PAGE 175

6.0 PROCEDURE

### 6.23.36.20

		CHANNEL B	(Continued)		
Parameter		OTB1			
Number	CEA Number	Signal X	Reference Y		
SG1 4	53	55	55	Data	1
SG15	58	59	60	Date	Technician
5315	50	53	80	Date	Technician
SG16	63	63	54		1
0017	~	67		Date	Technician
SG17	64	67	68	Date	Technician
SG13	73	71	72		/
SG1 9	74	75	74	Date	Technician
2013	/4	75	76	Date	Technician
SG20	75	79	80		/
				Date	Technician
Parameter		OT	A2		
Number XX	CEA Number	Signal X	Reference Y		
SG21	94	3	4		/
				Date	Technician
SG22	85	7	8		1
				Date	Technician
SG23	90	11	12		1
				Date	Technician

SAN ONOFRE NUCLEAR GENERATING STATION INSTRUMENT AND ' UNITS 2&3 REVISION O

.2

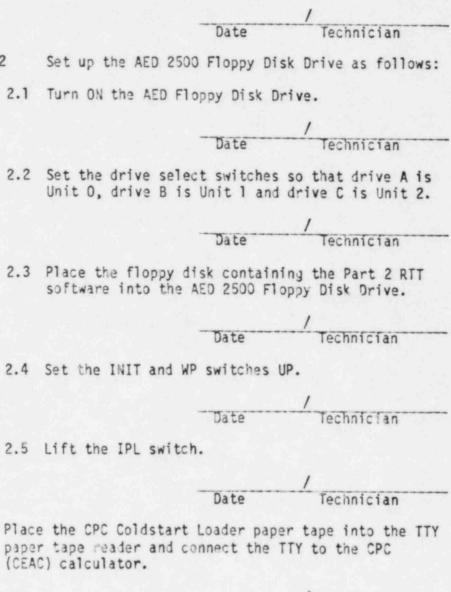
2.3

INSTRUMENT AND TEST PROCEDURE S023-II-3.2 REVISION 0 PAGE 177

6.0 PROCEDURE

6.23.86.21 RTT Part 2 - Processor Timing Test

.1 Set the Calculator Select rotary switch on the OPERATOR'S MODULE to load the CPC (CEAC) calculator. The calculator not selected is memory protected.



Date Technician

SAN ONOFRE NUCLEAR GENERATING STATION UNITS 2&3

INSTRUMENT AND TEST PROCEDURE S023-II-3.2 REVISION 0 PAGE 178

6.0 PROCEDURE

6.23.85.21.4

21.4 Hit "FUNCTION" button, then hit "LOCATION" button on the Hexadecimal Display Panel.

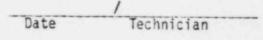
Technician

.5 Set up the following memory locations via the Interdata Hexadecimal Display Panel:

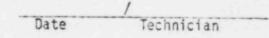
Location	Contents
30	0000
32	0000
34	0000
36	0050
50	D500
52	OOCF
54	4300
56	0030
78	0294

Date Technician

.6 Read through these same locations to verify the correct contents.



.7 Start the processor at location 30.



.8 Start the TTY paper tape reader by setting the READER/PUNCH switch to the "MANUAL START" position.

Date Technician

.9 Respond to the TEST TRACK prompt with 55.

Date Technician

UNITS 283

SAN ONOFRE NUCLEAR GENERATING STATION INSTRUMENT AND TEST PROCEDURE S023-11-3.2 REVISION O PAGE 179

#### 6.0 PROCEDURE .

6.23.86.21.10 Verify that the MEMORY PROTECT key switch is OFF.

.11 Remove the disk from the AED 2500 disk drive.

.12 After approximately 10 minutes a TEST REPORT will be output to the TTY. Remove the TEST REPORT from the TTY.

.13 Verify that the actual times are within +5% of the expected time shown in Figures H-1 and H-2 in the column labeled MAX EX. of Appendix H.

/ Technician Date

.14 Attach the TEST REPORT printout to this procedure as a record of the test.

	1		
Date	Tech	nician	

VJS:19435/js/mr Continued from 1942b Continued to 1944b

SAN ONOFRE NUCLEAR GENERATING STATION INSTRUMENT AND TEST PROCEDURE SO23-11-3.2 UNITS 283

REVISION O PAGE 180

#### 6.0 PROCEDURE

6.23.85.22 CEA Positions - CEAC to CPC RTT

- NOTE: The setup for this test is similar to that for the previous test except that two CPC/CEAC TTY's are required. Operation commonds must be entered in both the CPC and CEAC TTY's. It would be desirable to have three persons available for the performance of this test.
- .22.1 Move the momentary contact STEPPED FUNCTIONS STEP switch to RESET and release. The RESET light should be turned ON.
  - NOTE: It is assumed that the calibration of the voltage signal that was performed on the C-E RTT box for the previous test will be satisfactory for this test. If not. repeat steps 5.23.5.2 through 6.23.6.11.
- .22.2 On the Bay B Operator's Module, select the CPC calculator.
- .22.3 To set up the TTY's, connect one TTY to the channel B, CPC calculator and enter the command ST CR . If there are any live inputs, make them constant by entering the command NOP X CR .
- .22.4 On the Bay B Operator's Module, select the CEAC calculator. The CPC memory in channel is now protected.
- .22.5 Connect another TTY to the channel B CEAC calculator and enter the command ST CR . If there are any live inputs make them constant by entering the command NOP X CR . CEAC 1 in Bay B will be used for channel B tests.
- .22.5 To set up the C-E RTT box, inside channel B of cabinet L-91, the Auxiliary Protection Cabinet, connect the signal lead to terminal No. 15 (and subsequently as indicated on the following tables) and the reference lead to terminal No. 15 (and subsequently as indicated on the following tables).

SAN ONOFRE NUCLEAR GENERATING STATION UNITS 2&3

INSTRUMENT AND TEST PROCEDURE S023-II-3.2 REVISION 0 PAGE 181

#### 6.0 PROCEDURE

6.23.85.22.7 C

7 Connect the other end of the probe leads to the C-E RTT box "VOLTAGE, HIGH CURRENT, FREQUENCY, RESISTANCE" banana jacks in the FUNCTION SIGNAL OUTPUTS section.

- NOTE: The output from the terminals is connected to the core protection calculators in channel 3, and to an isolation amplifier for transmission to CEA calculator No. 1 in Bay B. This test utilizes the signal that is directed to the CEAC.
- .22.8 Use six optical pickups. Place the optical pickup ends over the LED's in Channel B, column three (Hi Local Power) and column four (Low DNBR). Insert other ends in the six STOP LAMPS banana jacks and turn ON all stop lamps switches.
- .22.9 To initialize the signals, at the CEAC TTY, type in the command LI CEAXX,120,DE CR to make the parameter CEAXX a live input. At the CEAC TTY, enter the command GO to start the program then refer to the following tables for the values that should be substituted for XX.
- .22.10 On the Bay B, Operator's Module, select the CPC calculator.
- .22.11 At the CPC TTY, type in the command LI PF1 BOTH CR to make the parameter Penalty Factor 1 from CEAC No. 1 a live input. PF1 will be used when checking channel B at the CPC TTY, type in the command "GO".
- .22.12 Reset the CEAC calculator trip by pushing the white (SPARE) pushbutton on the Operator's Module and entering an R (for Restart) when prompted by the TTY.
- .22.13 Reset the CPC calculator trip by pushing the whete (SPARE) pushbutton on the Operators Module and entering an R (for Restart) when prompted by the TTY.

SAN ONOFRE NUCLEAR GENERATING STATION INSTRUMENT AND TEST PROCEDURE SO23-II-3.2 UNITS 2&3 REVISION 0 PAGE 132

#### 5.0 PROCEDURE

- 6.23.86.22.14 With the appropriate selector switch selecting the CEAC, type GO on the CEAC TTY. Verify that the point I.D. displayed on the Operator's Module is 043 and the value is +33.000.
  - .22.15 With the appropriate selector switch selecting the CPC, type GO on the CPC TTY. Verify that the point I.D. displayed on the Operator's Module is 043 and the value is +33.000.
  - .22.16 Reset the Low DNBR and Hi LPD trips on the Bistable Control Panel of the PPS.
  - .22.17 Reset the C-E RIT box digital timer to zero.
  - .22.13 Move the STEP toggle switch on the C-E RTT box to START, then release.
  - .22.19 When the timer stops incrementing, note the value.
  - .22.20 Select the CEAC calculator and using the CEAC TTY, enter ST CR. Make all existing live inputs constant by entering the command NOP CEAXX, where CEAXX is the live parameter.
  - .22.21 Repeat steps 5.23.7.9 and 5.23.7.12 through 6.23.7.20 for all the parameters on the following list for channel B and C.

SAN ONOFRE NUCLEAR GENERATING STATION INSTRUMENT AND TEST PROCEDURE S023-11-3.2 UNITS 2&3 PAGE 183

PARAMETER NUMBER XX		SIGNAL X	SIGNAL	PERFORMED INITIAL/DATE
CEA 01	OTB2-	15	16	1
CEA 02	- LATO	3	4	/
CEA 03	OT31 -	3	4	/
CEA 04	OTAI -	7	8	1
CEA GJ	OTB2-	19	20	/
CEA 06	0TB1 -	7	8	/
CEA 07	OTB2-	23	24	/
CEA 08	OTA1 -	11	12	/
CEA 09	OTB2-	27	23	/
CEA 10	OTB1 -	11	12	/
CEA 11	0TB2-	31	32	/
CEA 12	OTA1 -	15	16	/
CEA 13	OTAI -	19	20	/
CEA 14	0 TB2 -	35	36	/
CEA 15	0TB2-	39	40	1
CEA 16	OTB1 -	15	16	/
CEA 17	0781 -	19	20	/
CEA 18	OTB2-	43	44	/
CEA 19	OTB2-	47	49	/
CEA 20	OTA1 -	23	24	/
CEA 21	0182-	51	52	/
CEA 22	OTB1-	23	24	/

SAN ONOFRE NUCLEAR GENERATING STATION INSTRUMENT AND TEST PROCEDURE S023-II-3.2 UNITS 2&3 PACE 184

PARAMETER NUMBER XX		SIGNAL X	SIGNAL	PERFORMED INITIAL/DATE
CEA 23	0TB2-	55	55	/
CEA 24	OTA1-	27	28	/
CEA 25	OTB2-	59	60	/
CEA 26	OT 1-	27	28	/
CEA 27	OTB2-	53	54	1
CEA 28	OTA1-	31	32	/
CEA 29	OTAI -	35	35	/
CEA 30	0TB2-	67	68	/
CEA 31	OTA2-	71	72	/
CEA 32	OTB1-	31	32	/
CEA 33	OT 1-	35	35	/
CEA 34	OTB2-	75	76	/
CEA 35	0T32-	79	80	1
CEA 35	OTA1 -	39	40	/
CEA 37	OTB3-	3	4	/
CEA 38	OTB3-	7	8	/
CEA 39	0TB1-	39	40	/
CEA 40	0181-	43	44	/
CEA 41	OTB3-	11	12	1
CEA 42	0TB3-	15	16	1

SAN ONOFRE NUCLEAR GENERATING STATION INSTRUMENT AND TEST PROCEDURE S023-11-3.2 UNITS 283

.

REVISION O PAGE 185

PARAMETER NUMBER XX		SIGNAL X	SIGNAL	PERFORMED INITIAL/DATE
CEA 43	0TA1 -	43	44	/
CEA 44	OTA1 -	47	48	1
CEA 45	OT63-	19	20	1
CEA 45	OTB1 -	47	48	/
CEA 47	OTB3-	23	24	/
CEA 48	OTAI -	51	52	
CEA 49	0TA1 -	55	55	/
CEA 50	OTB3-	27	28	1
CEA 51	OTB3-	31	32	1
CEA 52	OTB1 -	51	52	/
CEA 53	OTB1-	55	56	1
CEA 54	OTB3-	35	35	/
CEA 55	OTB3-	39	40	/
CEA 56	OTAI -	59	60	
CEA 57	OTB3-	43	44	1
CEA 58	0731-	59	60	/
CEA 59	OTB3-	47	43	/
CEA 60	OTA1 -	53	54	/
CEA 51	OTB3-	43	44	1
CEA 62	OTB3-	59	60	1
CEA 53	отв1 -	47	43	1

SAN ONOFRE NUCLEAR GENERATING STATION INSTRUMENT AND TEST PROCEDURE S023-II-3.2 UNITS 2&3 PAGE 185

CEAC #1 CPC CHANNEL B

PARAMETER NUMBER XX		SIGNAL X	SIGNAL Y	PERFORMED INITIAL/DATE
CEA 54	OTB1-	63	54	/
CEA 65	OTB3-	63	54	/
CEA 55	OTB3-	43	44	/
CEA 67	0TA1 -	59	60	/
CEA 58	0TA1 -	47	48	/
CEA 69	- TATO	63	64	/
CEA 70	OTB3-	43	44	/
CEA 71	OTB3-	59	60	1
CEA 72	OTB3-	47	43	1
CEA 73	OTB1-	71	72	/
CEA 74	OTB1-	75	75	/
CEA 75	0TB1 -	79	80	/
CEA 75	OTB3-	79	80	
CEA 77	OTB5-	53	54	/
CEA 78	OT35-	57	58	/
CEA 79	OTA1 -	79	80	/
CEA 80	OTA2-	2	3	1
CEA 81	OTA2-	6	7	1
CEA 82	OTB5-	61	62	/
CEA 83	OTB5-	65	66	/
CEA 84	OTB2-	3	4	,

SAN ONOFRE NUCLEAR GENERATING STATION INSTRUMENT AND TEST PROCEDURE S023-II-3.2 UNITS 2&3 PAGE 137

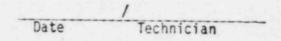
PARAMETER NUMBER XX		SIGNAL X	SIGNAL Y	PERFORMED INITIAL/DATE
CEA 85	OTB2-	7	7	/
CEA 86	0 TB5-	69	70	/
CEA 87	OTB5-	73	74	/
CEA 88	OTA2-	10	11	/
CEA 89	OT35-	77	78	/
CEA 90	0TB2-	11	12	//
CEA 91	OTB5-	81	82	/

SAN ONOFRE NUCLEAR GENERATING STATION INSTRUMENT AND TEST PROCEDURE S023-II-3.2 UNITS 283 REVISION O

## PAGE 188

#### 6.0 PROCEDURE

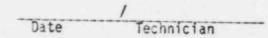
- 6.24 High Pressurizer Pressure to RTSG Response Time
  - NOTE: The following section measures the response time from the simulation of a trip signal into the Foxboro cabinet (using the PPS Response Time Test panel L151) to the time when the rotary relays trip. The C-E test box will be used as the response time measuring device.
  - Ensure the temporary LED's are installed across the rotary 5.24.1 relay contacts per steps 6.19.1 through 6.19.3.



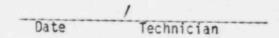
Remove the PPS input simulator box leads from terminals 39 6.24.2 and 40 on TB-1 of L125, if not already removed.



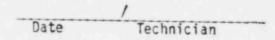
Connect the "Bistable Test" leads of L151 to terminals 39 and 6.24.3 10 on T3-1 of L125, if not already connected.



On the bistable control panel being tested, rotate the 6.24.4 bistable selector switch to position number 5.



Rotate the meter input selector switch to the "TRIP SP" 5.24.5 position.



Record the value indicated on the bistable control panel 6.24.5 digital indicator.

Volts / Value/Units Date Technician

UNITS 283

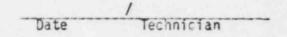
SAN ONOFRE NUCLEAR GENERATING STATION INSTRUMENT AND TEST PROCEDURE S023-11-3.2 REVISION O PAGE 189

#### 6.0 PROCEDURE

6.24.7 Rotate the meter input selector switch to the "INPUT" position.

> / Technician Date

In the "Bistable Test" section of L151 place the toggle 6.24.8 switch in the "OPEN" position. The LED should extinguish.



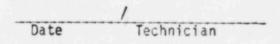
Adjust the "HIGH COARSE" and the "HIGH FINE" 6.24.9 potentiometers in the "Bistable Test" section of L151 until the digital indicator at the bistable control panel reads 4.00 Vdc +.1 Vdc.

In the "Bistable Test" section of L151, place the toggle switch in the "CLOSE" position. The LED should energize. 6.24.10

Adjust the "LOW COARSE" and "LOW FINE" potentiometers in 5.24.11 the "Bistable Test" section of 2L151 until the digital indicator on the bistable control panel reads approximately .1 Vdc on the tripped side of the value recorded in step 6.24.6.

6.24.12 Record the adjusted voltage.

6.24.13 Connect the optical end of a C-E test box pickup cable to the "Bistable Test" section LED of L151.



SAN ONOFRE NUCLEAR GENERATING STATION UNITS 2&3

INSTRUMENT AND TEST PROCEDURE S023-II-3.2 REVISION 0 PAGE 190

#### 6.0 PROCEDUKE

6.24.14 Connect the other end of this pickup cable to the "LED 1" jacks in the "Start Lamps" section of the C-E test box.

Date Technician

6.24.15 Connect the optical end of four pickup cables to the temporary LED's installed in steps 5.19.1 through 5.19.3.

- 6.24.16 Connect the other end of these four pickup cables to the "L1", "L2", "L3", and "L4" jacks in the "STOP LAMPS" section of the C-E test box.
- 6.24.17 Energize the C-E test box and ensure the following switches are in the correct positions.
  - .1 "L1", "L2", "L3", "L4" stop lamps toggle switches are in the "ON" position.

Date Technician

.2 "START LAMPS" toggle switch is in the "1/1" position.

Date / Technician

.3 Start "TIMER MODES" switch is in the step up position.

Date / Technician

.4 Stop "TIMER MODES" switch is in the step up position.

Date Technician

.5 "L5" and "L6" stop lamps toggle switches are in the "OFF" position.

Date Technician

SAN ONOFRE NUCLEAR GENERATING STATION UNITS 243

#### 6.0 PROCEDURE

6.24.18 Adjust the input simulator box potentiometer in channel 'A' corresponding to bistable number 5 antil the bistable is tripped.

Date Technician

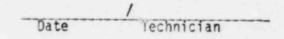
6.24.19 Ensure the toggle switch in the "Bistable Test" section of 2L151 is in the "OPEN" position.

Date Technician

6.24.20 Ensure the C-E test box timer is reset.

Date Technician

5.24.21 After the test equipment has stabilized, place the "Bistable Test" section toggle switch on 2L151 in the "CLOSED" position. The timer should start.



6.24.22 Record the response time.

Volts / Value/Units Date Technician

- 6.24.23 Adjust the input simulator box potentiometer in channel 'A' corresponding to bistable number 5 until the bistable input is returned to the value adjusted for in step 6.1.1.
- 5.24.24 Reset bistable number 5 in channel 4.

Date / Technician

6.24.25 Repeat steps 6.24.18 through 6.24.24 substituting channel 'C' in place of channel 'A'.

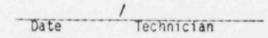
Volts / Value/Units Date Technician SAN ONOFRE NUCLEAR GENERATING STATION UNITS 283 INSTRUMENT AND TEST PROCEDURE S023-II-3.2 REVISION 0 PAGE 192

5.0 PROCEDURE

6.24.25 Repeat steps 5.24.18 through 5.24.24 substituting channel 'D' in place of channel 'A'.

Volts / Value/Units Date Technician

- 6.25 Low Pressurizer Pressure to RTSG Response Time
  - NOTE: The following section measures the response time from the simulation of a trip signal into the Foxboro cabinet (using the PPS Response Time Test panel L151) to the time when the rotary relays trip. The C-E test box will be used as the response time measuring device.
  - 6.25.1 Ensure the temporary LED's are installed across the rotary relay contacts per steps 5.19.1 through 6.19.3.



6.25.2 Remove the PPS input simulator box leads from terminals 33 and 34 on TB-1 of L125, if not already removed.

Date Technician

6.25.3 Connect the "Bistable Test" leads of L151 to terminals 33 and 34 on TB-1 of L125, if not already connected.

Date / Technician

6.25.4 On the bistable control panel being tested, rotate the bistable selector switch to position number 5.

Date / Technician

6.25.5 Rotate the meter input selector switch to the "TRIP SP" position.

/ Technician Date

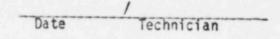
SAN ONOFRE NUCLEAR GENERATING STATION UNITS 283

#### 6.0 PROCEDURE

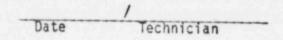
6.25.6 Record the value indicated on the bistable control panel digital indicator.

Volts		1
Value/Units	Date	Technician

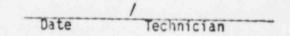
6.25.7 Rotate the meter input selector switch to the "INPUT" position.



In the "Bistable Test" section of L151 place the toggle 6.25.8 switch in the "OPEN" position. The LED should extinguish.



Adjust the "HIGH COARSE" and the "HIGH FINE" 6.25.9 potentiometers in the "Bistable Test" section of 2L151 until the digital indicator on the bistable control panel reads approximately .1 VDC on the tripped side of the value recorded in step 6.26.5.



In the "Bistable Test" section of L151, place the toggle switch in the "CLOSE" position. The LED should energize. 6.25.10

Date / Technician

Adjust the "LOW COURSE" and "LOW FINE" potentiometers in 5.25.11 the "Bistable Test" section of L151 until the digital indicator on the bistable control panel reads 4.00 VDC +. + VDC.

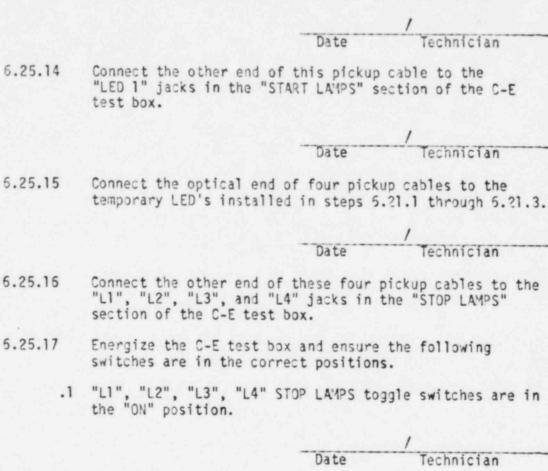
6.25.12 Record the adjusted voltage.

Volts Value/Units Date Technician SAN ONOFRE NUCLEAR GENERATING STATION INSTR UNITS 2&3 REVIS

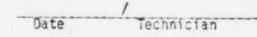
INSTRUMENT AND TEST PROCEDURE S023-II-3.2 REVISION 0 PAGE 194

#### 6.0 PROCEDURE

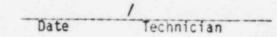
6.25.13 Connect the optical end of a C-E test box pickup cable to the "Bistable Test" section LED of L151.



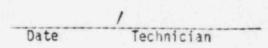
.2 "START LAMPS" toggle switch is in the "1/1" position.



.3 Start "TIMER MODES" switch is in the step DOWN position.



.4 Stop "TIMER MODES" switch is in the step up position.



SAN ONOFRE NUCLEAR GENERATING STATION UNITS 243

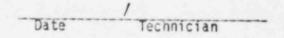
INSTRUMENT AND TEST PROCEDURE S023-II-3.2 REVISION 0 PAGE 195

#### 6.0 PROCEDURE

6.25.17.5 "L5" and "L6" STOP LAMPS toggle switches are in the "OFF" position.

Date Technician

6.25.18 Adjust the input simulator box potentiometer in channel 'A' corresponding to bistable number 6 until the bistable is tripped.



6.25.19 Ensure the toggle switch in the "Bistable Test" section of 2L151 is in the "CLOSE" position.

Date / Technician

6.25.20 Ensure the C-E test box timer is reset and channel B bistable is reset.

Date Technician

5.25.21 After the test equipment has stabilized, place the "Bistable Test" section toggle switch on 2L151 in the "OPEN" position. The timer should start.

Date Technician

6.25.22 Record the response time.

Volts / Value/Units Date Technician

- 6.25.23 Adjust the input simulator box potentiometer in channel 'A' corresponding to bistable number 6 until the bistable input is returned to the value adjusted for in step 6.1.1.
- 6.25.24 Reset bistable number 6 in channel A.

Date Technician

SAN ONOFRE NUCLEAR GENERATING STATION INSTRUMENT AND TEST PROCEDURE S023-II-3.2 UNITS 2&3 PAGE 195

#### 6.0 PROCEDURE

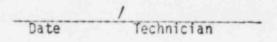
6

6.

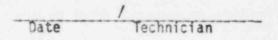
## 6.25.25 Repeat steps 5.25.13 through 6.25.24 substituting channel 'C' in place of channel 'A'.

	Volts		1
	Value/Units	Date	Technician
.25.25	Repeat steps 6.25.18 thro channel 'D' in place of c		substituting
	Value/Units	Date	Technician
.25.27	Disconnect the "Bistable		

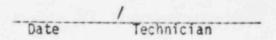
input simulator leads on the terminals they were removed from in step 6.25.1



6.25.28 Reset all bistables.



6.25.29 Record the largest response time value of steps 6.25.22, 6.25.25, 5.25.25 in the Data Collection Table.



- 6.26 Low Pressurizer Pressure to ESFAS Response Time
  - NOTE: The following section measures the response time from the simulation of a trip signal into the Foxboro cabinet (using the PPS Response Time Test Panel L151) to the time when the mechanical or solid state relays trip. The C-E test box will be used as the response time measuring device.
  - 6.26.1 Remove the input simulator box leads from terminals 33 and 34 on TB-1 of L125, if not already removed.



SAN ONOFRE NUCLEAR GENERATING STATION UNITS 283

INSTRUMENT AND TEST PROCEDURE S023-II-3.2 REVISION 0 PAGE 197

#### 5.0 PROCEDURE

5.25.2 Connect the "Bistable Test" leads of L151 to terminals 33 and 34 on TB-1 of L125, if not already connected.

Date Technician

6.26.3 In bay 6 of cabinet A (LO34), connect an LED jumper cable in series with a six VDC power supply across terminals 25 and 27 on terminal strip TB65. This monitors contacts on the mechanical relay MRIA. (SIAS)

6.26.4 In bay 5 of cabinet B (LO35), connect an LED jumper cable in series with a six volt DC power supply across terminals 25 and 27 on terminal strip TB55. This monitors contacts on the mechanical relay MRIB. (SIAS)

6.26.5 Connect the optical end of a stop cable to the LED installed in step 6.26.3 and connect the double banana plug end to the "Ll" jacks of the C-E test box.

6.26.6 Connect the optical end of a second stop cable to the LED installed in step 5.25.4 and connect the double banana plug end to the "L2" jacks of the C-E test box.

6.25.7 Connect the optical end of a start cable to the LED in the "Bistable Test" section of L151 and connect the double banana plug end to the "LED 1" jacks on the C-E test box.

dan barren a	/
Date	Technician

SAN ONOFRE NUCLEAR GENERATING STATION UNITS 2&3

INSTRUMENT AND TEST PROCEDURE S023-II-3.2 REVISION 0 PAGE 198

#### 5.0 PROCEDURE

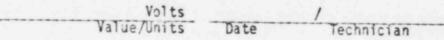
6.25.8 On channel 'B' bistable control panel, rotate the bistable selector switch to position number 6.

Date Technician

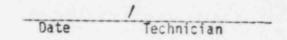
5.25.9 Rotate the meter input selector switch to the "TRIP SP" position.

Date Technician

6.26.10 Record the value indicated on the bistable control panel digital indicator.



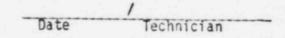
5.25.11 Rotate the meter input selector switch to the "INPUT" position.



6.25.12 In the "Bistable Test" section of L151 place the toggle switch in the "OPEN" position. The LED should extinguish.

Date / Technician

6.26.13 Adjust the "HIGH COARSE" and the "HIGH FINE" potentiometers in the "Bistable Test" section of L151 until the digital indicator at the bistable control panel reads approximately .1 VDC on the trip side of the value recorded in step 6.26.10.



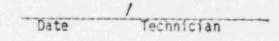
5.26.14 In the "Bistable Test" section of L151, place the toggle switch in the "CLOSED" position. The LED should energize.

Date Technician

SAN ONOFRE NUCLEAR GENERATING STATION UNITS 2&3

#### 5.0 PROCEDURE

6.25.15 Adjust the "LOW COARSE" and "LOW FINE" potentiometers in the "Bistable Test" section of L151 until the digital indicator on the bistable control panel reads 4.00 +.1 VDC.



6.26.15 Recor

Record the adjusted voltage.

Volts / Value/Units Date Technician

- 5.26.17 Energize the C-E test box and ensure the following switches are in the correct positions.
  - .1 "L1" and "L2" stop lamps toggle switches are in the "ON" position.

Date	Technician
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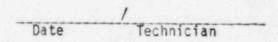
.2 "L3", "L4", "L5", "L6" stop lamps toggle switches are in the "OFF" position.

Date / Technician

.3 "START LAMPS" toggle switch is in the "1/1" position.

Date Technician

.4 Start "Timer Modes" switch is in the step down position.



.5 Stop "Timer Modes" switch is in the step up position.

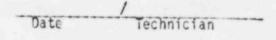
Date Technician

SAN ONOFRE NUCLEAR GENERATING STATION UNITS 2&3

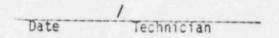
INSTRUMENT AND TEST PROCEDURE S023-II-3.2 REVISION 0 PAGE 200

#### 6.0 PROCEDURE

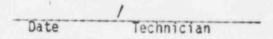
6.25.18 Adjust the input simulator box potentiometer in channel 'A' corresponding to bistable number 6 until the bistable is tripped.



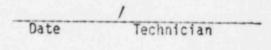
6.25.19 Ensure the toggle switch in the "Bistable Test" section of L151 is in the "CLOSED" position.



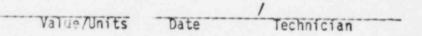
5.26.20 Ensure the C-E test box timer is reset and the bistable is reset in channel 'B'.



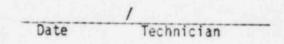
6.26.21 After the test equipment has stabilized, place the "Bistable Test" section toggle switch on L151 in the "OPEN" position. The timer should start.



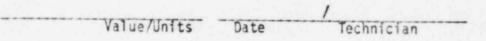
5.25.22 Record the response time.



- 6.25.23 Adjust the input simulator box potentiometer in channel 'A' corresponding to bistable number 6 until the bistable input is returned to the value adjusted for in step 6.1.1.
- 5.25.24 Reset bistable number 5 in channel A.



6.26.25 Repeat steps 6.26.18 through 6.26.24 substituting channel 'C' in place of channel 'A'.

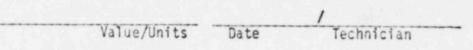


SAN ONOF MUCLEAR GENERATING STATION INSTRUMEN UNITS 283 REVISION

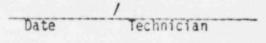
INSTRUMENT AND TEST PROCEDURE SO23-II-3.2 REVISION 0 PAGE 201

#### 6.9 ADCEDURE

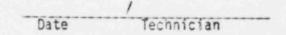
6.25.26 Repeat steps 5.25.18 through 5.25.21 substituting channel 'D' in place of channel 'A'.



5.25.27 Reset all bistables.

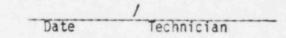


6.25.23 Record the largest response time value of steps 5.26.22, 6.25.25, 5.25.25 in the "Data Collection Table".

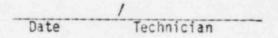


6.26.29 In bay 5 of cabinet A (LO34), move the optical pickup setup to terminals 43 and 45 on terminal strip 55. This monitors contacts on the solid state relay SSRIA. (CCAS)

6.26.30 In bay 5 of cabinet B (L035), move the optical pickup setup to terminals 43 and 45 on terminal strip 55. This monitors contacts on the solid state relay SSRIB. (CCAS)



6.26.31 Adjust the input simulator box potentiometer in channel 'A' corresponding to bistable number 5 until the bistable is tripped.



6.26.32 Ensure the toggle switch in the "Bistable Test" section of L151 is in the "CLOSE" position.

Date / Technician

SAN ONOFRE NUCLEAR GENERATING STATION INSTRUMENT AND TEST PROCEDURE S023-II-3.2 UNITS 2&3 REVISION 0 PAGE 202

6.0 PROCEDURE

6.25.33 Ensure the C-E test box timer and the channel 'B' bistable are both reset.

Date Technician

6.26.34 Place the "Bistable Test" section toggle switch on L151 in the "OPEN" position. The timer should start.

/ Date Technician

6.25.35 Record the response time.

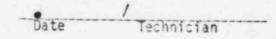
Volts / Value/Units Date Technician

6.25.35 Adjust the input simulator box potentiometer in channel 'A' corresponding to bistable number 6 until the bistable input is returned to the value adjusted for in step 6.1.1.

5.26.37 Reset bistable number 6 in channel 'A'.

Date / Technician

6.25.38 Repeat steps 6.25.31 through 5.26.37 substituting channel 'C' in place of channel 'A'.



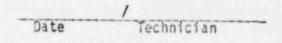
5.26.39 Repeat steps 6.26.31 through 6.25.37 substituting channel 'D' in place of channel 'A'.

Date / Technician

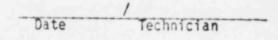
SAN ONOFRE NUCLEAR GENERATING STATION INSTRUMENT AND TEST PROCEDURE S023-11-3.2 UNITS 2%3

#### 6.0 PROCEDURE

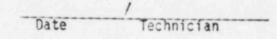
6.25.40 Disconnect the "Bistable Test" leads and replace the input simulator leads on the terminals they were removed from in step 6.26.1.



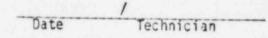
6.26.41 Reset all bistables.



6.26.42 Record the largest response time value of steps 6.26.35, 6.25.38, 5.25.39 in the "Data Collection Table".



- 5.27 Low SG-1 Level to RTSG Response Time
  - NOTE: The following section measures the response time from the simulation of a trip signal into the Foxboro cabinet (using the PPS Response Time Test panel L151) to the time when the rotary relays trip. The C-E test box will be used as the response time measuring device.
  - 6.27.1 Ensure the temporary LED's are installed across the rotary relay contacts per steps 6.19.1 through 5.19.3.



6.27.2 Remove the PPS input simulator box leads from terminals 24 and 25 on TB-1 of L125.

Date Technician

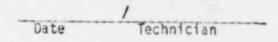
Connect the "Bistable Test" leads of L151 to terminals 6.27.3 24 and 25 on TB-1 of L125.

/ Date Technician

SAN ONOFRE NUCLEAR GENERATING STATION INSTRUMENT AND TEST PROCEDURE S023-II-3.2 UNITS 2%3 PAGE 204

#### 6.0 PROCEDURE

6.27.4 On the bistable control panel being tested, rotate the bistable selector switch to position number 7.



6.27.5 Rotate the meter input selector switch to the "TRIP SP" position.

6.27.5 Record the value indicated on the bistable control panel digital indicator.

Volts / Value/Units Date Technician

6.27.7 Rotate the meter input selector switch to the "INPUT" position.

5.27.8 In the "Bistable Test" section of L151 place the toggle switch in the "OPEN" position. The LED should extinguish.

6.27.9 Adjust the "HIGH COARSE" and the "HIGH FINE" potentiometers in the "Bistable Test" section of L151 until the digital indicator at the bistable control panel reads 3.50 VDC +.1 VDC.

Date ./ Technician

6.27.10 In the "Bistable Test" section of L151, place the toggle switch in the "CLOSE" position. The LED should energize.

/ Technician Date

SAN UNOFRE NUCLEAR GENERATING STATION UNITS 2&3

INSTRUMENT AND TEST PROCEDURE S023-II-3.2 REVISION 0 PAGE 205

#### 6.0 PROCEDURE

6.27.11 Adjust the "LOW COARSE" and "LOW FINE" potentiometers in the "Bistable Test" section of L151 until the digital indicator on the bistable control panel reads approximately .1 VDC on the tripped side of the value recorded in step 5.27.6.

6.27.12 Record the adjusted voltage.

Volts		/
Value/Units	Date	Technician

6.27.13 Connect the optical end of a C-E test box pickup cable to the "Bistable Test" section LED of L151.

6.27.14 Connect the other end of this pickup cable to the "LED 1" jacks in the "Start Lamps" section of the C-E test box.

6.27.15 Connect the optical end of four pickup cables to the temporary LED's installed in steps 5.19.1 through 5.19.3.

- 6.27.16 Connect the other end of these four pickup cables to the "L1", "L2", "L3" and "L4" jacks in the "STOP LAMPS" section of the C-E test box.
- 5.27.17 Energize the C-E test box and ensure the following switches are in the correct positions.
  - .1 "L1", "L2", "L3", "L4" stop lamps toggle switches are in the "ON" position.

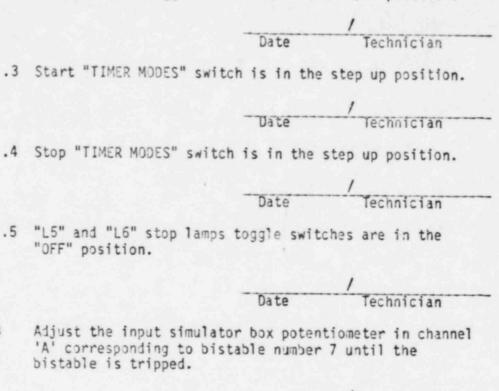
Date / Technician

SAN ONOFRE NUCLEAR GENERATING STATION INSTRUMENT AND TEST PROCEDURE S023-II-3.2 UNITS 2&3 REVISION 0 PAGE 205

6.0 PROCEDURE

6.27.18

6.27.17.2 "START LAMPS" toggle switch is in the "1/1" position.



Date Technician

6.27.19 Ensure the toggle switch in the "Bistable Test" section of L151 is in the "OPEN" position.

Date Technician

6.27.20 Ensure the C-E test box timer is reset.

Date Technician

6.27.21 After the test equipment has stabilized, place the "Bistable Test" section toggle switch on L151 in the "CLOSED" position. The timer should start.

Date Technician

SAN ONOFRE NUCLEAR GENERATING STATION INSTRUMENT AND TEST PROCEDURE S023-II-3.2 UNITS 2&3 PAGE 207

#### 6.0 PROCEDURE

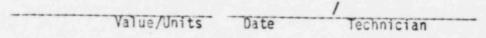
6.21.22 Record the response time.

Value/Units Date Technician

- 6.27.23 Adjust the input simulator box potentiometer in channel 'A' corresponding to bistable number 7 until the bistable input is returned to the value adjusted for in step 6.1.1.
- 6.27.24 Reset bistable number 7 in channel A.

Date Technician

6.27.25 Repeat steps 6.27.18 through 6.27.24 substituting channel 'C' in place of channel 'A'.



5.27.25 Repeat steps 5.27.18 through 5.27.24 substituting channel 'D' in place of channel 'A'.

Value/Units Date Technician

6.27.27 Disconnect the "Bistable Test" leads and replace the input simulator leads on the terminals they were removed from in step 5.27.1

Technician Date

- NOTE: This step may be omitted if section 5.28 is to be performed next.
- 6.27.28 Reset all bistables.

Date Technician

SAN ONOFRE NUCLEAR GENERATING STATION INST UNITS 2&3 REVI

INSTRUMENT AND TEST PROCEDURE S023-11-3.2 REVISION 0 PAGE 203

#### 6.0 PROCEDURE

6.27.29 Record the largest response time value of steps 6.27.22, 6.27.25, 6.27.26 in the Data Collection Table.

Date Technician

- 6.28 Low SG-1 Level to ESFAS Response Time
  - NOTE: The following section measures the response time from the simulation of a trip signal into the Foxboro cabinet (using the PPS Response Time Test panel L151) to the time when the solid state relays trip. The C-E test box will be used as the response time measuring device.
  - 6.28.1 Remove the input simulator box leads from terminals 24 and 25 on TB-1 of L125. If not already connected.

Date Technician

6.28.2 Connect the "Bistable Test" leads of L151 to terminals 24 and 25 on TB-1 of L125, if not already removed.

6.28.3 In bay 6 of cabinet A (LO34), connect an LED jumper cable in series with a six VDC power supply across terminals 37 and 39 on terminal strip TB55. This monitors contacts on the solid state relay SSRIA. (EFAS-1)

Date / Technician

6.28.4 In bay 5 of cabinet B (LO35), connect an LED jumper cable in series with a six volt DC power supply across terminals 37 and 39 on terminal strip TB55. This monitors contacts on the solid state relay SSRIB. (EFAS-1)

Date / Technician

SAN ONOFRE NUCLEAR GENERATING STATION INSTRUMEN UNITS 283 REVISION

INSTRUMENT AND TEST PROCEDURE S023-II-3.2 REVISION 0 PAGE 209

#### 6.0 PROCEDURE

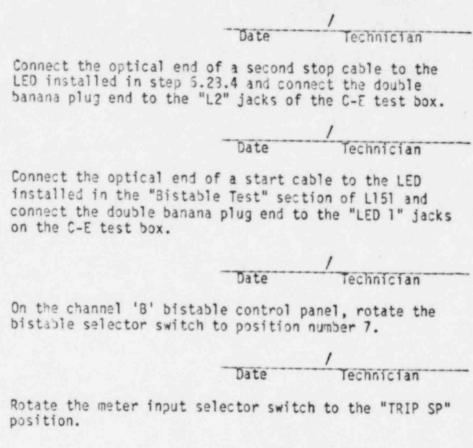
6.28.6

6.23.7

6.28.8

6.28.9

5.23.5 Connect the optical end of a stop cable to the LED installed in step 6.28.3 and connect the double banana plug end to the "Ll" jacks of the C-E test box.



Date Technician

6.28.10 Record the value indicated on the bistable control panel digital indicator.

Volts		1
Value/Units	Date	Techn cian

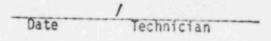
6.23.11 Rotate the meter input selector switch to the "INPUT" position.

Date Technician

SAN ONOFRE NUCLEAR GENERATING STATION INSTRUMENT AND TEST PROCEDURE S023-11-3.2 UNITS 243

# 5.0 PROCEDURE

In the "Bistable Test" section of L151, place the toggle 6.23.12 switch in the "OPEN" position. The LED should extinguish.



Adjust the "HIGH COARSE" and the "HIGH FINE" 6.28.13 potentiometers in the "Bistable Test" section of L151 until the digital indicator on the bistable control panel reads 3.50 VDC +.1 VDC.

Date Technician

In the "Bistable Test" section of L151, place the toggle 6.28.14 switch in the "CLOSED" position. The LED should energize.

Adjust the "LOW COARSE" and "LOW FINE" potentiometers in 6.28.15 the "Bistable Test" section of L151 until the digital indicator on the bistable control panel reads approximately .1 VDC on the tripped side of the value recorded in step 6.28.10.

6.23.16 Record the adjusted voitage.

/ Technician Volts Value/Units Date

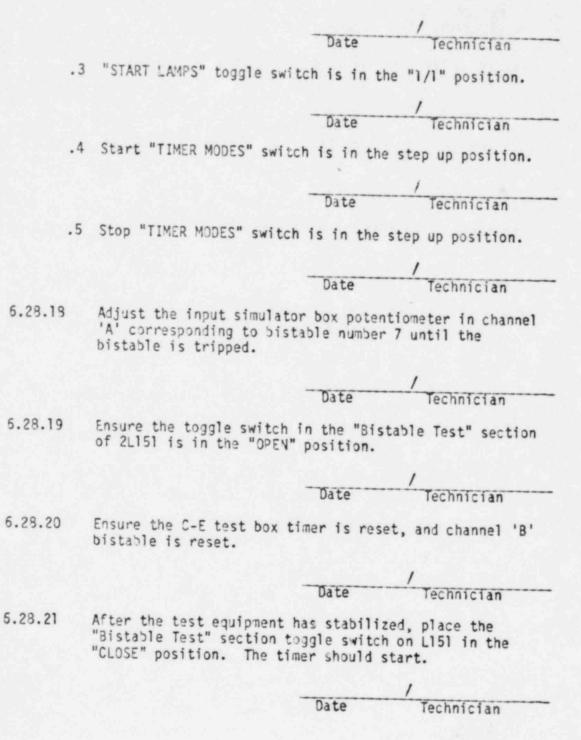
- 6.23.17 Energize the C-E test box and ensure the following switches are in the correct positions.
  - .1 "L1" and "L2" stop lamps toggle switches are in the "ON" position.

Technician Date

SAN ONOFRE NUCLEAR GENERATING STATION INSTRUMENT AND TEST PROCEDURE S023-11-3.2 REVISION 0 PAGE 211

# 6.0 PROCEDURE

6.28.17.2 "L3", "L4", "L5" and "L6" stop lamps toggle switches are in the "OFF" position.



SAN ONOFRE NUCLEAR GENERATING STATION UNITS 283

INSTRUMENT AND TEST PROCEDURE S023-II-3.2 REVISION 0 PAGE 212

6.0 PROCEDURE

6.23.22 Record the response time.

Value/Units Date Technician

- 6.23.23 Adjust the input simulator box potentiometer in channel 'A' corresponding to bistable number 7 until the bistable input is returned to the value adjusted for in step 6.1.1.
- 5.28.24 Reset bistable number 7 in channel A.

Date Technician

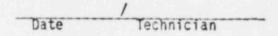
6.28.25 Repeat steps 6.28.18 through 6.28.24 substituting channel 'C' in place of channel 'A'.

Volts / Value/Units Date Technician

6.23.26 Repeat steps 5.23.13 through 6.23.24 substituting channel 'D' in place of channel 'A'.

Volts / Value/Units Date Technician

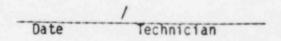
6.23.27 Disconnect the "Bistable Test" leads and replace the input simulator leads on the terminals they were removed from in step 6.28.1



5.28.28 Reset all bistables.

Date / Technician

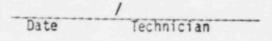
6.28.29 Record the largest response time value of steps 6.28.22, 5.23.25, 6.23.26 in the "Data Collection Table".



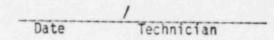
SAN ONOFRE NUCLEAR GENERATING STATION UNITS 2%3

INSTRUMENT AND TEST PROCEDURE S023-II-3.2 REVISION 0 PAGE 213

- 6.29 Low SG-2 Level to RTSG Response Time
  - NOTE: The following section measures the response time from the simulation of a trip signal into the Foxboro cabinet (using the PPS Response Time Test panel L151) to the time when the rotary relays trip. The C-E test box will be used as the response time measuring device.
  - 6.29.1 Ensure the temporary LED's are installed across the rotary relay contacts per steps 5.21.1 through 5.21.3.



6.29.2 Remove the PPS input simulator box leads from terminals 21 and 22 on TB-1 of L125.



6.29.3 Connect the "Bistable Test" leads of L151 to terminals 21 and 22 on TB-1 of L125.

6.29.4 On the bistable control panel being tested, rotate the bistable selector switch to position number 8.

6.29.5 Rotate the meter input selector switch to the "TRIP SP" position.

Date Technician

6.29.6 Record the value indicated on the bistable control panel digital indicator.

Volts / Value/Units Date Technician SAN ONOFRE NUCLEAR GENERATING STATION UNITS 2&3

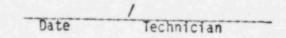
INSTRUMENT AND TEST PROCEDURE S023-II-3.2 REVISION O PAGE 214

#### 5.0 PROCEDURE

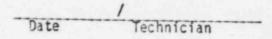
6.29.7 Rotate the meter input selector switch to the "INPUT" position.

Date Technician

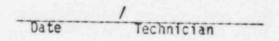
6.29.8 In the "Bistable Test" section of L151 place the toggle switch in the "OPEN" position. The LED should extinguish.



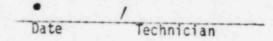
6.29.9 Adjust the "HIGH COARSE" and the "HIGH FINE" potentiometers in the "Bistable Test" section of L151 until the digital indicator at the bistable control panel reads 3.50 VDC +.1 VDC.



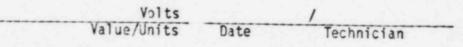
6.29.10 In the "Bistable Test" section of L151, place the toggle switch in the "CLOSE" position. The LED should energize.



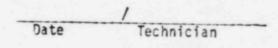
6.29.11 Adjust the "LOW COARSE" and "LOW FINE" potentiometers in the "Bistable Test" section of L151 until the digital indicator on the bistable control panel reads approximately .1 VDC on the tripped side of the value recorded in step 6.29.5.



6.29.12 Record the adjusted voltage.



6.29.13 Connect the optical end of a C-E test box pickup cable to the "Bistable Test" section LED of L151.



SAN ONOFRE NUCLEAR GENERATING STATION UNITS 233

INSTRUMENT AND TEST PROCEDURE S023-II-3.2 REVISION 0 PAGE 215

# 6.0 PROCEDURE

5.23.14 Connect the other end of this pickup cable to the "LED 1" jacks in the "START LAMPS" section of the C-E test box.

Date Technician

6.29.15 Connect the optical end of four pickup cables to the temporary LED's installed in steps 5.19.1 through 6.19.3.

- 6.29.16 Connect the other end of these four pickup cables to the "L1", "L2", "L3", and "L4" jacks in the "STOP LAMPS" section of the C-E test box.
- 5.29.17 Energize the C-F test box and ensure the following switches are in the correct positions.
  - .1 "L1", "L2", "L3", "L4" stop lamps toggle switches are in the "ON" position.

Date Technician

.2 "START LAMPS" toggle switch is in the "1/1" position.

.3 Start "TIMER MODES" switch is in the step up position.

Date Technician

.4 Stop "TIMER MODES" switch is in the step up position.

Date Technician

.5 "L5" and "L6" stop lamps toggle switches are in the "OFF" position.

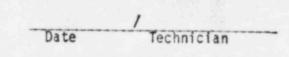
Technician Date

SAN ONOFRE NUCLEAR GENERATING STATION UNITS 283

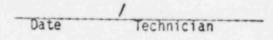
INSTRUMENT AND TEST PROCEDURE S023-II-3.2 REVISION O PAGE 215

# 6.0 PROCEDURE

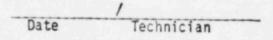
6.29.18 Adjust the input simulator box potentiometer in challel 'A' corresponding to bistable number 8 until the bistable is tripped.



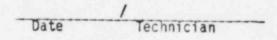
5.29.19 Ensure the toggle switch in the "Bistable Test" section of L151 is in the "OPEN" position.



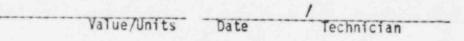
Ensure the C-5 test box timer is reset. 6.29.20



After the test equipment has stabilized, place the 5.29.21 "Bistable Test" section toggle switch on 2L151 in the "CLOSE" position. The timer should start.



6.29.22 Record the response time.



- 6.29.23 Adjust the input simulator box potentiometer in channel 'A' corresponding to bistable number 8 until the bistable input is returned to the value adjusted for in step 6.1.1.
- 6.23.24 Reset bistable number 8 in channel 'A'.

Date / Technician

Repeat steps 5.29.18 through 6.29.24 substituting 6.28.25 channel 'C' in place of channel 'A'.

Value/Units Date Technician

SAN ONOFRE NUCLEAR GENERATING STATION INSTRUMENT AND TEST PROCEDURE S023-11-3.2 UNITS 2&3 REVISION 0 PAGE 217

# 6.0 PROCEDURE

# 6.29.26 Repeat steps 5.29.18 through 5.29.24 substituting channel 'D' in place of channel 'A'.

		1
Value/Units	Date	Technician

5.29.27 Disconnect the "Bistable Test" leads and replace the input simulator leads on the terminals they were removed from in step 6.29.1

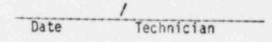


NOTE: This step may be omitted if section 6.30 is to be performed next.

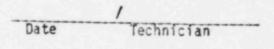
6.29.28 Reset all bistables.

Date / Technician

6.29.29 Record the largest response time value of steps 6.29.22, 6.29.25, 5.23.25 in the Data Collection Table.



- 6.30 Low SG-2 Level to ESFAS Response Time
  - NOTE: The following section measures the response time from the simulation of a trip signal into the Foxboro cabinet (using the PPS Response Time Test panel L151) to the time when the solid state relays trip. The C-E test box will be used as the response time measuring device.
  - 6.30.1 Remove the input simulator box leads from terminals 21 and 22 on TB-1 of 125, if not already removed.



SAN ONOFRE NUCLEAR GENERATING STATION INSTRUMENT AND TEST PROCEDURE S023-11-3.2 UNITS 243

# 6.0 PROCEDURE

6.30.2 Connect the "Bistable Test" leads of L151 to terminals 21 and 22 on TB-1 of L125, if not already connected.

Date / Technician

6.30.3 In bay 6 of cabinet A (LO34), connect an LED jumper cable in series with a six VDC power supply across terminals 40 and 42 on terminal strip TB55. This monitors contacts on the solid state relay SSRIA. (EFAS-2)

Date Technician

In bay 5 of cabinet B (L035), connect an LED jumper 6.30.4 cable in series with a six volt DC power supply across terminals 40 and 42 on terminal strip TB55. This monitors contacts on the solid state relay SSRIB. (EFAS-2)



6.30.5 Connect the optical end of a stop cable to the LED installed in step 5.30.3 and connect the double banana plug end to the "L1" jacks of the C-E test box.

Date / Technician

Connect the optical end of a second stop cable to the 6.30.6 LED installed in step 6.23.4 and connect the double banana plug end to the "L2" jacks of the C-E test box.

Date / Technician

6.30.7 Connect the optical end of a start cable to the LED installed in the "Bistable Test" section of L151 and connect the double banana plug end to the "LED 1" jacks on the C-E test box.

Date / Technician

SAN ONOFRE NUCLEAR GENERATING STATION INSTRUMENT AND TEST PROCEDURE S023-II-3.2 UNITS 2&3 REVISION 0 PAGE 219

### 6.0 PROCEDURE

6.30.8 On the channel 'B' bistable control panel, rotate the bistable selector switch to position number 8.

Date Technician

6.30.9 Rotate the meter input selector switch to the "TPIP SP" position.

Date Technician

6.30.10 Record the value indicated on the bistable control panel digital indicator.

Volts / Value/Units Date Technician

5.30.11 Rotate the meter input selector switch to the "INPUT" position.

6.30.12 In the "Bistable Test" section of L151, place the toggle switch in the "OPEN" position. The LED should extinguish.

6.30.13 Adjust the "HIGH COARSE" and the "HIGH FINE" potentiometers in the "Bistable Test" section of L151 until the digital indicator on the bistable control panel reads 3.50 VDC +.1 VDC.

Date / Technician

6.30.14 In the "Bistable Test" section of L151, place the toggle switch in the "CLOSED" position. The LED should energize.

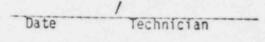
/ Technician Date

SAN ONOFRE NUCLEAR GENERATING STATION UNITS 2&3

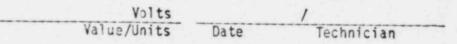
INSTRUMENT AND TEST PROCEDURE S023-II-3.2 REVISION 0 PAGE 220

# 6.0 PROCEDURE

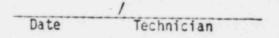
6.30.15 Adjust the "LOW COARSE" and "LOW FINE" potentiometers in the "Bistable Test" section of L151 until the digital indicator on the bistable control panel reads approximately .1 VDC on the tripped side of the value recorded in step 6.30.10.



5.30.15 Record the adjusted voltage.



- 6.30.17 Energize the C-E test box and ensure the following switches are in the correct positions.
  - .1 "L1" and "L2" stop lamps toggle switches are in the "ON" position.



.2 "L3", "L4", "L5" and "L6" stop lamps toggle switches are in the "OFF" position.

Date Technician

.3 "START LAMPS" toggle switch is in the "1/1" position.

Date Technician

.4 Start "TIMER MODES" switch is in the step up position.

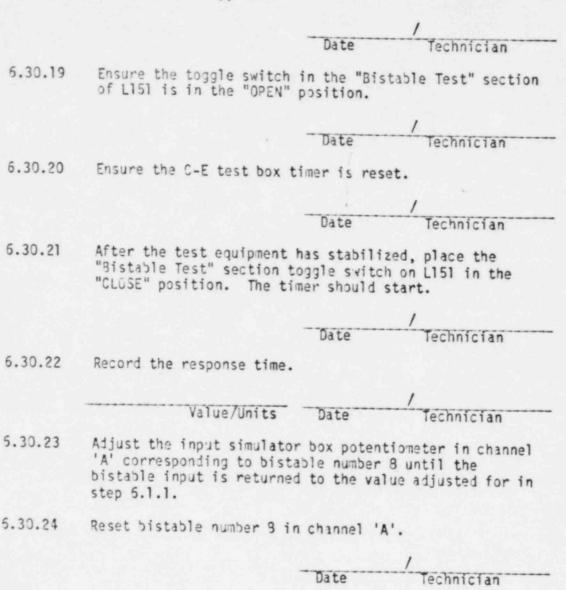
.5 Stop "TIMER MODES" switch is in the step up position.

SAN ONOFRE NUCLEAR GENERATING STATION INSTRUMENT AND TEST PROCEDURE S023-11-3.2 UNITS 283 REVISION O PAGE 221

# 5.0 PROCEDURE

1

6.30.18 Adjust the input simulator box potentiometer in channel 'A' corresponding to bistable number 8 until the bistable is tripped.



Repeat steps 6.30.18 through 5.30.24 substituting 6.30.25 channel 'C' in place of channel 'A'.

Value/Units Date / Technician

SAN ONOFRE NUCLEAR GENERATING STATION INSTRUMENT AND TEST PROCEDURE S023-11-3.2 UNITS 2&3

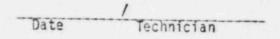
REVISION O PAGE 222

## 5.0 PROCEDURE

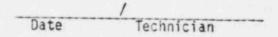
#### 5.30.25 Repeat steps 5.30.18 through 5.30.24 substituting channel 'D' in place of channel 'A'.

Value/Units Date Technician	
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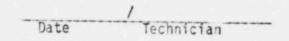
Disconnect the "Bistable Test" leads and replace the 5.30.27 input simulator leads on the terminals they were removed from in step 6.30.1



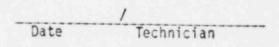
6.30.28 Reset all bistables.



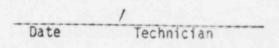
6.30.29 Record the largest response time value of steps 5.30.22, 6.30.25, 5.30.26 in the "Data Collection Table".



- 6.31 Low SG-1 Pressure to RTSG Response Time
  - NOTE: The following section measures the response time from the simulation of a trip signal into the Foxboro cabinet (using the PPS Response Time Test panel L151) to the time when the rotary relays trip. The C-E test box will be used as the response time measuring device.
  - 5.31.1 Ensure the temporary LED's are installed across the rotary relay contacts per steps 5.19.1 through 5.19.3.



6.31.2 Remove the PPS input simulator box leads from terminals 30 and 31 on TB-1 of L125.



SAN ONOFRE NUCLEAR GENERATING STATION INSTRUMENT AND TEST PROCEDURE S023-11-3.2 UNITS 233 REVISION O PAGE 223

# 6.0 PROCEDURE

Connect the "Bistable Test" leads of L151 to terminals 6.31.3 30 and 31 on TB-1 of L125.

Technician On the bistable control panel being tested, rotate the 6.31.4 bistable selector switch to position number 11.

Date

Rotate the meter input selector switch to the "TRIP SP" 6.31.5 position.

> / Technician Date

Record the value indicated on the bistable control panel 6.31.5 digital indicator.

Rotate the meter input selector switch to the "INPUT" 6.31.7 position.

> Technician Date

In the "Bistable Test" section of L151 place the toggle 5.31.8 switch in the "OPEN" position. The LED should extinguish.

> Technician Date

Adjust the "HIGH COARSE" and the "HIGH FINE" 6.31.9 potentiometers in the "Bistable Test" section of L151 until the digital indicator on the bistable control panel reads approximately .1 VDC on the tripped side of the value recorded in step 6.31.6.

SAN ONOFRE NUCLEAR GENERATING STATION INSTRUMENT AND TEST PROCEDURE S023-II-3.2 UNITS 2&3 PAGE 224

#### 6.0 PROCEDURE

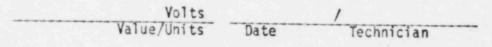
6.31.10 In the "Bistable Test" section of L151, place the toggle switch in the "CLOSE" position. The LED should energize.

6.31.11 Adjust the "LOW COARSE" and "LOW FINE" potentiometers in the "Bistable Test" section of L151 until the digital indicator on the bistable control panel reads 3.70 VDC ±.1 VDC.

Date Technician

Date Technician

6.31.12 Record the adjusted voltage.



5.31.13 Connect the optical end of a C-E test box pickup cable to the "Bistable Test" section LED of L151.

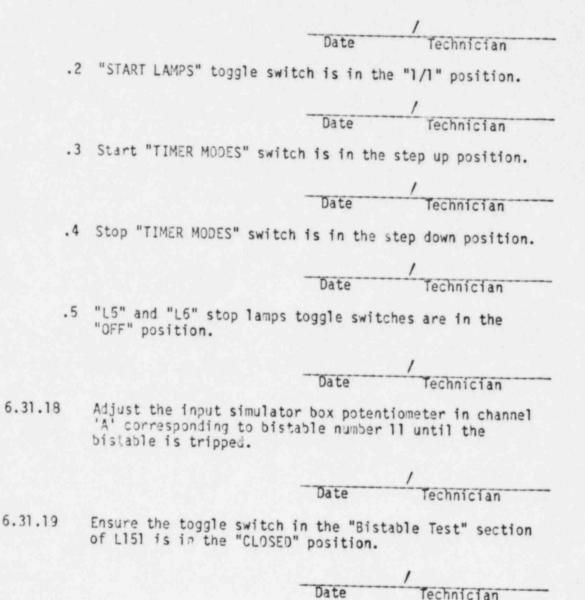
6.31.14 Connect the other end of this pickup cable to the "LED 1" jacks in the "START LAMPS" section of the C-E test box.

6.31.15 Connect the optical end of four pickup cables to the temporary LED's installed in steps 5.19.1 through 5.19.3.

6.31.16 Connect the other end of these four pickup cables to the "L1", "L2", "L3" and "L4" jacks in the "STOP LAMPS" section of the C-E test box. SAN DNOFRE NUCLEAR GENERATING STATION UNITS 283

# 6.0 PROCEDURE

- 6.31.17 Energize the C-E test box and ensure the following switches are in the correct positions.
  - .1 "L1", "L2", "L3", "L4" stop lamps toggle switches are in the "ON" position.



SAN ONOFRE NUCLEAR GENERATING STATION UNITS 2&3

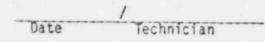
INSTRUMENT AND TEST PROCEDURE S023-II-3.2 REVISION 0 PAGE 225

# 6.0 PROCEDURE

6.31.20 Ensure the C-E test box timer is reset .

Date Technician

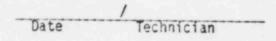
6.31.21 After the test equipment has stabilized, place the "Bistable Test" section toggle switch on L151 in the "OPEN" position. The timer should start.



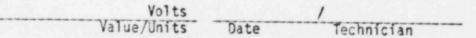
5.31.22 Record the response time.

Vaïue/Units Date Technician

- 6.31.23 Adjust the input simulator box potentiometer in channel 'A' corresponding to bistable number 11 until the bistable input is returned to the value adjusted for in step 6.1.1.
- 6.31.24 Reset bistable number 11 in channel 'A'.



5.31.25 Repeat steps 5.31.18 through 6.31.24 substituting channel 'C' in place of channel 'A'.



5.31.25 Repeat steps 5.31.13 through 5.31.24 substituting channel 'D' in place of channel 'A'.

Volts		/
Value/Units	Date	Technician

6.31.27 Disconnect the "Bistable Test" leads and replace the input simulator leads on the terminals they were removed from in step 6.31.1

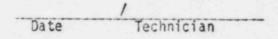
SAN ONOFRE NUCLEAR GENERATING STATION INSTRUMENT AND TEST PROCEDURE S023-11-3.2 UNITS 233

REVISION O PAGE 227

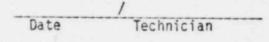
5.0 PROCEDURE

NOTE: This step may be omitted if section 6.32 is to be performed next.

6.31.28 Reset all bistables.



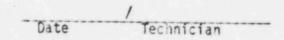
6.31.29 Record the largest response time value of steps 5.31.22, 6.31.25, 5.31.25 in the "Data Collection Table".



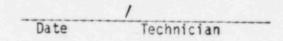
- 6.32 Low SG-1 Pressure to ESFAS Response Time
  - NOTE: The following section measures the response time from the simulation of a trip signal into the Foxboro cabinet (using the PPS Response Time Test panel L151) to the time when the solid state relays trip. The C-E test box will be used as the response time measuring device.
  - 6.32.1 Remove the input simulator box leads from terminals 33 and 31 on TB-1 of L125, if not already removed.

Date fechnician

6.32.2 Connect the "Bistable Test" leads of L151 to terminals 30 and 31 on TB-1 of L125, if not already connected.



In bay 6 of cabinet A (LO34), connect an LED jumper 6.32.3 cable in series with a six VDC power supply across terminals 34 and 36 on terminal strip TB65. This monitors contacts on the solid state relay SSRIA. (MSIS)

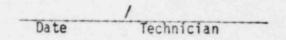


SAN ONOFRE NUCLEAR GENERATING STATION UNITS 283

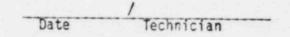
INSTRUMENT AND TEST PROCEDURE S023-II-3.2 REVISION 0 PAGE 223

#### 6.0 PROCEDURE

6.32.4 In bay 5 of cabinet B (L035), connect an LED jumper cable in series with a six volt DC power supply across terminals 34 and 35 on terminal strip TB55. This monitors contacts on the solid state relay SSRIB. (MSIS)



6.32.5 Connect the optical end of a stop cable to the LED installed in step 6.32.3 and connect the double banana plug end to the "Ll" jacks of the C-E test box.



6.32.5 Connect the optical end of a second stop cable to the LED installed in step 5.32.4 and connect the double banana plug end to the "L2" jacks of the C-E test box.

6.32.7 Connect the optical end of a start cable to the LED installed in the "Bistable Test" section of L151 and connect the double banana plug end to the "LED 1" jacks on the C-E test box.

6.32.8 On the channel 'B' bistable control panel, rotate the bistable selector switch to position number 11.

Date Technician

6.32.9 Rotate the meter input selector switch to the "TRIP SP" position.

Date Technician

6.32.10 Record the value indicated on the bistable control panel digital indicator.

Volts / Value/Units Date Technician SAN ONOFRE NUCLEAR GENERATING STATION UNITS 283

INSTRUMENT AND TEST PROCEDURE S023-II-3.2 REVISION 0 PAGE 229

# 6.0 PROCEDURE

2

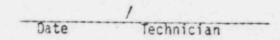
5.32.11 Rotate the meter input selector switch to the "INPUT" position.

Date Technician

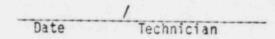
6.32.12 In the "Bistable Test" section of L151, place the toggle switch in the "OPEN" position. The LED should extinguish.

Date / Technician

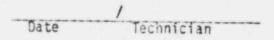
6.32.13 Adjust the "HIGH COARSE" and the "HIGH FINE" potentiometers in the "Bistable Test" section of L151 until the digital indicator on the bistable control panel reads approximately .1 VDC on the tripped side of the value recorded in step 6.32.6.



5.32.14 In the "Bistable Test" section of L151, place the toggle switch in the "CLOSED" position. The LED should energize.



6.32.15 Adjust the "LOW COARSE" and "LOW FINE" potentiometers in the "Bistable Test" section of L151 until the digital indicator on the bistable control panel reads 3.70 VDC +.1 VDC.



6.32.15 Record the adjusted voltage.

Volts		/
Value/Units	Date	Technician

SAN ONOFRE NUCLEAR GENERATING STATION INSTRUMENT AND TEST PROCEDURE S023-11-3.2 UNITS 283

# 6.0 PROCEDURE

- 5.32.17 Energize the C-E test box and ensure the following switches are in the correct positions.
  - .1 "L1" and "L2" stop lamps toggle switches are in the "ON" position.

Date / Date Technician .2 "L3", "L4", "L5" and "L6" stop lamps toggle switches are in the "OFF" position.

Date / Technician

.3 "START LAMPS" toggle switch is in the "1/1" position.

Date Technician

.4 Start "TIMER MODES" switch is in the step DOWN position.

Date / Technician

.5 Stop "TIMER MODES" switch is in the step up position.

Date / Technician

Adjust the input simulator box potentiometer in channel 6.32.18 'A' corresponding to bistable number 11 until the bistable is tripped.

Date / Technician

Ensure the toggle switch in the "Bistable Test" section 6.32.19 of L151 is in the "CLOSED" position.

Date Technician

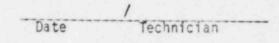
6.32.20 Ensure the C-E test box timer is reset.

Date Technician

SAN ONOFRE NUCLEAR GENERATING STATION INSTRUMENT AND TEST PROCEDURE S023-11-3.2 UNITS 283

# 6.0 PROCEDURE

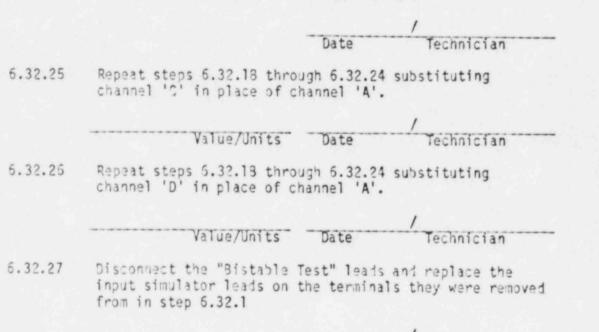
6.32.21 After the test equipment has stabilized, place the "Bistable Test" section toggle switch on L151 in the "OPEN" position. The timer should start.



6.32.22 Record the response time.

		/
Value/Units	Date	Technician

- 6.32.23 Adjust the input simulator box potentiometer in channel 'A' corresponding to bistable number 11 until the bistable input is returned to the value adjusted for in step 6.1.1.
- 5.32.24 Reset bistable number 11 in channel 'A'.



Technician Date

5.32.28 Reset all bistables.

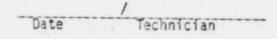
Date Technician SAN ONOFRE NUCLEAR GENERATING STATION INSTRUMENT AND TEST PROCEDURE S023-II-3.2 UNITS 2&3 PAGE 232

# 5.0 PROCEDURE

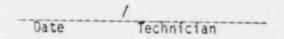
6.32.29 Record the largest response time value of steps 6.32.22, 6.32.25, 6.32.26 in the "Data Collection Table".

Date Technician

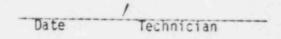
- 6.33 Low SG-2 Pressure to RTSG Response Time
  - NOTE: The following section measures the response time from the simulation of a trip signal into the Foxboro cabinet (using the PPS Response Time Test panel L151) to the time when the rotary relays trip. The C-E test box will be used as the response time measuring device.
  - 5.33.1 Ensure the temporary LED's are installed across the rotary relay contacts per steps 5.19.1 through 5.19.3.



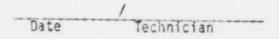
6.33.2 Remove the PPS input simulator box leads from terminals 27 and 23 on TB-1 of L125, if not already removed.



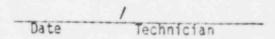
6.33.3 Connect the "Bistable Test" leads of L151 to terminals 27 and 28 on TB-1 of L125, if not already connected.



6.33.4 On the bistable control panel being tested, rotate the bistable selector switch to position number 12.



6.33.5 Rotate the meter input selector switch to the "TRIP SP" position.



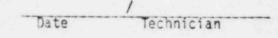
SAN ONOFRE NUCLEAR GENERATING STATION INSTRUMENT AND TEST PROCEDURE S023-11-3.2 UNITS 283

## 5.0 PROCEDURE

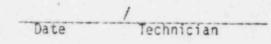
6.33.6 Record the value indicated on the bistable control panel digital indicator.

Volts		/
Value/Units	Date	Technician

6.33.7 Rotate the meter input selector switch to the "INPUT" position.



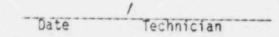
In the "Bistable Test" section of L151 place the toggle 6.33.8 switch in the "OPEN" position. The LED should extinguish.



Adjust the "HIGH COARSE" and the "HIGH FINE" 5.33.9 potentiometers in the "Bistable Test" section of L151 until the digital indicator on the bistable control panel reads approximately .1 VDC on the tripped side of the value recorded in step 6.33.6.



In the "Bistable Test" section of L151, place the toggle switch in the "CLOSE" position. The LED should energize. 5.33.10



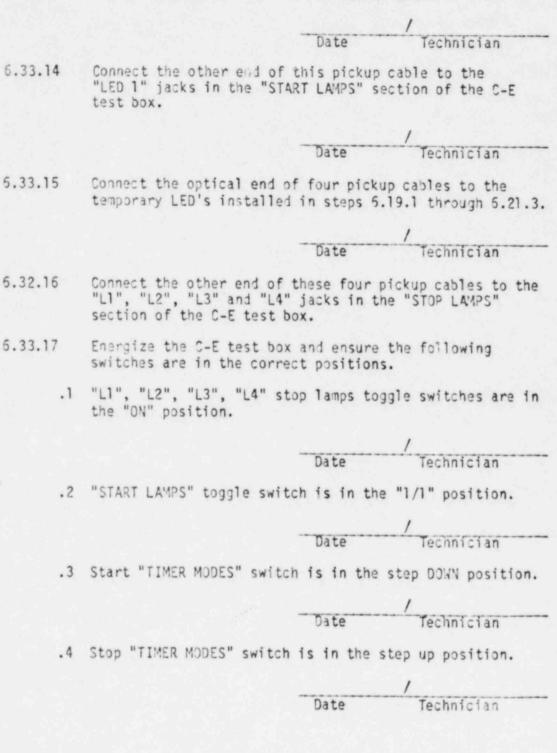
Adjust the "Low Coarse" and "Low Fine" potentiometers in 5.33.11 the "Bistable Test" section of L151 until the digital indicator at the bistable control panel reads 3.70 VDC +.1 VDC.

6.33.12 Record the adjusted voltage.

Volts Value/Units Date Technician SAN ONOFPE NUCLEAR GENERATING STATION INSTRUMENT AND TEST PROCEDURE S023-II-3.2 UNITS 2&3 REVISION 0 PAGE 234

#### 6.0 PROCEDURE

6.33.13 Connect the optical end of a C-E test box pickup cable to the "Bistable Test" section LED of L151.



SAN ONOFRE NUCLEAR GENERATING STATION UNITS 243

INSTRUMENT AND TEST PROCEDURE S023-II-3.2 REVISION 0 PAGE 235

# 6.0 PROCEDURE

6.33.17.5 "L5" and "L6" stop lamps toggle switches are in the "OFF" position.

Date / Technician Adjust the input simulator box potentiometer in channel 6.33.18 'A' corresponding to bistable number 12 until the bistable is tripped. Date / Technician Ensure the toggle switch in the "Bistable Test" section of L151 is in the "CLOSED" position. 6.33.19 Date / Technician 6.33.20 Ensure the C-E test box timer is reset. Date / Date Technician After the test equipment has stabilized, place the 6.33.21 "Bistable Test" section toggle switch on L151 in the "OPEN" position. The timer should start. Date Technician 6.33.22 Record the response time. Volts / Value/Units Date Technician

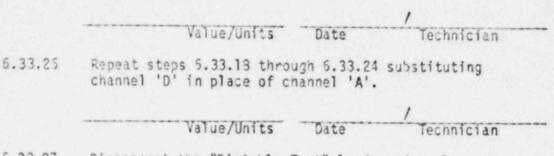
- 5.33.23 Adjust the input simulator box potentiometer in channel 'A' corresponding to bistable number 12 until the bistable input is returned to the value adjusted for in step 5.1.1.
- 6.33.24 Reset bistable number 12 in channel 'A'.

Date / Technician

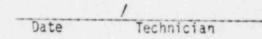
SAN ONOFRE NUCLEAR GENERATING STATION INSTRUMENT AND TEST PROCEDURE \$023-II-3.2 UNITS 2&3 REVISION 0 PAGE 235

# 6.0 PROCEDURE

6.33.25 Repeat steps 5.33.18 through 5.33.24 substituting channel 'C' in place of channel 'A'.



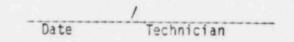
6.33.27 Disconnect the "Bistable Test" leads and replace the input simulator leads on the terminals they were removed from in step 6.32.1



- NOTE: This step may be omitted if section 6.34 is to be performed next.
- 6.33.28 Reset all bistables.

Date Technician

6.33.29 Record the largest response time value of steps 6.33.22, 5.33.25, 5.33.26 in the "Data Collection Table".



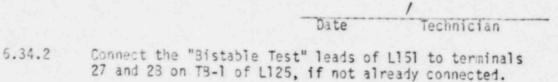
- 6.34 Low SG-2 Level to ESFAS Response Time
  - NOTE: The following section measures the response time from the simulation of a trip signal into the Foxboro cabinet (using the PPS Response Time Test panel L151) to the time when the solid state relays trip. The C-E test box will be used as the response time measuring device.

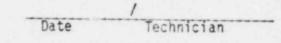
SAN ONOFRE NUCLEAR GENERATING STATION INSTRUMENT AND TEST PROCEDURE S023-11-3.2 UNITS 2\$3

REVISION O PAGE 237

#### 6.0 PROCEDURE

6.34.1 Remove the input simulator box leads from terminals 27 and 28 on TB-1 of L125, if not already removed.

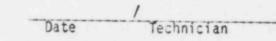




6.34.3 In bay 5 of cabinet A (LO34), connect an LED jumper cable in series with a six VDC power supply across terminals 34 and 36 on terminal strip TB65. This monitors contacts on the solid state relay SSRIA. (MSIS)

Date / Technician

6.34.4 In bay 5 of cabinet B (LO35), connect an LED jumper cable in series with a six volt DC power supply across terminals 34 and 36 on terminal strip TB55. This monitors contacts on the solid state relay SSRIB. (MSIS)



5.34.5 Connect the optical end of a stop cable to the LED installed in step 6.34.3 and connect the double banana plug end to the "Ll" jacks of the C-E test box.

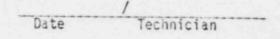
5.34.5 Connect the optical end of a second stop cable to the LED installed in step 5.34.4 and connect the double banana plug end to the "L2" jacks of the C-E test box.

Date / Technician

SAN ONOFRE NUCLEAR GENERATING STATION INSTRUMENT AND TEST PROCEDURE \$023-11-3.2 UNITS 283

# 6.0 PROCEDURE

5.34.7 Connect the optical end of a start cable to the LED installed in the "Bistable Test" section of L151 and connect the double banana plug end to the "LED 1" jacks on the C-E test box.



6.34.8 On the channel 'B' bistable control panel, rotate the bistable selector switch to position number 12.

Date Technician

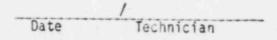
6.34.9 Rotate the meter input selector switch to the "TRIP SP" position.

Record the value indicated on the bistable control panel 6.34.10 digital indicator.

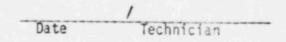
Volts / Value/Units Date Technician

6.34.11 Rotate the meter input selector switch to the "INPUT" position.

5.34.12 In the "Bistable Test" section of L151, place the toggle switch in the "OPEN" position. The LED should extinguish.



6.34.13 Adjust the "HIGH COARSE" and the "HIGH FINE" potentiometers in the "Bistable Test" section of L151 until the digital indicator on the bistable control panel reads approximately .1 VDC on the tripped side of the value recorded in step 5.34.6.

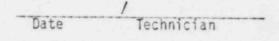


SAN ONOFRE NUCLEAR GENERATING STATION UNITS 283

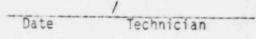
INSTRUMENT AND TEST PROCEDURE \$023-II-3.2 REVISION 0 PAGE 239

# 5.0 PROCEDURE

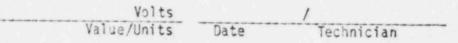
6.34.14 In the "Bistable Test" section of L151, place the toggle switch in the "CLOSED" position. The LED should energize.



6.34.15 Adjust the "LOW COARSE" and "LOW FINE" potentiometers in the "Bistable Test" section of L151 until the digital indicator on the bistable control panel reads 3.70 VDC + .1 VDC.



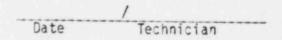
5.34.15 Record the adjusted voltage.



- 6.34.17 Energize the C-E test box and ensure the following switches are in the correct positions.
  - .1 "L1" and "L2" stop lamps toggle switches are in the "ON" position.

Date Technician

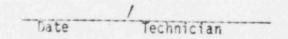
.2 "L3", "L4", "L5" and "L6" stop lamps toggle switches are in the "OFF" position.



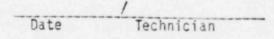
.3 "START LAMPS" toggle switch is in the "1/1" position.

Date Technician

.4 Start "TIMER MODES" switch is in the step DOWN position.



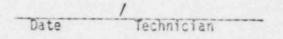
.5 Stop "TIMER MODES" switch is in the step up position.



SAN ONOFRE NUCLEAR GENERATING STATION INSTRUMENT AND TEST PROCEDURE \$023-11-3.2 UNITS 2\$3

### 6.0 PROCEDURE

6.34.18 Adjust the input simulator box potentiometer in channel 'A' corresponding to bistable number 12 until the bistable is tripped.



6.34.19 Ensure the toggle switch in the "Bistable Test" section of L151 is in the "CLOSED" position.

6.34.20 Ensure the C-E test box timer is reset.

/ Technician Date

6.34.21 After the test equipment has stabilized, place the "Bistable Test" section toggle switch on L151 in the "OPEN" position. The timer should start.

> / Technician Date

5.34.22 Record the response time.

> Date Technician Value/Units

- 6.31.23 Adjust the input simulator box potentiometer in channel 'A' corresponding to bistable number 12 until the bistable input is returned to the value adjusted for in step 5.1.1.
- Reset bistable number 12 in channel 'A'. 5.34.24

Technician Date

SAN ONOFRE NUCLEAR GENERATING STATION UNITS 2%3

INSTRUMENT AND TEST PROCEDURE S023-II-3.2 REVISION 0 PAGE 241

## 6.0 PROCEDURE

# 6.34.25 Repeat steps 5.34.18 through 6.34.24 substituting channel 'C' in place of channel 'A'.

				/
		Value/Units	Date	Technician
Repeat	steps	5.34.19 thro	ugh 5,34.2	4 substituting

6.34.25 Repeat steps 5.34.19 through 5.34.24 substituting channel 'D' in place of channel 'B'.

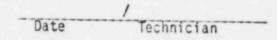
Value/Units	Date	/ Technician

6.34.27 Disconnect the "Bistable Test" leads and replace the input simulator leads on the terminals they were removed from in step 6.34.1

6.34.28 Reset all bistables.

Date Technician

6.34.29 Record the largest response time value of steps 6.34.22, 5.34.25, 5.34.26 in the Data Collection Table.



- 6.35 High Containment Pressure to RTSG Response Time
  - NOTE: The following section measures the response time from the simulation of a trip signal into the Foxboro cabinet (using the PPS Response Time Test panel L151) to the time when the rotary relays trip. The C-E test box will be used as the response time measuring device.
  - 5.35.1 Ensure the temporary LED's are installed across the rotary relay contacts per steps 5.19.1 through 5.19.3.

Technician Date

SAN ONOFRE NUCLEAR GENERATING STATION UNITS 283

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# INSTRUMENT AND TEST PROCEDURE S023-II-3.2 REVISION 0 PAGE 242

#### 6.0 PROCEDURE

6.35.2 Remove the PPS input simulator box leads from terminals 43 and 44 on TB-1 of L125, if not already removed.

Date / Technician

6.35.3 Connect the "Bistable Test" leads of L151 to terminals 43 and 44 on TB-1 of L125, if not already connected.

6.35.4 On the bistable control panel being tested, rotate the bistable selector switch to position number 13.

Date Technician

6.35.5 Rotate the meter input selector switch to the "TRIP SP" position.

6.35.6 Record the value indicated on the bistable control panel digital indicator.

Volts		1
Value/Units	Date	Technician

6.35.7 Rotate the meter input selector switch to the "INPUT" position.

Date Technician

5.35.8 In the "Bistable Test" section of L151 place the toggle switch in the "OPEN" position. The LED should extinguish.

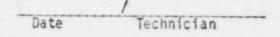
Technician Date

SAN ONOFRE NUCLEAR GENERATING STATION INSTRUMENT AND TEST PROCEDURE SO23-11-3.2 UNITS 283

REVISION O PAGE 243

# 6.0 PROCEDURE

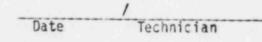
6.35.9 Adjust the "HIGH COARSE" and the "HIGH FINE" potentiometers in the "Bistable Test" section of L151 until the digital indicator at the bistable control panel reads 1.00 VDC + .1 VDC.



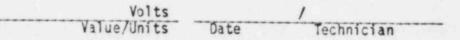
In the "Bistable Test" section of L151, place the toggle 6.35.10 switch in the "CLOSE" position. The LED should energize.

Date / Technician

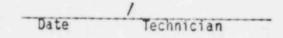
6.35.11 Adjust the "LOW COARSE" and "LOW FINE" potentiometers in the "Bistable Test" section of L151 until the digital indicator on the bistable control panel reads approximately .1 VDC on the tripped side of the value recorded in step 5.35.6.



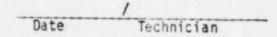
6.35.12 Record the adjusted voltage.



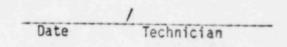
Connect the optical end of a C-E test box pickup cable 6.35.13 to the "Bistable Test" section LED of L151.



6.35.14 Connect the other end of this pickup cable to the "LED 1" jacks in the "START LAMPS" section of the C-E test box.



6.35.15 Connect the optical end of four pickup cables to the temporary LED's installed in steps 5.19.1 through 6.19.3.



SAN ONOFRE NUCLEAR GENERATING STATION INSTRUMENT AND TEST PROCEDURE S023-11-3.2 UNITS 283

## REVISION O PAGE 244

# 5.0 PROCEDURE

- 6.35.16 Connect the other end of these four pickup cables to the "L1", "L2", "L3" and "L4" jacks in the "STOP LAMPS" section of the C-E test box.
- 6.35.17 Energize the C-E test box and ensure the following switches are in the correct positions.
  - .1 "L1", "L2", "L3", "L4" stop lamps toggle switches are in the "ON" position.

Date / Technician

.2 "START LAMPS" toggle switch is in the "1/1" position.

Date Technician

.3 Start "TIMER MODES" switch is in the step up position.

Date Technician

.4 Stop "TIMER MODES" switch is in the step up position.

Date / Technician

.5 "L5" and "L6" stop lamps toggle switches are in the "OFF" position.

Date / Technician

6.35.18 Adjust the input simulator box potentiometer in channel 'A' corresponding to bistable number 13 until the bistable is tripped.

Date / Technician

6.35.19 Ensure the toggle switch in the "Bistable Test" section of L151 is in the "OPEN" position.

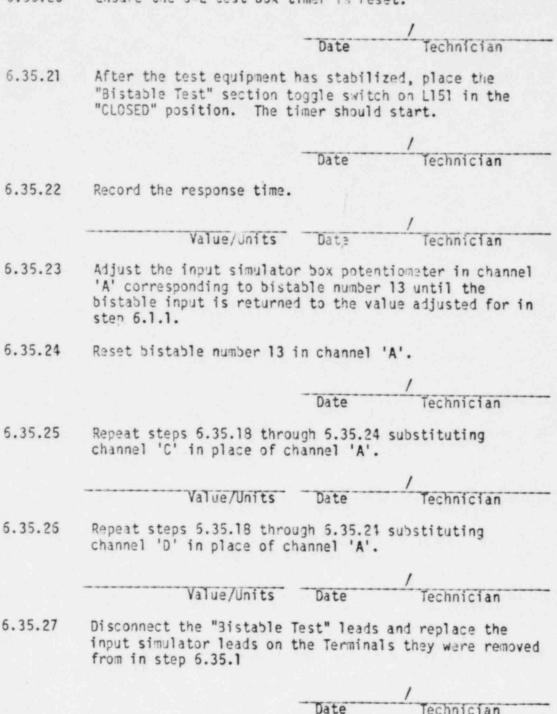
Date Technician

SAN ONOFRE NUCLEAR GENERATING STATION UNITS 2&3

INSTRUMENT AND TEST PROCEDURE S023-II-3.2 REVISION 0 PAGE 245

6.0 PROCEDURE

6.35.20 Ensure the C-E test box timer is reset.



NOTE: This step may be omitted if section 6.36 is to be performed next.

SAN ONOFRE NUCLEAR GENERATING STATION INSTRUMENT AND TEST PROCEDURE SO23-11-3.2 UNITS 2&3

REVISION O PAGE 245

## 6.0 PROCEDURE

6.35.28 Reset all bistables.

Technician Date

Record the largest response time value of steps 6.35.22, 6.35.29 6.35.25, 5.35.25 in the Data Collection Table.

> / Technician Date

6.36 High Containment Pressure to ESFAS Response Time

- NOTE: The following section measures the response time from the simulation of a trip signal into the Foxboro cabinet (using the PPS Response Time Test panel L151) to the time when the solid state or mechanical relays trip. The C-E test box will be used as the response time measuring device.
- Remove the input simulator box leads from terminals 43 6.35.1 and 44 on TB-1 of 1125.

Date / Technician

Connect the "Bistable Test" leads of L151 to terminals 6.35.2 43 and 44 on TB-1 of L125.

Date / Technician

In bay 6 of cabinet A (L034), connect an LED jumper 6.36.3 cable in series with a six VDC power supply across terminals 28 and 30 on terminal strip TB65. This monitors contacts on the mechanical relay MRIA. (CIAS)

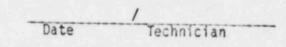
	1
Date	Technician

SAN ONOFRE NUCLEAR GENERATING STATION UNITS 243

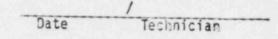
INSTRUMENT AND TEST PROCEDURE S023-11-3.2 REVISION 0 PAGE 247

### 6.0 PROCEDURE

6.35.4 In bay 5 of cabinet B (L035), connect an LED jumper cable in series with a six volt DC power supply across terminals 23 and 30 on terminal strip TB55. This monitors contacts on the mechanical relay MRID. (CIAS)



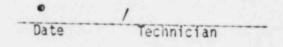
6.36.5 Connect the optical end of a stop cable to the LED installed in step 5.35.3 and connect the double banana plug end to the "Ll" jacks of the C-E test box.



6.35.6 Connect the optical end of a second stop cable to the LED installed in step 5.35.4 and connect the double banana plug end to the "L2" jacks of the C-E test box.

6.35.7 Connect the optical end of a start cable to the LED in the "Bistable Test" section of L151 and connect the double banana plug end to the "LED 1" jacks on the C-E test box.

6.35.8 On the channel 'B' bistable control panel, rotate the bistable selector switch to position number 18.



6.35.9 Rotate the meter input selector switch to the "TRIP SP" position.

6.36.10 Record the value indicated on the bistable control panel digital indicator.



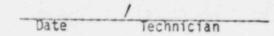
SAN ONOFRE NUCLEAR GENERATING STATION INSTRUMENT AND TEST PROCEDURE S023-11-3.2 UNITS 2&3 REVISION 0 PAGE 248

#### 6.0 PROLEDURE

5.36.11 Rotate the meter input selector switch to the "INPUT" position.

Date / Technician

6.36.12 In the "Bistable Test" section of L151, place the toggle switch in the "OPEN" position. The LED should extinguish.

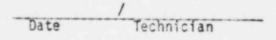


6.36.13 Adjust the "HIGH COARSE" and the "HIGH FINE" potentiometers in the "Bistable Test" section of L151 until the digital indicator at the bistable control panel reads 1.00 VDC + .1 VDC.

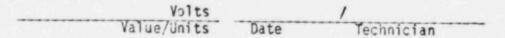
6.35.14 In the "Bistable Test" section of L151, place the toggle switch in the "CLOSED" position. The LED should energize.

Date / Technician

6.35.15 Adjust the "LOW COARSE" and "LOW FINE" potentiometers in the "Bistable Test" section of L151 until the digital indicator on the bistable control panel reads approximately .1 VDC on the tripped side of the value recorded in step 6.35.10.



5.35.16 Record the adjusted voltage.

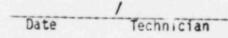


SAN ONOFRE NUCLEAR GENERATING STATION INSTRUMENT AND TEST PROCEDURE S023-11-3.2 REVISION 0 PAGE 249

### 6.0 PROCEDURE

- 6.36.17 Energize the C-E test box and ensure the following switches are in the correct positions.
  - .1 "L1" and "L2" stop lamps toggle switches are in the "ON" position.

.2 "L3", "L4", "L5" and "L6" stop lamps toggle switches are in the "OFF" position.



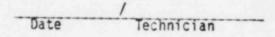
.3 "START LAMPS" toggle switch is in the "1/1" position.

.4 Start "TIMER MODES" switch is in the step up position.

.5 Stop "TIMER MODES" switch is in the step up position.

Date Technician

6.35.18 Adjust the input simulator box potentiometer in channel 'A' corresponding to bistable number 18 until the bistable is tripped.



6.35.19 Ensure the toggle switch in the "Bistable Test" section of L151 is in the "OPEN" position.

Date Technician

6.36.20 Ensure the C-E test box timer is reset.

/ Technician Date

SAN ONOFRE NUCLEAR GENERATING STATION UNITS 2&3

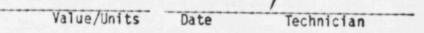
## INSTRUMENT AND TEST PROCEDURE S023-II-3.2 REVISION 0 PAGE 250

#### 6.0 PROCEDURE

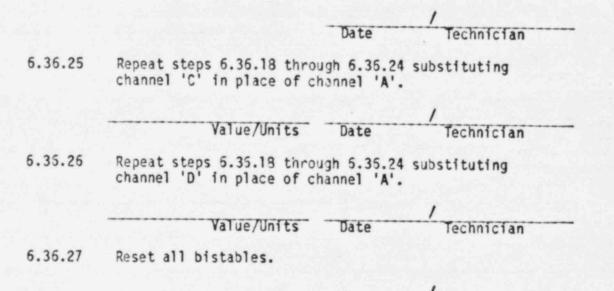
6.36.21 After the test equipment has stabilized, place the "Bistable Test" section toggle switch on L151 in the "CLOSE" position. The timer should start.

Date Technician

5.36.22 Record the response time.



- 6.35.23 Adjust the input simulator box potentiometer in channel 'A' corresponding to bistable number 18 until the bistable input is returned to the value adjusted for in step 5.1.1.
- 6.36.24 Reset bistable number 18 in channel 'A'.



Date Technician

6.36.28 Record the largest response time value of steps 6.36.22, 6.36.25, 5.35.26 in the "Data Collection Table."

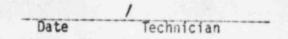
Technician Date

SAN ONOFRE NUCLEAR GENERATING STATION UNITS 2&3

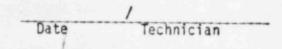
INSTRUMENT AND TEST PROCEDURE S023-II-3.2 REVISION 0 PAGE 251

# 6.0 PROCEDURE

6.35.29 In bay 5 of cabinet A (L034), move the optical pickup setup to terminals 43 and 45 on terminal strip 65. This monitors contacts on the solid state relay SSRIA. (CCAS)



6.36.30 In bay 5 of cabinet B (L035), move the optical pickup setup to terminals 43 and 45 on terminal strip 55. This monitors contacts on the solid state relay SSRIB. (CCAS)



- 6.36.31 Adjust the input simulator box potentiometer in channel 'A' corresponding to bistable number 18 until the bistable is tripped.
- 6.36.32 Ensure the toggle switch in the "Bistable Test" section of L151 is in the "OPEN" position.

6.36.33 Ensure the C-E test box timer and the channel 'B' bistable are both reset.

6.36.34 Place the "Bistable Test" section toggle switch on L151 in the "CLOSE" position. The timer should start.

6.36.35 Record the response time.

Date

6.36.36 Adjust the input simulator box potentiometer in channel 'A' corresponding to bistable number 18 until the bistable input is returned to the value adjusted for in step 6.1.1.

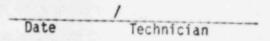
SAN ONOFRE NUCLEAR GENERATING STATION INSTRUMENT AND TEST PROCEDURE SO23-11-3.2 UNITS 283 REVISION O

5.0 PROCEDURE

5.36.37 Reset bistable number 18 in channel 'A'.

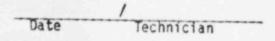
Date / Technician

Repeat steps 6.35.31 through 6.36.37 substituting 6.36.38 channel 'C' in place of channel 'A'.

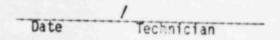


6.36.39 Repeat steps 6.35.31 through 6.35.37 substituting channel 'D' in place of channel 'A'.

6.35.40 Reset all bistables.



Record the largest response time value of steps 6.35.35, 6.36.41 5.35.39, 6.35.39 in the "Data Collection Table".



In bay 6 of cabinet A (LO34), move the optical pickup 6.36.42 setup to terminals 25 and 27 on terminal strip 55. This monitors contacts on the mechanical relay MRIA. (SIAS)

In bay 5 of cabinet B (LO35), move the optical pickup 6.26.43 setup to terminals 25 and 27 on terminal strip 55. This monitors contacts on the mechanical relay MRIB. (SIAS)

Adjust the input simulator box potentiometer in channel 6.36.44 'A' corresponding to bistable number 18 until the bistable is tripped.

PAGE 252

UNITS 283

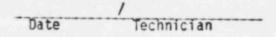
SAN ONOFRE NUCLEAR GENERATING STATION INSTRUMENT AND TEST PROCEDURE SO23-II-3.2 REVISION O PAGE 253

#### 6.0 PROCEDURE

6.35.45 Ensure the toggle switch in the "Bistable Test" section of L151 is in the "OPEN" position.

Date Technician

6.36.46 Ensure the C-E test box timer and the channel 'B' bistable are both reset.



6.36.47 Place the "Bistable Test" section toggle switch on L151 in the "CLOSE position. The timer should start.

> / Technician Date

6.36.48 Record the response time.

Volts		1
Value/Units	Date	Technician

- Adjust the input simulator box potentiometer in channel 6.36.4 'A' corresponding to bistable number 18 until the bistable input is returned to the value adjusted for in step 6.1.1.
- 5.36.50 Reset bistable number 18 in channel 'A'.

Date / Technician

6.35.51 Repeat steps 6.35.44 through 6.36.50 substituting channel 'C' in place of channel 'A'.

> Date Technician Value/Units

Repeat steps 5.36.44 through 5.36.50 substituting 6.36.52 channel 'D' in place of channel 'A'.

> Technician Value/Units Date

SAN ONOFRE NUCLEAR GENERATING STATION INSTRUMENT AND TEST PROCEDURE S023-11-3.2 UNITS 283

## 6.0 PROCEDURE

Disconnect the "Bistable Test" leads and replace the 5.35.53 input simulator leads on the terminals they were removed from in step 6.36.1

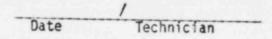
Date Technician

6.36.54 Reset all bistables.

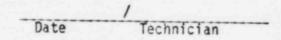
.

Date / Technician

Record the largest response time value of steps 6.36.35, 6.35.55 5.35.39, 5.35.39 in the "Data Collection Table".



- 6.37 Low SG-1 Flow to RTSG Response Time
  - NOTE: The following section measures the response time from the simulation of a trip signal into the Foxboro cabinet (using the PPS Response Time Test panel L151) to the time when the rotary relays trip. The C-E test box will be used as the response time measuring device.
  - Ensure the temporary LED's are installed across the 6.37.1 rotary relay contacts per steps 5.19.1 through 5.19.3.



6.37.2 Remove the PPS input simulator box leads from terminals 13 and 14 on TB-3 of L125.

Date / Technician

5.37.3 Connect the "Bistable Test" leads of L151 to terminals 13 and 14 on TB-3 of L125.

Date Technician

SAN ONOFRE NUCLEAR GENERATING STATION INSTRUMENT AND TEST PROCEDURE S023-11-3.2 UNITS 2\$3

REVISION O PAGE 255

# 6.0 PROCEDURE

On the bistable control panel being tested, rotate the 6.37.4 bistable selector switch to position number 15.

> Technician Date

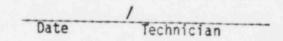
6.37.5 Rotate the meter input selector switch to the "TRIP SP" position.

Date / Technician

Record the value indicated on the bistable control panel 5.37.6 digital indicator.

Volts / Value/Units Date Technician

Rotate the meter input selector switch to the "INPUT" 6.37.7 position.



In the "Bistable Test" section of L151 place the toggle 5.37.8 switch in the "OPEN" position. The LED should extinguish.

Date Technician

6.37.9 Adjust the "HIGH COARSE" and the "HIGH FINE" potentiometers in the "Bistable Test" section of L151 until the digital indicator at the bistable control panel reads approximately .1 VDC on the tripped side of the value recorded in step 6.37.6.

Date Technician

In the "Bistable Test" section of L151, place the toggle switch in the "CLOSE" position. The LED should energize. 5.37.10

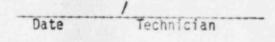
Date / Technician

SAN ONOFRE NUCLEAR GENERATING STATION INSTRUMENT AND TEST PROCEDURE S023-11-3.2 UNITS 243

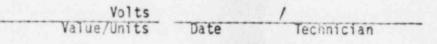
REVISION O PAGE 255

#### 6.0 PROCEDURE

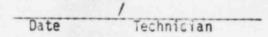
6.37.11 Adjust the "LOW COARSE" and "LOW FINE" potentiometers in the "Bistable Test" section of L151 until the digital indicator at the bistable control panel reads 5.00 VDC + .1 VDC.



5.37.12 Record the adjusted voltage.



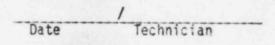
Connect the optical end of a C-E test box pickup cable 6.37.13 to the "Bistable Test" section LED of L151.



6.37.14 Connect the other end of this pickup cable to the "LED 1" jacks in the "START LAMPS" section of the C-E test box.

Technician Date

Connect the optical end of four pickup cables to the 6.37.15 temporary LED's installed in steps 5.19.1 through 5.19.3.



- Connect the other end of these four pickup cables to the 6.37.16 "L1", "L2", "L3" and "L4" jacks in the "STOP LAMPS" section of the C-E test box.
- 6.37.17 Energize the C-E test box and ensure the following switches are in the correct positions.
  - .1 "L1", "L2", "L3", "L4" stop lamps toggle switches are in the "ON" position.

							1	1		
			Date				Technician			
.2	"START	LAMPS"	toggle	switch	is	in th	ne "1	/1"	position.	

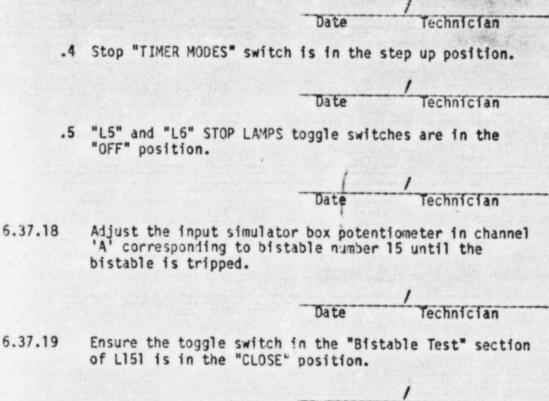
Date

SAN ONOFRE NUCLEAR GENERATING STATION IN UNITS 2&3

INSTRUMENT AND TEST PROCEDURE S023-II-3.2 REVISION O PAGE 257

6.0 PROCEDURE

6.37.17.3 Start "TIMER MODES" switch is in the step down position.



Technician Date

6.37.20 Ensure the C-E test box timer is reset.

Date / Technician

6.37.21 After the test equipment has stabilized, place the "Bistable Test" section toggle switch on L151 in the "OPEN" position. The timer should start.

Technician Date

6.37.22 Record the response time.

Value/Units Date

Technician

SAN ONOFRE NUCLEAR GENERATING STATION UNITS 2&3

INSTRUMENT AND TEST PROCEDURE S023-II-3.2 REVISION 0 PAGE 258

Date / Technician

## 5.0 PROCEDURE

- 6.37.23 Adjust the input simulator box potentiometer in channel 'A' corresponding to bistable number 15 until the bistable input is returned to the value adjusted for in step 6.1.1.
- 6.37.24 Reset bistable number 15 in channel A.
- 6.37.25 Repeat steps 6.36.18 through 6.36.24 substituting channel 'C' in place of channel 'A'.

Value/Units Date / Technician

6.37.26 Repeat steps 5.37.18 through 5.37.24 substituting channel 'D' in place of channel 'A'.

	/
Date	Technician
	Date

6.37.27 Disconnect the "Bistable Test" leads and replace the input simulator leads on the terminals they were removed from in step 6.37.1

Date Technician

6.37.28 Reset all bistables.

Date Technician

6.37.29 Record the largest response time value of steps 6.37.22, 5.37.25, 5.37.26 in the "Data Collection Table".

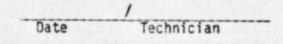
Technician Date

SAN ONOFRE NUCLEAR GENERATING STATION UNITS 283

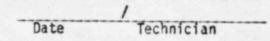
INSTRUMENT AND TEST PROCEDURE S023-II-3.2 REVISION 0 PAGE 259

#### 6.0 PROCEDURE

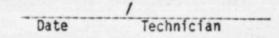
- 6.38 Low SG-2 Flow to RTSG Response Time
  - NOTE: The following section measures the response time from the simulation of a trip signal into the Foxboro cabinet (using the PPS Response Time Test panel L151) to the time when the rotary relays trip. The C-E test box will be used as the response time measuring device.
  - 6.38.1 Ensure the temporary LED's are installed across the rotary relay contacts per steps 6.19.1 through 6.19.3



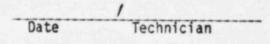
6.38.2 Remove the PPS input simulator box leads from terminals 19 and 20 on TB-3 of L125.



5.38.3 Connect the "Bistable Test" leads of L151 to terminals 19 and 20 on TB-3 of L125.



6.38.4 On the bistable control panel being tested, rotate the bistable selector switch to position number 16.



6.38.5 Rotate the meter input selector switch to the "TRIP SP" position.

6.38.5 Record the value indicated on the bistable control panel digital indicator.

Volts		1
Value/Units	Date	Technician

6.38.7 Rotate the meter input selector switch to the "INPUT" position.

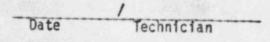
	1
Date	Technician

SAN ONOFRE NUCLEAR GENERATING STATION UNITS 233

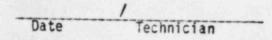
INSTRUMENT AND TEST PROCEDURE S023-II-3.2 REVISION 0 PAGE 250

### 6.0 PROCLDURE

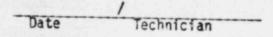
6.33.8 In the "Bistable Test" section of L151, place the toggle switch in the "OPEN" position. The LED should extinguish.



6.38.9 Adjust the "HIGH COARSE" and the "HIGH FINE" potentiometers in the "Bistable Test" section of L151 until the digital indicator on the bistable control panel reads approximately .1 VDC on the tripped side of the value recorded in step 6.38.6.

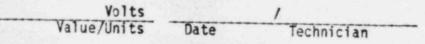


6.38.10 In the "Bistable Test" section of L151, place the toggle switch in the "CLOSE" position. The LED should energize.

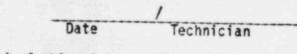


6.38.11 Adjust the "LOW COARSE" and "LOW FINE" potentiometers in the "Bistable Test" section of L151 until the digital indicator on the bistable control panel reads 5.00 VDC + .1 VDC.

6.38.12 Record the adjusted voltage.



6.38.13 Connect the optical end of a C-E test box pickup cable to the "Bistable Test" section LED of L151.



6.38.14 Connect the other end of this pickup cable to the "LED 1" jacks in the "START LAMPS" section of the C-E test box.

Technician Date

SAN ONOFRE NUCLEAR GENERATING STATION INSTRUMENT AND TEST PROCEDURE S023-II-3.2 UNITS 2&3 REVISION 0 PAGE 251

#### 6.0 PROCEDURE

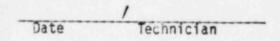
6.33.15 Connect the optical end of four pickup cables to the temporary LED's installed in steps 6.19.1 through 6.19.3.

Date Technician

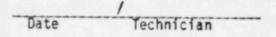
- 6.38.16 Connect the other end of these four pickup cables to the "L1", "L2", "L3" and "L4" jacks in the "STOP LAMPS" section of the C-E test box.
- 6.38.17 Energize the C-E test box and ensure the following switches are in the correct positions.
  - .1 "L1", "L2", "L3", "L4" stop lamps toggle switches are in the "ON" position.

Date Technician

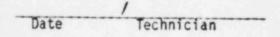
.2 "START LAMPS" toggle switch is in the "1/1" position.



.3 Start "TIMER MODES" switch is in the step down position.



.4 Stop "TIMER MODES" switch is in the step up position.



.5 "L5" and "L6" stop lamps toggle switches are in the "OFF" position.

Date Technician

6.38.18 Adjust the input simulator box potentiometer in channel 'B' corresponding to bistable number 16 until the

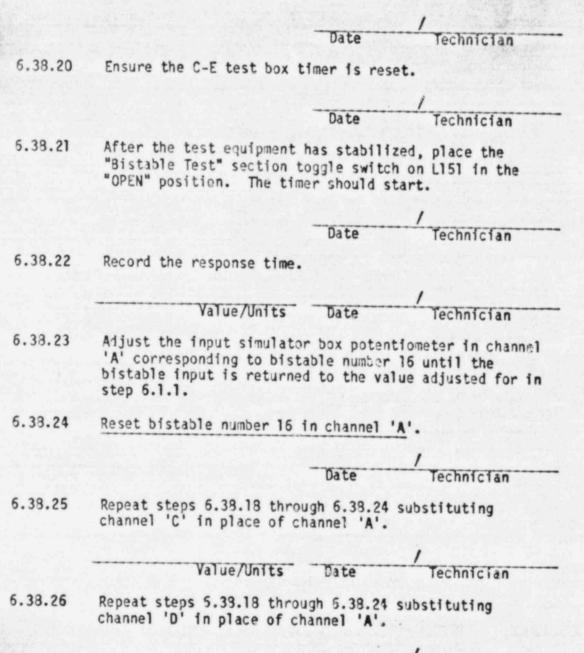
'B' corresponding to bistable number 16 until the bistable is tripped.

Technician Date

SAN ONOFRE NUCLEAR GENERATING STATION INSTRUMENT AND TEST PROCEDURE S023-II-3.2 UNITS 283 REVISION O PAGE 262

### 5.0 PROCEDURE

6.38.19 Ensure the toggle switch in the "Bistable Test" section of L151 is in the "CLOSED" position.



Date Value/Units Technician

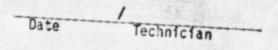
SAN ONOFRE NUCLEAR GENERATING STATION INSTRUMENT AND TEST PROCEDURE SO23-11-3.2

PAGE 263

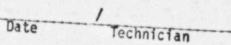
6.0 PROCEDURE

6.39.3

6.33.27 Disconnect the "Bistable Test" leads and replace the input simulator leads on the terminals they were removed



6.38.28 Reset all bistables.

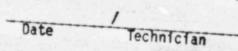


6.38.29 Record the largest response time value of steps 6.38.22, 5.33.25, 5.33.26 in the "Data Collection Table".

- Date Technician 6.39 High-High Containment Pressure to ESFAS Response Time
  - NOTE: The following section measures the response time from the simulation of a trip signal into the Foxboro cabinet (using the PPS Response Time Test panel L151) to the time when the solid state relays trip. The C-E test box will be used as the response time measuring device.
  - 6.39.1 Remove the input simulator box leads from terminals 45
  - Date Technician Connect the "Bistable Test" leads of L151 to terminals 6.39.2

Date / Technician

In bay 6 of cabinet A (LO34), connect an LED jumper cable in series with a six VDC power supply across terminals 45 and 48 on terminal strip TB55. This monitors contacts on the solid state relay SSRIA (CCAS)



SAN ONOFRE NUCLEAR GENERATING STATION UNITS 243

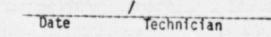
INSTRUMENT AND TEST PROCEDURE S023-II-3.2 REVISION 0 PAGE 254

# 6.0 PROCEDURE

6.39.4 In bay 5 of cabinet B (2L035), connect an LED jumper cable in series with a six volt DC power supply across terminals 45 and 48 on terminal strip TB55. This monitors contacts on the mechanical relay SSRIB. (CSAS)

6.39.5 Connect the optical end of a stop cable to the LED installed in step 6.39.3 and connect the double banana plug end to the "Ll" jacks of the C-E test box.

Date



Technician

6.39.6 Connect the optical end of a second stop cable to the LED installed in step 5.39.4 and connect the double banana plug end to the "L2" jacks of the C-E test box.

6.39.7 Connect the optical end of a start cable to the LED installed in the "Bistable Test" section of Li51 and connect the double banana plug end to the "LED 1" jacks on the C-E test box.

6.39.8 On the channel 'B' bistable control panel, rotate the bistable selector switch to position number 19.

6.39.9 Rotate the meter input selector switch to the "TRIP SP" position.

6.39.10 Record the value indicated on the bistable control panel digital indicator.

Value/Units	Date	Technician

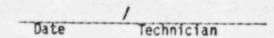
SAN ONOFRE NUCLEAR GENERATING STATION INSTRUMENT AND TEST PROCEDURE SO23-II-3.2 UNITS 2&3 REVISION 0 PAGE 265

## 6.0 PROCEDURE

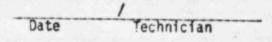
6.39.11 Rotate the meter input selector switch to the "INPUT" position.

Date Technician

5.39.12 In the "Bistable Test" section of L151, place the toggle switch in the "OPEN" position. The LED should extinguish.

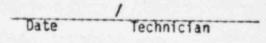


6.39.13 Adjust the "HIGH COARSE" and the "HIGH FINE" potentiometers in the "Bistable Test" section of [15] until the digital indicator at the bistable control panel reads 1.00 VDC + .1 VDC.

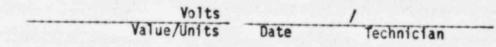


6.39.14 In the "Bistable Test" section of L151, place the toggle switch in the "CLOSED" position. The LED should energize.

6.39.15 Adjust the "LOW COARSE" and "LOW FINE" potentiometers in the "Bistable Test" section of L151 until the digital indicator on the bistable control panel reads approximately .1 VDC on the tripped side of the value recorded in step 6.39.10.



6.39.15 Record the adjusted voltage.



6.39.17 Energize the C-E test box and ensure the following switches are in the correct positions.

SAN ONOFRE NUCLEAR GENERATING STATION INSTRUMENT AND TEST PROCEDURE S023-II-3.2 UNITS 2&3 REVISION O PAGE 255

### 6.0 PROCEDURE

6.39.17.1 "L1" and "L2" stop lamps toggle switches are in the "ON" position.

Date Technician

.2 "L3", "L4", "L5" and "L6" stop lamps toggle switches are in the "OFF" position.

Date Technician

.3 "START LAMPS" toggle switch is in the "1/1" position.

Date Technician

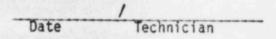
.4 Start "TIMER MODES" switch is in the step up position.

Date Technician

.5 Stop "TIMER MODES" switch is in the step up position.

Date Technician

6.39.18 Adjust the input simulator box potentiometer in channel 'A' corresponding to bistable number 19 until the bistable is tripped.



6.39.19 Ensure the toggle switch in the "Bistable Test" section of L151 is in the "OPEN" position.

Date Technician

6.39.20 Ensure the C-E test box timer is reset.

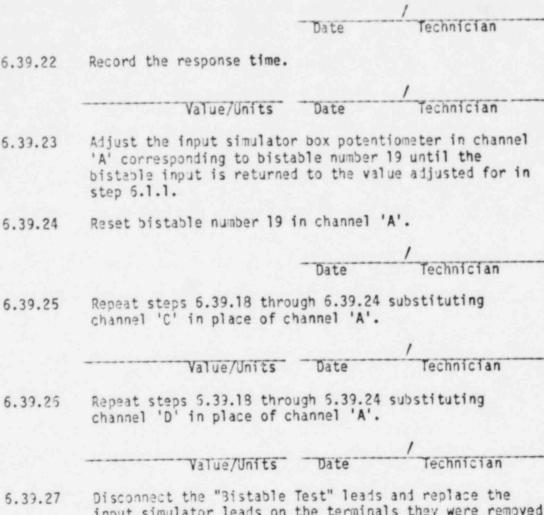
Technician Date

SAN ONOFRE NUCLEAR GENERATING STATION UNITS 243

INSTRUMENT AND TEST PROCEDURE S023-II-3.2 PAGE 257 REVISION O

#### 6.0 PROCEDURE

After the test equipment has stabilized, place the 6.39.21 "Bistable Test" section toggle switch on L151 in the "CLOSE" position. The timer should start.



5.39.27 input simulator leads on the terminals they were removed from in step 6.39.1.

Technician Date

6.39.28 Reset all bistables.

Technician Date

SAN ONOFRE NUCLEAR GENERATING STATION INSTRUMENT AND TEST PROCEDURE S023-II-3.2 UNITS 2%3 REVISION 0 PAGE 253

### 6.0 PROCEDURE

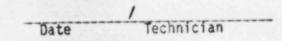
5.39.29 Record the largest response time value of steps 6.39.22, 6.39.25, 6.39.26 in the "Data Collection Table."

Date Technician

- 6.40 Low RWT Level to ESFAS Response Time
  - NOTE: The following section measures the response time from the simulation of a trip signal into the Foxboro cabinet (using the PPS Response Time Test panel L151) to the time when the solid state relays trip. The C-E test box will be used as the response time measuring device.
  - 6.40.1 Remove the input simulator box leads from terminals 35 and 37 on TB-1 of L125.

Date Technician

6.40.2 Connect the "Bistable Test" leads of L151 to terminals 36 and 37 on T3-1 of L125.



6.40.3 In bay 6 of cabinet A (LO34), connect an LED jumper cable in series with a six VDC power supply across terminals 31 and 33 on terminal strip TB65. This monitors contacts on the solid state relay SSRIA. (RAS)

Date Technician

6.40.4 In bay 5 of cabinet B (L035), connect an LED jumper cable in series with a six volt DC power supply across terminals 31 and 33 on terminal strip TB55. This monitors contacts on the solid state relay SSRIB. (RAS)

Date Technician

6.40.5 Connect the optical end of a stop cable to the LED installed in step 5.40.3 and connect the double banana plug end to the "Ll" jacks of the C-E test box.

Date Technician

SAN ONOFRE NUCLEAR GENERATING STATION INSTRUMENT AND TEST PROCEDURE S023-11-3.2 UNITS 283

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REVISION O PAGE 259

#### 6.0 PROCEDURE

Connect the optical end of a second stop cable to the 6.40.6 LED installed in step 5.40.4 and connect the double banana plug end to the "L2" jacks of the C-E test box.

> Technician Date

Connect the optical end of a start cable to the LED 6.40.7 installed in the "Bistable Test" section of L151 and connect the double banana plug end to the "LED 1" jacks on the C-E test box.

Date Technician

6.40.3 On the channel 'B' bistable control panel, rotate the bistable selector switch to position number 20.

Rotate the meter input selector switch to the "TRIP SP" 5.40.9 position.

Date Technician

5.40.10 Record the value indicated on the bistable control panel digital indicator.

Volts		1
Value/Units	Date	Technician

6.40.11 Rotate the meter input selector switch to the "INPUT" position.

Date / Technician

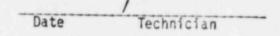
In the "Bistable Test" section of L151, place the toggle 6.40.12 switch in the "OPEN" position. The LED should extinguish.

> Date Technician

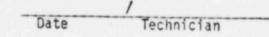
SAN ONDERE NUCLEAR GENERATING STATION INSTRUMENT AND TEST PROCEDURE S023-II-3.2 UNITS 283

### 5.0 PROCEDURE

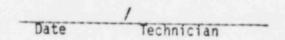
Adjust the "HIGH COARSE" and the "HIGH FINE" 6.40.13 potentiometers in the "Bistable Test" section of L151 until the digital indicator at the bistable control panel reads 2.50 VDC + .1 VDC.



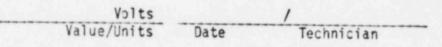
In the "Bistable Test" section of L151, place the toggle 6.40.14 switch in the "CLOSED" position. The LED should energize.



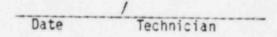
Adjust the "LOW COARSE" and "LOW FINE" potentiometers in 5.40.15 the "Bistable Test" section of L151 until the digital indicator on the bistable control panel reads approximately .1 VDC on the tripped side of the value recorded in step 6.40.10.



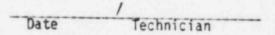
6.40.16 Record the adjusted voltage.



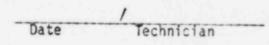
- 6.40.17 Energize the C-E test box and ensure the following switches are in the correct positions.
  - "L1" and "L2" stop lamps toggle switches are in the "C!" .1 position.



.2 "L3", "L4", "L5" and "L6" stop lamps toggle switches are in the "OFF" position.



.3 "START LAMPS" toggle switch is in the "1/1" position.

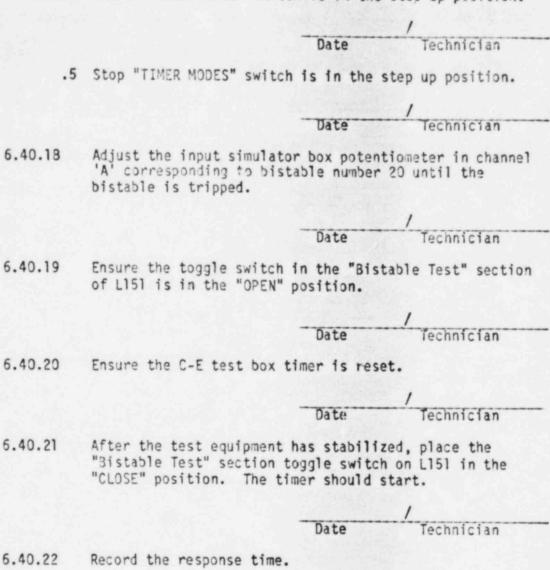


SAN ONOFRE NUCLEAR GENERATING STATION UNITS 2&3

INSTRUMENT AND TEST PROCEDURE S023-II-3.2 REVISION 0 PAGE 271

5.0 PROCEDURE

6.40.17.4 Start "TIMER MODES" switch is in the step up position.



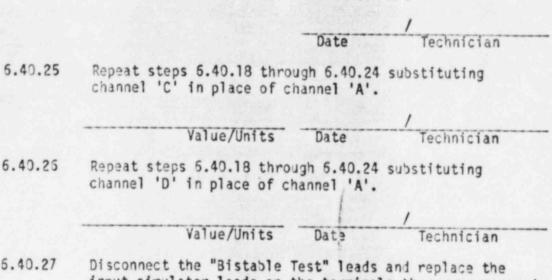
Value/Units Date Technician

6.40.23 Adjust the input simulator box potentiometer in channel 'A' corresponding to bistable number 20 until the bistable input is returned to the value adjusted for in step 6.1.1. SAN ONOFRE NUCLEAR GENERATING STATION INSTRUMENT UNITS 2&3 REVISION O

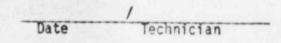
INSTRUMENT AND TEST PROCEDURE SO23-II-3.2 REVISION O PAGE 272

### 6.0 PROCEDURE

6.40.24 Reset bistable number 20 in channel 'A'.



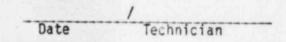
5.40.27 Disconnect the "Bistable Test" leads and replace the input simulator leads on the terminals they were removed from in step 6.40.1



6.40.23 Reset all bistables.

Date / Technician

6.40.29 Record the largest response time value of steps 6.40.22, 6.40.25, 5.40.25 in the "Data Collection Table".



- 5.41 High SG-1 Differential Pressure to ESFAS Response Time
  - NOTE: The following section measures the response time from the simulation of a trip signal into the Foxboro cabinet (using the PPS Response Time Test panel L151) to the time when the solid state relays trip. The C-E test box will be used as the response time measuring device.

SAN ONOFRE NUCLEAR GENERATING STATION UNITS 2&3

INSTRUMENT AND TEST PROCEDURE SO23-II-3.2 REVISION O PAGE 273

#### 6.0 PROCEDURE

6.41.1 Remove the input simulator box leads from terminals 30 and 31 on TB-1 of L125.

Date Technician

6.41.2 Connect the "Bistable Test" leads of L151 to terminals 30 and 31 on TB-1 of L125.

Date Technician

6.41.3 In bay 6 of cabinet A (LO34), connect an LED jumper cable in series with a six VDC power supply across terminals 37 and 39 on terminal strip TB65. This monitors contacts on the solid state relay SSRIA. (EFAS-1)

Date / Technician

6.41.4 In bay 5 of cabinet B (L035), connect an LED jumper cable in series with a six volt DC power supply across terminals 37 and 39 on terminal strip TB55. This monitors contacts on the solid state relay SSRIB. (EFAS-1)

Date / Technician

6.41.5 Connect the optical end of a stop cable to the LED installed in step 6.39.3 and connect the double banana plug end to the "Ll" jacks of the C-E test box.

Date / Technician

6.41.6 Connect the optical end of a second stop cable to the LED installed in step 5.40.4 and connect the double banana plug end to the "L2" jacks of the C-E test box.

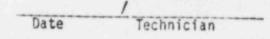
Date / Technician

SAN ONOFRE NUCLEAR GENERATING STATION INSTRUMENT AND TEST PROCEDURE S023-11-3.2 UNITS 283

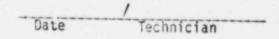
REVISION O PAGE 274

#### 6.0 PROCEDURE

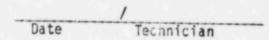
Connect the optical end of a start cable to the LED 5.41.7 installed in the "Bistable Test" section of L151 and connect the double banana plug end to the "LED 1" jacks on the C-E test box.



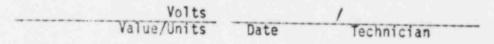
On channel 'B' bistable control panel, rotate the 5.41.8 bistable selector switch to position number 21.



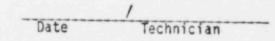
Rotate the meter input selector switch to the "TRIP SP" 6.41.9 position.



Record the value indicated on the bistable control panel 6.41.10 digital indicator.

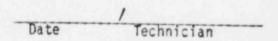


Rotate the meter input selector switch to the "INPUT" 6.41.11 position.



In the "Bistable Test" section of L151, place the toggle 6.41.12 switch in the "OPEN" position. The LED should extinguish.

Adjust the "HIGH COARSE" and the "HIGH FINE" 6.41.13 potentiometers in the "Bistable Test" section of L151 until the digital indicator at the bistable control panel reads 3.70 VDC + .1 VDC.

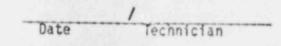


SAN ONOFRE NUCLEAR GENERATING STATION UNITS 243

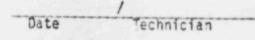
INSTRUMENT AND TEST PROCEDURE SO23-II-3.2 REVISION 0 PAGE 275

#### 6.0 PROCEDURE

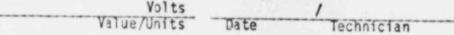
6.41.14 In the "Bistable Test" section of L151, place the toggle switch in the "CLOSED" position. The LED should energize.



6.41.15 Adjust the "LOW COARSE" and "LOW FINE" potentiometers in the "Bistable Test" section of L151 until the digital indicator on the bistable control panel reads approximately the sum of: .1 VDC plus the input value of position 22 plus the value recorded in step 6.41.10.

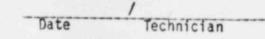


6.41.15 Record the adjusted voltage.

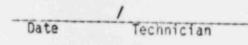


6.41.17 Energize the C-E test box and ensure the following switches are in the correct positions.

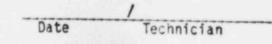
.1 "L1" and "L2" stop lamps toggle switches are in the "ON" position.



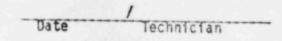
.2 "L3", "L4", "L5" and "L6" stop lamps toggle switches are in the "OFF" position.



.3 "START LAMPS" toggle switch is in the "1/1" position.



.4 Start "TIMER MODES" switch is in the step up position.



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SAN ONOFRE NUCLEAR GENERATING STATION INSTRUMENT AND TEST PROCEDURE S023-11-3.2 UNITS 2&3

# 5.0 PROCEDURE

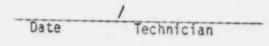
5.41.17.5 Stop "TIMER MODES" switch is in the step up position.

	/
Date	Technician

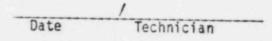
Adjust the input simulator box potentiometer in channel 6.41.13 'A' corresponding to bistable number 21 until the bistable is tripped.

Date Technician

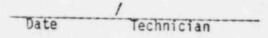
Ensure the toggle switch in the "Bistable Test" section 5.41.19 of L151 is in the "OPEN" position.



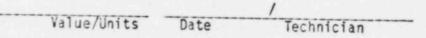
Ensure the C-E test box timer is reset. 6.41.20



After the test equipment has stabilized, place the 6.41.21 "Bistable Test" section toggle switch on L151 in the "CLOSE" position. The timer should start.



6.41.22 Record the response time.



- Adjust the input simulator box potentiometer in channel 5.41.23 'A' corresponding to bistable number 21 until the bistable input is returned to the value adjusted for in step 6.1.1.
- 5.41.24 Reset bistable number 21 in channel 'A'.

/ Technician Date

UNITS 283

6.41.26

SAN ONOFRE NUCLEAR GENERATING STATION INSTRUMENT AND TEST PROCEDURE S023-11-3.2 REVISION O PAGE 277

#### 6.0 PROCEDURE

6.41.25 Repeat steps 5.41.18 through 5.41.24 substituting channel 'C' in place of channel 'A'.

				1
	Value/Uni	ts	Date	Technician
Repeat steps	5.41.13	through	5.41.24	substituting

channel 'D' in place of channel 'A'.

Disconnect the "Bistable Test" leads and replace the 6.41.27 input simulator leads on the terminals they were removed from in step 6.41.1

6.41.28 Reset all bistables.

Date Technician

Record the largest response time value of steps 5.41.22, 6.41.29 6.41.25, 6.41.25 in the "Data Collection Table".

- 6.42 High SG-2 Differential Pressure to ESFAS Response Time
  - NOTE: The following section measures the response time from the simulation of a trip signal into the Foxboro cabinet (using the PPS Response Time Test panel L151) to the time when the solid state relays trip. The C-E test box will be used as the response time measuring device.
  - 6.42.1 Remove the input simulator box leads from terminals 27 and 28 on TB-1 of L125.

Date Technician SAN ONOFRE NUCLEAR GENERATING STATION UNITS 243

INSTRUMENT AND TEST PROCEDURE S023-II-3.2 REVISION 0 PAGE 278

## 6.0 PROCEDURE

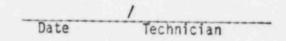
5.42.2 Connect the "Bistable Test" leads of L151 to terminals 27 and 28 on TB-1 of L125.

Date Technician

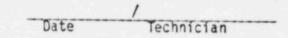
6.42.3 In bay 6 of cabinet A (L034), connect an LED jumper cable in series with a six VDC power supply across terminals 40 and 42 on terminal strip TB65. This monitors contacts on the solid state relay SSRIA. (EFAS-2)

Date Technician

5.42.4 In bay 5 of cabinet B (L035), connect an LED jumper cable in series with a six volt DC power supply across terminals 40 and 42 on terminal strip TB55. This monitors contacts on the solid state relay SSRIB. (EFAS-2)

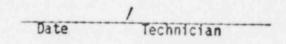


6.42.5 Connect the optical end of a stop cable to the LED installed in step 6.42.3 and connect the double banana plug end to the "Ll" jacks of the C-E test box.



6.42.6 Connect the optical end of a second stop cable to the LED installed in step 5.42.4 and connect the double banana plug end to the "L2" jacks of the C-E test box.

6.42.7 Connect the optical end of a start cable to the LED in the "Bistable Test" section of L151 and connect the double banana plug end to the "LED 1" jacks on the C-E test box.



SAN ONOFRE NUCLEAR GENERATING STATION INSTRUMENT AND TEST PROCEDURE S023-11-3.2 UNITS 283

5.42.9

REVISION O PAGE 279

### 6.0 PROCEDURE

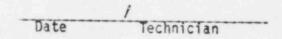
On channel 'B' bistable control panel, rotate the 6.42.8 bistable selector switch to position number 22.

> Date Technician Rotate the meter input selector switch to the "TRIP SP" position. Date Technician

Record the value indicated on the bistable control panel 6.42.10 digital indicator.

Volts / Value/Units Date Technician

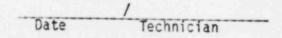
Rotate the meter input selector switch to the "INPUT" 6.42.11 position.



In the "Bistable Test" section of L151, place the toggle switch in the "OPEN" position. The LED should 5.42.12 extinguish.

Date / Technician

6.42.13 Adjust the "HIGH COARSE" and the "HIGH FINE" potentiometers in the "Bistable Test" section of L151 until the digital indicator at the bistable control panel reads 3.70 VDC + .1 VDC.



6.42.14 In the "Bistable Test" section of L151, place the toggle switch in the "CLOSED" position. The LED should energize.

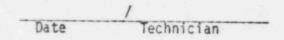
Date Technician

SAN ONOFRE NUCLEAR GENERATING STATION UNITS 2&3

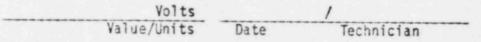
INSTRUMENT AND TEST PROCEDURE S023-II-3.2 REVISION 0 PAGE 280

#### 6.0 PROCEDURE

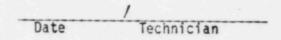
6.42.15 Adjust the "LOW COARSE" and "LOW FINE" potentiometers in the "Bistable Test" section of L151 until the digital indicator on the bistable control panel reads approximately the sum of: .1 VDC plus the input value of position 21 plus value recorded in step 5.42.10.



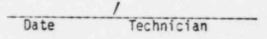
5.42.16 Record the adjusted voltage.



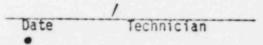
- 6.42.17 Energize the C-E test box and ensure the following switches are in the correct positions.
  - .1 "L1" and "L2" stop lamps toggle switches are in the "ON" position.



.2 "L3", "L4", "L5" and "L6" stop lamps toggle switches are in the "OFF" position.



.3 "START LAMPS" toggle switch is in the "1/1" position.



.4 Start "TIMER MODES" switch is in the step up position.

Date Technician

.5 Stop "TIMER MODES" switch is in the step up position.

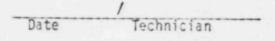
Date Technician

SAN ONOFRE NUCLEAR GENERATING STATION UNITS 2&3

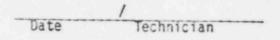
INSTRUMENT AND TEST PROCEDURE S023-11-3.2 REVISION 0 PAGE 281

### 5.0 PROCEDURE

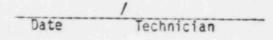
5.42.18 Adjust the input simulator box potentiometer in channel 'A' corresponding to bistable number 22 until the bistable is tripped.



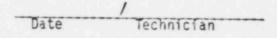
6.42.19 Ensure the toggle switch in the "Bistable Test" section of L151 is in the "OPEN" position.



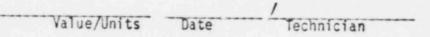
6.42.20 Ensure the C-E test box timer is reset.



6.42.21 After the test equipment has stabilized, place the "Bistable Test" section toggle switch on L151 in the "CLOSE" position. The timer should start.



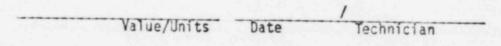
5.42.22 Record the response time.



- 6.42.23 Adjust the input simulator box potentiometer in channel 'A' corresponding to bistable number 22 until the bistable input is returned to the value adjusted for in step 6.1.1.
- 5.42.24 Reset bistable number 22 in channei 'A'.

Date Technician

6.42.25 Repeat steps 6.42.18 through 6.42.24 substituting channel 'C' in place of channel 'A'.



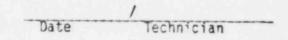
SAN ONOFRE NUCLEAR GENERATING STATION INSTRUMENT AND TEST PROCEDURE SO23-11-3.2 UNITS 2&3 REVISION 0 PAGE 282

### 6.0 PROCEDURE

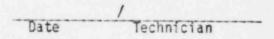
6.42.25 Repeat steps 5.42.18 through 5.42.24 substituting channel 'D' in place of channel 'A'.

		/
Value/Units	Date	Technician

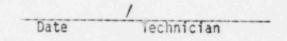
6.42.27 Disconnect the "Bistable Test" leads and replace the input simulator leads on the terminals they were removed from in step 5.42.1



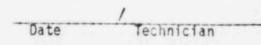
6.42.28 Reset all bistables.



6.42.29 Record the largest response time value of steps 6.42.22, 6.42.25, 5.42.26 in the "Data Collection Table".



- 6.42.30 After completing the "DATA COLLECTION TABLE", use the data to fill in the "RESPONSE TIME TABLE" and verify that the total response time value meets the technical specifications listed on table 3.3-2.
- NOTE: The ESFAS field component response time values will be supplied by engineering personnel.
- NOTE: If more than one combination of integral response times exist for a given function, use the most conservative (longest) response time value when filling in the time response table.
- 6.43 Restoration
  - 6.43.1 Disconnect all test boxes and reconnect proper leads to terminals.



SAN ONOFRE NUCLEAR GENERATING STATION INSTRUMENT AND TEST PROCEDURE S023-II-3.2 UNITS 2&3 REVISION 0 PAGE 283

### 5.0 PROCEDURE

6.43.2 Reconnect P34 and P35 in all four channels.

Date Technician

6.43.3 Verify the RPS/ESFAS per press bypass is enabled on all four channels.

Date Technician

5.43.4 Verify the DNBR/LOCAL POWER DENSITY BYPASS is enabled on all four channels.

Date / Technician

6.43.5 Verify the LOSS OF LOAD BYPASS is enabled on all four channels.

Date Technician

6.43.5 Verify the HI LOG POWER BYPASS is not enabled on any channel.

Date / Technician

6.43.7 Verify the TEST POWER SUPPLY is deenergized.

Date / Technician

- 6.43.8 Step the variable SG pressure setpoint down to its minimum to clear the LO SG PRESS trips.
- NOTE: Depending on actual RWT level and steam generator levels, it may not be possible to clear the LOW SG LEVEL and LOW RWT LEVEL trips.
- 6.43.9 Verify no bistable Pretrip, Trip, or Bypass lights are energized on any of the four channels.

Date Technician

INSTRUMENT AND TEST PROCEDURE S023-II-3.2 REVISION 0 PAGE 234

# 6.0 PROCELURE

6.43.10 Verify all PPS bay doors are closed and locked.

Date Technician

6.43.11 Remove all jumpers that were installed in step 6.1.4 and unisolate all the field wiring that was isolated in step 5.1.4.

Date / Technician

6.43.12 Inform the watch engineer that the test has been completed.

1.1.1	1
Date	Technician

# 7.0 RECORDS

- 7.1 On completion of this test, this procedure shall be signed by the technician and responsible Instrument Foreman. The Supervisor of Nuclear Plant Instrumentation shall review and approve the data.
- 7.2 Transfer of data shall be made to the CDM Center per S023-IC-4 on completion of this test. Copies of this procedure may be made for retention in the Instrument and Test Shop Files.
- 7.3 List the test equipment as instructed in Step 3.5.

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			 	dimension of the second second

INSTRUMENT AND TEST PROCEDURE SO23-II-3.2 REVISION 1 PAGE 285

# 67.0 RECORDS

Technicians	
Foreman	
Approved by	Date
Remarks	

## 8.0 ATTACHMENTS

- 8.1 Data Collection Tables (11pages)
- 8.2 Drawings and Diagrams (7 pages)
- 8.3 Pressure Transient Information (Appendix C) (1 page)
- 8.4 Rotary Select Switch Positions (Appendix D) (3 pages)
- 8.5 ESFAS Actuation Relays Electrical Line Up (Appendix E) (4 pages)
- 8.6 ESFAS Actuation Relays (Appendix F) (3 pages)
- 8.7 ESFAS Interposing Relays (Appendix G) (1 page)
- 8.8 CPC/CEAC Response Time Test (Appendix H) (9 pages)
- 8.9 Valid User Entries (Table H1) (5 pages)
- 8.10 RTT Part 2 CPC Sample Run (2 pages)
- 8.11 CPC Point ID Assignments (Table H2) (3 pages)
- 8.12 CPC Point ID Assignments (Table H3) (8 pages)

Brian Kats

B. KATZ Station Technical Manager

VS:1944b/mr Continued from 1943b

SAN ONOFRE NUCLEAR GENERATING STATION INSTR. AND TEST PROCEDURE S023-II-3.2 UNITS 2 AND 3

REVISION 1 PAGE 1 OF 11

ATTACHMENT 8.1

CDM ENCODE NO.

DATA COLLECTION TABLE

STEP NO.	DESCRIPTION	VALUE	UNITS
6.2.12	PT-0101-1 High Pzr Press		
6.3.12	PT-0102-1 Low Pzr Press		
6.4.12	PT-1013-1 Low SG-1 Press		
5.5.12	PT-1023-1 Low SG-2 Press		
5.6.12	LT-1113-1 Low SG-1 Level		
5.7.12	LT-1123-1 Low SG-2 Level		
.8.12	PT-0351-1 High Cont. Press		
.9.12	PT-0352-1 High High Cont. Press		
.10.12	LT-0305-1 Low RWT Level		
.11.12	PDT-0978-1 Low SG-1 Flow		
. 12.12	PDT-0979-1 Low SG-2 Flow		
5.14.16	TE-0112-1		
. 15.16	TE-9178-1		
.16.16	TE-0122-1		
.17.16	TE-9179-1		
.18.4	RTSG Uncorrected		
5.20.13	High Linear Power to RTSG		
5.20.28	High Log Bistable to RTSG		
.22.2.20	High Log Preamp Low Temperature TT112CA		
.22.2.40	Low Temperature TT122CA		
.22.2.60	High Temperature TT112HA		
.22.2.80	High Temperature TT122HA		
.22.3.21	Pzr Pressure		
.22.4.28	Excore Power		
.22.5.23	ST 113A W1 RCP Speed		
.22.5.46	ST 123 W2 RCP Speed		
.22.5.58	ST 133 W3 RCP Speed		
.22.6.19	ST 143 W4 RCP Speed		
.23.29	High Pzr Press to RTSG		
.24.29	Low Pzr Press to RTSG		
.25.28	Low Pzr Press to SIAS		
.25.42	Low Pzr Press to CCAS		
.26.29	Low SG-1 Level to RTSG		
.27.29	Low SG-1 Level to EFAS-1		
.28.29	Low SG-2 Level to RTSG		
.29.29	Low SG-2 Level to EFAS-2		
.30.29	Low SG-1 Press to RTSG		
.31.29	Low SG-1 Press to MSIS		
.32.29	Low SG-2 Press to RTSG		
.33.29	Low SG-2 Press to MSIS		
.34.29 .35.28	High Cont. Press to RTSG		
.35.41	High Cont. Press to CIAS		
.35.55	High Cont. Press to CCAS High Cont. Press to SIAS		
	ingh conc. riess to SIAS		

SAN ONOFRE NUCLEAR GENERATING STATION INSTRUMENT AND TEST PROCEDURE SO23-II-3.2 UNITS 2 AND 3

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**REVISION 1** PAGE 2 OF 11 ATTACHMENT 8.1

# DATA COLLECTION TABLE

# (Continued)

STEP NO.	DESCRIPTION	VALUE	UNITS
6.36.29 6.37.29 6.38.29 6.39.29 6.40.29 6.41.29	Low SG-1 Flow to RTSG Low SG-2 Flow to RTSG High-High Cont. Press to CSAS Low RWT Level to RAS HighAP SG-1 to EFAS-1 HighAP SG-2 to EFAS-2		

INSTRUMENT AND TEST PROCEDURE S023-11-3.2 REVISION 1 ATTACHMENT 8.1

TRAIN A

Pressurizer Pressure-Low ÷

a. SIAS
(1). Safety Injection
a. High Pressure Safety Injection

Test No. Rec. Time Field Comp. \*P017 \*P018

Total Time

Test No.

Relay Time

\*HV-9327 \*HV-9330 #HV-9324 \*HV-9333 \*P015 \*P015 þ.

\*HV-9325 \*HV-9328

Containment Isolation Emerg. Diesel Start Delay of 10 sec + Instr. and Logic Response Only 3.

Containment Spray (pumps) 4.

\*HV-6501 \*P-012

Containment Emergency Cooling 5.

Total Time Test No. Relay Time Test No. Rec. Time Field Comp. CCW. Pumps \*P-024 \*P-025 а. .

C.C.W. Valves HV-6212 HV-6218 HV-6366 HV-6367 HV-6370 HV-6371 ġ.

Emergency Cooling Fans 0.

A-071 A-074 E-399 E-401

\* \*

Containment Pressure High 3.

а.

SIAS (see Pressurizer Pressure Low) CIAS (1.) Containment Isolation (see Ite

Containment Isolation (See Items)

Containment Pressure High High 4.

CSAS а.

(1) Containment Spray HV-9367 \*

5.

INSTRUMENT AND TEST PROCEDURE S023-11-3.2 REVISION 1 ATTACHMENT 8.1

Steam Generator Pressure Low	ield Comp. Rec. Time Test No. Relay Time Test No. Total Time MSIS (1) Main Steam Isolation (MSIV) HV-8204 HV-8205	(2) Main Feedwater Isolation HV-44048 HV-44052 efueling Water Storage Tank	RAS (1) Containment Sump Valves Open HV-9303 HV-9305 (2) ECCS Miniflow Valves Shut <sup>3</sup> HV-9306 HV-9307		ield Comp. Rec. Time Test No. Relay Time Test No. Total Time 1x. F.W. AC Train EFAS 1-4713 1-4731		P-141 P-141 HV-4730 HV-4716	P-141 P-141 HV-4730 HV-4716 HV-4775 HV-4775	Generator Pressure Low Comp. Rec. Time Test No. Relay Time Test No. San Steam Isolation (MSIV) San Steam Isolation (MSIV) B205 Main Feedwater Isolation Main Feedwater Isolation Main Feedwater Isolation (100 Water Storage Tank Containment Sump Valves Open 303 303 303 303 303 303 303 303 303 30	Total Time Total Time
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6.

7.

8.

INSTRUMENT AND TEST PROCEDURE S023-11-3.2 REVISION 1 PAGE 5 OF 11 ATTACHMENT 8.1

Total Time

T	D	٨	٤	NE.	D
	K.	13	1	19	D

Relay Time

Test No.

1. Pressurizer Pressure-Low

a. SIAS
(1). Safety Injection
a. High Pressure Safety Injection
Field Comp. Rec. Time Test No.
\* P010
\* HV-9323
\* HV-9326

- \* HV-9329
- \* HV-9333
- b. Low Pressure SAfety Injection
- \* P016
- \* HV-9322
- \* HV-9331
- Containment Isolation Emerg. Diesel Start Delay of 10 Sec + Instr. and Logic Response Only

18

- 4. Containment Spray (Pumps)
  - \* P-013
  - \* HV-6500

- -

3.

4.

5. Containment Emergency Cooling

	а. а.	Field Comp. CCW. Pumps *P-026	Rec. Time	Test No.	Relay Time	Test No.	Total Time	
	b.	C.C.W. Valves HV-6213 HV-6219 HV-6368 HV-6369 HV-6372 HV-6373						
	с.	Emergency Cooling	Fans					
	*	A-072 A-073 E-400 E-402						
	Con	tainment Pressure	High					
	a. b.	SIAS (see Pressur CIAS (1.) Containment	izer Pressure L Isolation (See					
÷	Con	tainment Pressure	High High					
	а. *	CSAS (1) Containment HV-9368	Spray					

5. Steam Generator Pressure Low

Test No. Rec. Time Field Comp.

MSIS (1) Main Steam Isolation (MSIV) HV-8204 HV-8205 а.

Main Feedwater Isolation (2) Mai HV-4048 HV-4052

Refueling Water Storage Tank .9

RAS а.

(1) Containment Sump Valves Open
\* HV-9302
\* HV-9304

2) ECCS Miniflow Valves Shut HV-9347 HV-9348

\* \*

4.16 KV. Emergency Bus Undervoltage a. LOV (Loss of voltage and degraded voltage) 7.

Steam Generator #2 Level-Low 8.

Relay Time Test No. Rec. Time Field Comp.

Total Time

Test No.

Aux, F.W. AC Train EFAS P-145 HV-4715 HV-4715 HV-4716 HV-4712 HV-4712 HV-4714

Aux, F.W. DC Train EFAS HV-8200 HV-4053 P-504

INSTRUMENT AND TEST PROCEDURE S023-11-3.2 REVISION 1 ATTACHMENT 8.1

Total Time Test No.

Relay Time

INSTRUMENT AND TEST PROCEDURE S023-11-3.2 REVISION 1 ATTACHMENT 8.1

# RESPONSE TIME TABLE

Reactor Trips

Function	Sensor	to RISG	(Corrected)	RTSG Total (Corrected) Response Time	Tech. Spec. Accept. Crit.	Verified Initial/Date
Linear Power High					≤ .40 sec*	
Log Pwr High					≤ .45 sec*	
PZR Press High					≤ .90 sec	
PZR Fress Low					≤ .90 sec	
Cntmt. Press High					≤ .90 sec	
SG-1 Press Low					≤ .90 sec	
SG-2 Press Low					≤ .90 sec	
SG-1 LVL LOW					≤ .90 sec	
SG-2 LVL LOW					≤ .90 sec	
SG-1 LOW FIOW					≤ .90 sec	
SG-2 LOW FIOW					≤ .90 sec	
FOOTNOTES:						

\*Neutron detectors are exempt from response time testing. Response time of the neutron flux signal portion of the channel shall be measured from detector output or input of first electronic component in channel.

\*\*Response time shall be measured from the onset of a single CEA drop.

#Response time shall be measured from the onset of a 2 out of 4 Reactor Coolant Pump coastdown.

##Response time shall be measured from the output of the sensor. RTD response time shall be measured at least once per 18 months by means of the Loop Current Step Response (LCSR) method. The measured R of the slowest T

RTD shall be less than or equal to 6.0 seconds.

###Response time shall be measured from the output of the pressure transmitter. The transmitter response time constant shall be less than or equal to 0.7 seconds where the pressure transmitter response time is equivalent to the time interval required for the transmitter to achieve 63.2% of its total change when subjected to a step change in pressure transmitter pressure.

INSTRUMENT AND TEST PROCEDURE S023-11-3.2 REVISION 1 PAGE 8 OF 11 ATTACHMENT 8.1

RESPONSE TIME TABLE (Continued)

Reactor Trips

Function	CPC Signal Processing	RTSG (Corrected)	Total Response Time	Tech. Spec. Accept, Crit.	Verified Initial/Date
Local Power Density Hi					
1. Ex-Core Detectors				.68 sec*	
2. CEA Positions				.53 sec**	
DNBR LOW					
1. Ex-Core Detectors				.68 sec*	
2. CEA Position				sec**	
3. Cold Leg Temp.				.68 sec##	
4. Hot Leg Temp.				.68 sec##	
5. RC Pump Shaft Speed				.68 sec#	
6. PRSRZR Pressure				.68 sec###	
NOTE: Cold and Hot Log Ton			in a star it a sin		

NOTE: Cold and Hot Leg Temperature sensors are response time tested on a stand alone basis. Record the time constants separately.

1.	Cold Leg Temp. Sensors	value/units	Acceptance Criteria 5.4 sec	Verified
				initial/date
2.	Hot Leg Temp. Sensors		5.4 sec	
		value units		initial/date

#### FOOTNOTES:

\*Neutron detectors are exempt from response time testing. Response time of the neutron flux signal portion of the channel shall be measured from detector output or input of first electronic component in channel.

\*\*Response time shall be measured from the onset of a single CEA drop.

#Response time shall be measured from the onset of a 2 out of 4 Reactor Coolant Pump coastdown.

##Response time shall be measured from the output of the sensor. RTD response time shall be measured at least once per 18 months by means of the Loop Current Step Response (LCSR) method. The measured R of the slowest RTD shall be less than or equal to 6.0 seconds.

###Response time shall be measured from the output of the pressure transmitter. The transmitter response time constant shall be less than or equal to 0.7 seconds where the pressure transmitter response time is equivalent to the time interval required for the transmitter to achieve 63.2% of its total change when subjected to a step change in pressure transmitter pressure.

INSTRUMENT AND TEST PROCEDURE S023-11-3.2 REVISION 1 PAGE 9 OF 11 ATTACHMENT 8.1

#### RESPONSE TIME TABLE

#### ESFAS

Function	Sensor	Trip Unit to ESFAS	Field Components	Total Response Time	Tech. Spec. Accept. Crit.	Verified Initial/Date
PZR Press Low HPSI					≤ 31.2 sec*	
PZR Press Low LPSI					_ 41.2 sec*	
PZR Press Low Cntmt, Isol.					$\leq$ 11.2 sec* Note 2 and 3	
PZR Press Low Cotmt. Spray Pumps					≤ 25.6 sec*	
PZR Press Low CCW Pumps					≤ 31.2 sec*	
PZR Press Low CCW Valves					≤ 11.2 sec Note 4	
PZR Press Low Emer. Cig. Fans	*				≤ 21.2 sec*	
Cntmt. Press High HPSI					≤ 41.0 sec*	
Cntmt. Press High LPSI					≤ 41.0 sec*	
Cntmt. Press High Cntmt. Spray Pumps					≤ 25.4 sec*	
Cntmt. Press High CCW Pumps					≤ 31.0 sec*	

#### FOOTNOTES:

1. Response times include movement of valves and attainment of pump or blower discharge pressure as applicable.

- \* Emergency diesel generator starting delay (10 sec.) and sequence loading delays for SIAS are included.
- Response time includes emergency diesel generator starting delay (applicable to AC motor operated valves other than containment purge valves), instrumentation and logic response only. Refer to table 3.6-1 for containment isolation valve closure times.

3. All CIAS-Actuated valves except MSIVs and MFIVs.

4. CCW non-critical loop isolation valves HV-6212, HV-6213, HV-6218 and HV-6219.

5. Response time includes instrumentation, logic, and isolation damper closure times only.

INSTRUMENT AND TEST PROCEDURE SO23-11-3.2 REVISION 1 ATTACHMENT 8.1

# RESPONSE TIME TABLE

# ESFAS

			(Continued)			
Function	Sensor	Trip Unit to ESFAS	Field Components	Total Response Time	Tech. Spec. Accept. Grit.	Verified Initial/Date
Cntmt Press High CCW Valves					<pre>≤ 11.0 sec Note 4</pre>	
Cntmt. Press High Emer. Cig. Fans					<pre>&lt; 21.0 sec*</pre>	
Cntmt. Press High Cntmt. Isol.					<pre>&lt; 10.9 sec* Note 2</pre>	
Cntmt. Press High- High Cntmt. Spray					<pre>&lt; 21.0 sec*</pre>	
SG-1 Press Low MSIV					≤ 20.9 sec	
SG-1 Press Low MFW 1sol.					≤ 10.9 sec	
SG-2 Press Low MSIV					≤ 20.9 sec	
FOOTNOTES:						

- Response times include movement of valves and attainment of pump or blower discharge pressure as applicable. -
- Emergency diesel generator starting delay (10 sec.) and sequence loading delays for SIAS are included. \*
- Response time includes emergency diesel generator starting delay (applicable to AC motor operated valves other than containment purge valves), instrumentation and logic response only. Refer to table 3.6-1 for containment isolation valve closure times. 2.
- All CIAS-Actuated valves except MSIVs and MFIVs. 3.
- CCW non-critical loop isolation valves HV-6212, HV-6213, HV-6218 and HV-6219. 4
- Response time includes instrumentation, logic and isolation damper closure times only. 5

INSTRUMENT AND TEST PROCEDURE S023-11-3.2 REVISION 1 PAGE 11 OF 11 ATTACHMENT 8.1

#### PESPONSE TIME TABLE

ESFAS

#### (Continued)

Function	Sensor	Trip Unit to ESFAS	Field Components	Total Response Time	Tech. Spec. Accept. Crit.	Verified Initial/Date
SG-2 Press Low MFW Isol.					≤ 10.9 sec*	
Low RWT LVL Cnimit. Sump VLVs Open					≤ 50.7 sec*	
Low RWT LVL ECCS Miniflow VLVs Shut		t			≤ 40.7 sec*	
SG-1 LVL LOW Aux. FW AC Trains					≤ 40.9 sec*	
SG-1 LVL Low Aux. FW Stm./DC Train					≤ 30.9 sec -	
SG-2 LVL Low Aux. FW AC Trains					≤ 40.9 sec*	
SG-2 LVL Low Aux. FW Stm./DC Train					≤ 30.9 sec	

FOOTNOTES:

1. Response times include movement of valves and attainment of pump or blower discharge pressure as applicable.

\* Emergency diesel generator starting delay (10 sec.) and sequence loading delays for SIAS are included.

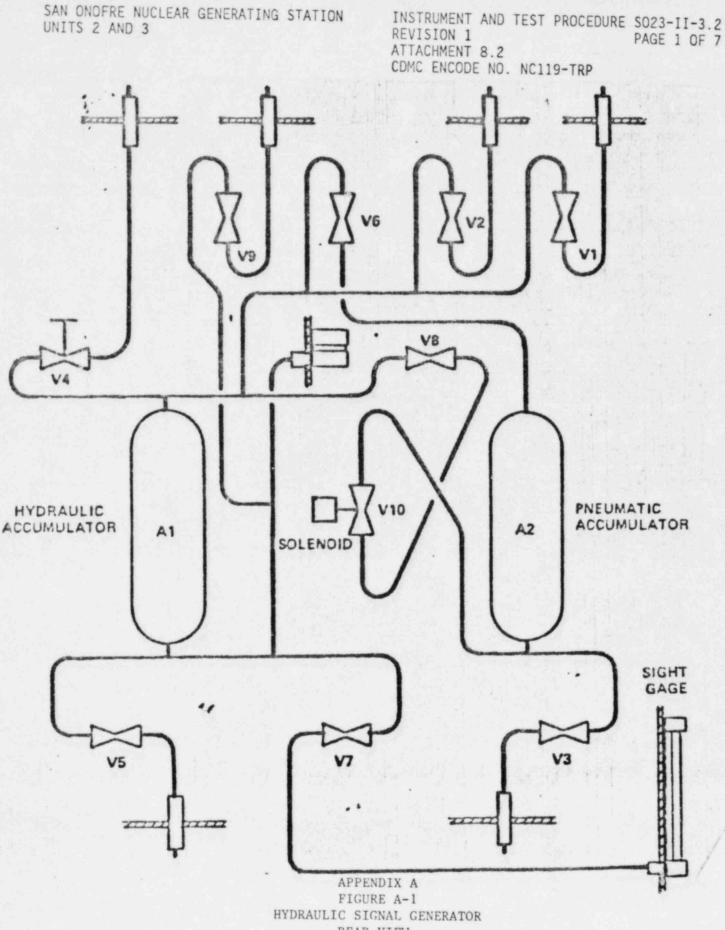
 Response time includes emergency diesel generator starting delay (applicable to AC motor operated valves other than containment purge valves), instrumentation and logic response only. Refer to table 3.6-1 for containment isolation valve closure times.

3. All CIAS-Actuated valves except MSIVs and MFIVs.

4. CCW non-critical loop isolation valves HV-6212, HV-6213, HV-6218 and HV-6219.

5. Response time includes instrumentation, logic, and isolation damper closure times only.

1945b



REAR VIEW

INSTRUMENT AND TEST PROCEDURE S023-II-3.2 REVISION 1 PAGE 2 OF 7 ATTACHMENT 8.2

# TIME RESPONSE TEST SET CONTROLS

# IDENTIFICATION

- A Sight Gage
- V1 Gas Isolation
- V2 Gage Isolation
- V6 Pressurize
- V9 Signal Isolation
- V8 Signal Rate
- V4 Pressure Bleed B Zero
- C Span
- D Ref-Bias
- E Process-Bias
- F Signal Conditioning
- G DVM Monitor
- H Pressure Switch Output Voltage
- SI Signal Initiate
- J Power
- RT Reference transducer
- V3 Vent/Drain
- V5 Drain
- V7 Sight Gage/Fill

# FUNCTION

Accumulator level indication and filling point

Isolation valve

Isolation valve

Accumulator pressurization select valve

Output Isolation valve

Throttle valve

Bleed valve Reference transmitter zero adjust

Reference transmitter span adjust

Reference transmitter output bias adjust

Process transmitter output bias adjust

Process transmitter input signal select

DVM test point select

Pressure switch output voltage

Solenoid valve actuation switch

On-Off switch

Reference signal source

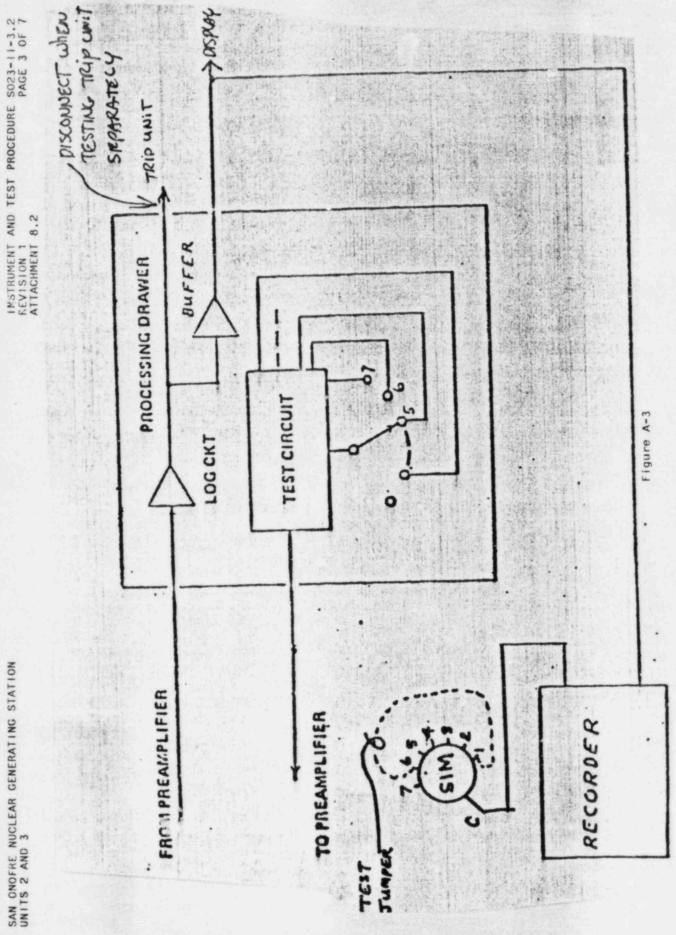
Vent-Drain valve for pneumatic accumulator

Drain valve for hydraulic accumulator

Sight gage isolation valve

APPENDIX A

Figure A-2



INSTRUMENT AND TEST PROCEDURE S023-11-3.2 REVISION 1 PAGE 4 OF 7 ATTACHMENT 8.2

AC. VOLTAGE SUPPLY

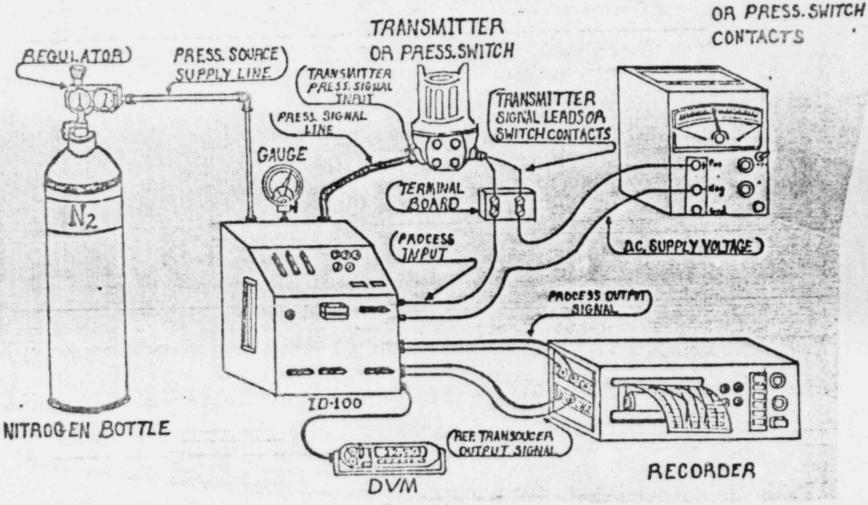
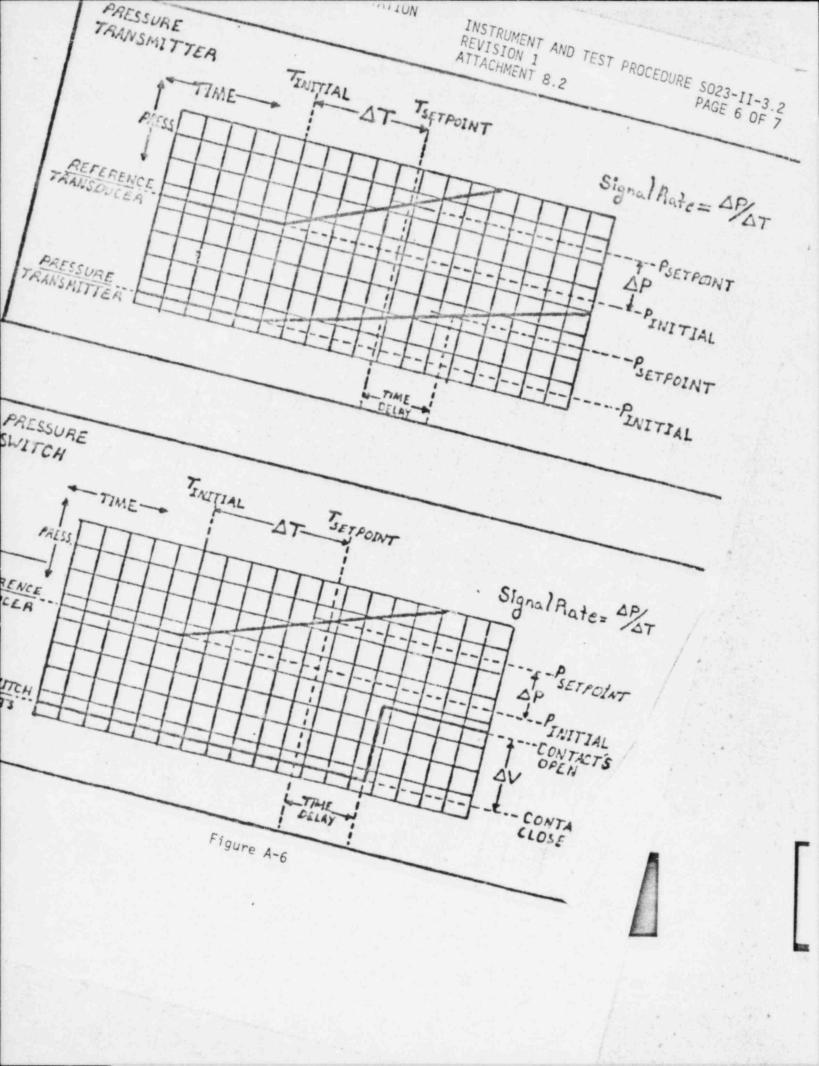


Figure A-4



INSTRUMENT AND TEST PROCEDURE S023-11-3.2 REVISION 1 PAGE 5 OF 7 ATTACHMENT 8.2

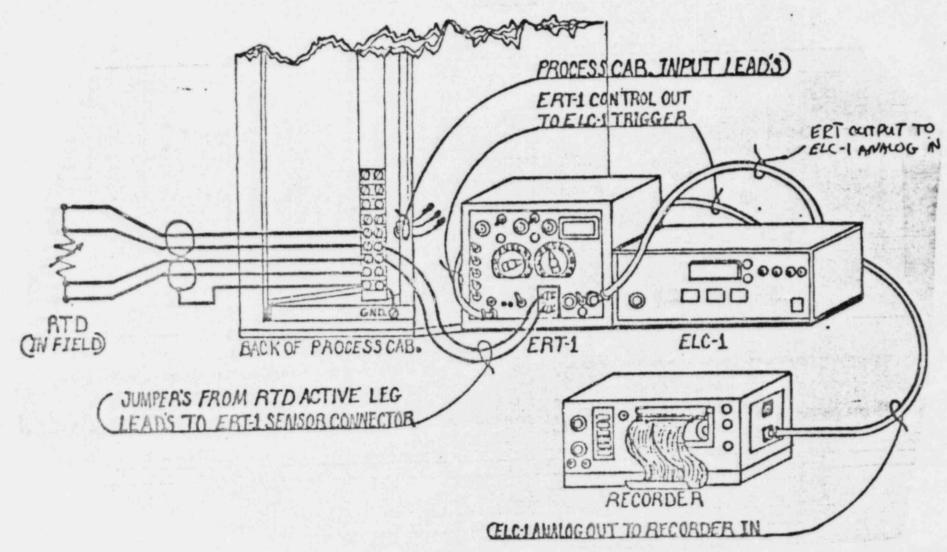


Figure A-5

INSTRUMENT AND TEST PROCEDURE S023-II-3.2 REVISION 1 PAGE 7 OF 7 ATTACHMENT 8.2

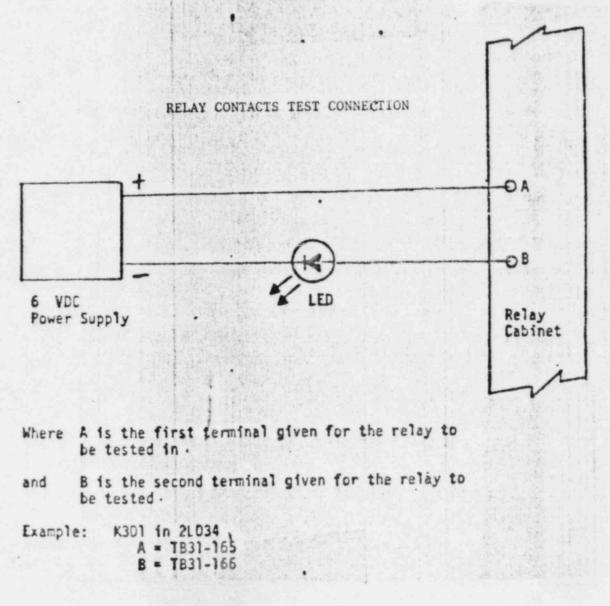


Figure A-7

March 13, 1983

MR. A. E. CHAFFEE

SUBJECT: NRC Requested Documents

Enclosed are copies of the following documents requested by the NRC:

- Operating Instruction S023-3-5.1, Rev. 7, "Emergency Plant Shutdown," which identifies operator actions following reactor trip or initiating reactor trip. It is provided in response to what was identified as item "I.d. Reactor Trip Followup (including ATWS)," on the "Paper" attachment to the NRC-prepared agenda.
- Operating Instruction S023-3-2.19.1, Rev. 5, "CEDM MG Set Operation," which specifies operator actions in performing testing of the Reactor Trip Circuit Breakers pursuant to Technical Specification 4.3.1.1, Table 4.3-1, item 1.
- 3. Instrument and Test Procedure S023-II-1.1, Rev. 8, "Surveillance Requirement, Reactor Plant Protection System, Channel Functional Test (31 Day Interval)," including TCNs 42, 43 and 44. This procedure, in combination with item 4, below, specifies I&C testing of, among other things, the Reactor Trip Circuit Breakers pursuant to Technical Specification 4.3.1.1, Table 4.3-1, item 13.
- 4. Instrument and Test Procedure S023-II-11.161, Rev. 2, "Surveillance Requirement, Reactor Breakers Undervoltage and Shunt Trip Device Circuit Test."
- 5. Instrument and Test Procedure S023-II-3.1, Rev. 1, "Plant Protection System, Response Time Test for Channel A (Eighteen Month Interval)," including TCNs 7, 8, 9, 10 and 11. This procedure, in combination with items 6, 7 and 8 below, specifies I&C testing of, among other things, the Reactor Trip Circuit Breakers pursuant to Technical Specification 4.3.1.3.
- Instrument and Test Procedure S023-II-3.2, Rev. 1, "Plant Protection System, Response Time Test for Channel B (Eighteen Month Interval)," including TCNs 7, 8, 9 and 10.
- Instrument and Test Procedure S023-II-3.3, Rev. 1, "Plant Protection System, Response Time Test for Channel C (Eighteen Month Interval)," including TCNs 7, 8 and 9.
- Instrument and Test Procedure S023-II-3.4, Rev. 1, "Plant Protection System, Response Time Test for Channel D (Eighteen Month Interval)," including TCNs 6, 7 and 8.

A. E. CHAFFEE

Items 2 through 8, above, are provided in response to item VII.D.1 of the NRC-prepared agenda.

- 9. Station Procedure S023-MPES008, Rev. 0, "Under-Voltage Tripping Device of GE AK-2-25 Circuit Breakers in the Reactor Trip Switchgear," which represents issuance, as a Station document, of Startup procedure MPES008, Rev. 1. Reference to "Tripping Device" in the title is reference to the Reactor Trip Circuit Breakers.
- 10. Maintenance Procedure S023-I-4.36, Rev. 0, "Inspection and Adjustment of Under-Voltage Tripping Device (GE Circuit Breaker AK-15 and 25)," including TCN 1. This procedure represents the development of a Station procedure which would replace item 9, above, but has not been used in any maintenance of the Reactor Trip Circuit Breakers (item 9, above, has been used). Reference to "Tripping Device" in the title is reference to the Reactor Trip Circuit Breakers. Action has been initiated to cancel this procedure and its TCN. It will be reissued when what represented TCN 1 to the procedure can be incorporated into a revision rather than a TCN.

Items 9 and 10, above, are provided in response to item VII.E.1 of the NRC-prepared agenda.

 A "Document History Summary" which identifies the chronological history of all revisions and TCNs for each of the procedures identified above.

Nim W. C. MOODY

1620v/jms

cc: H. B. Ray J. M. Price CDM