ENCODE REFERENCE: SO123 VI 1.0 \$0123 VI-1.1 50 TEMPORARY CHANGE NOTICE (When form filled out) NOTE: Technical Specification Violation if not processed within the stated time limits. Proced. re No. 5023-17- 3.3 TCN NO. Revision No. Testing for Channel C Procedure Title PPS Response Ime PAX (If known, Writer) Procedure Author PAX 1. The following charge shall be in effect Attach a copy of the effected papels), if applicable on attachment page 10 8 11, show the following at the bottom & the page. ≤ 21.0 sec (ant 3), ≤ 20.9 sec(ant 2) Note 4a Containment Priss High £ 23.0 ser \* Unt. 2+3 Contoinment Press High CCW Values 3 1983 FEB -2. Reason CDM SITE Correct omission on TCN & 1-27.83 Issuance Date JAN 2 8 1983 CDM (For CDM Use On ... Date or o hated 3 Dors this change affect FSF ? or Tech. Specificon motiments? Yes No L 5 Does this change affect the nonrad plogical environment of any offsite area previously undisturbed during site preparation and 6 plant construction? Yes\_\_\_ No \_\_\_ 7. is the intent of the original document altered? Yes\_\_\_ No L 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.) 19 Does this change affect licensing commitment requirements as stated in the Reference Section? Yes\_\_\_\_ No. 127-83 1550 Originator / o 10. Is the TCN to be incorporated into next permanent revision within 60 days of issuance date? Yes\_\_\_ No\* 11. \* One time change only against Procedure Station Order No. Rev. No 2.3-83 Copy sent to the Nuclear Safety Group // 12 13 Signatures Required (at least one (1) SROI Approved by Final appruval 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 appruva', 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.)

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Approved by two OSRC members	SO2, SO3, or SO23 (Series)	SO123 **(Sariar)	
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* SO1 and SO123 (series) TCNs will be rout	ted to the OSRC with P	and a second	

C 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 sout 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.)

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2 of 19 Roy 2016 Ploudene # 5023-21-3.3 R-1 add following steps: TONT 6.24.27 Disconneit the Bistable test" leals and replace the enquit semulator leads on the terminals they were removed from in step 6.24,2 Auti technician 6. 24. 28 Reset all bistables. Pote Connicion 6.24.29 Record the largest response Time value of steps 6.24.22, 6.24.25 and 6.24.26 in the Dota Collection toble Soto Celmician

(1)	DATA COLLECTION T	ABLE 3	10
STEP M		TCNS	17 -10
1 miles mil	DESCRIPTION	1000	-Poge 3 to
6.3.12	PT-0101-2 High P.	VA VA	LUE PRITE
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· 103 15-	PT-1013-2 Low SC-1 Press		
6.6.12	19-10-3-3 Low SG-2 Press		
6.7.12	LT-1123-2 Low SG-1 Level		
0.8.12	PT-0351-3 High Cover		
6.10 12	PT-0352-3 High High Fort		
6.11.12	LT-D3D5-3 LOW RWT Level		
6.12.12	PDT-DOTO-2 LOW SG-1 Flow		
6.14.16	TE-DI12-3 LOW SG-2 Flow		all and
6 16 16	TE-9178-3		
6.17.16	TE-0122-3		and the linesest
6.18.4	1E-9179-3		
6.19.35	High Linear a		
6.20.13	High Loo Bistable to RTSG		
6. 23 20	High Log Preamp		
6.23 40	Low Temperature Transa T.C.		
6.23 .60	High Temperature II12204 TT-617	8-3	1 1 .
6. 23 .80	High Temperature TILLAR TT-0112	-3	
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6.23.85 23	Excore Power		
6.23 85.35	ST 13A WI RCP Speed	1. A. Poulse	
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6.25.29	High Par Press to RTSC		1 1
6.26.28	Low Pir Press to RTSG		Γ
6.26.42	Low Press to SIAS		1 1
27.29	Low SG-1 Level to CCAS		
29.29	Low SG-1 Level to FFAS		
. 30.29	Low SG-2 Level to RTSG		1
.31.29	Low SG-2 Level to EFAS-2		
37-29	Low SG-1 Press to RTSG		
3329	Low SG-2 Press to MSIS		
35.29	Low SG-2 Press to HSIC		
36.28	High Cont. Press to RTSG		
36.41	High Cont. Press to CIAS		
6.25	High Cont. Press to CCAS	1 1	
7.29	Low SG-1 ST-		
6.29	Low SC-2 FLOW to RISG		
0.29	High-High Cont. Provide		
1.29	Low RWT Level to RAS		
	HIGHAP SC-1 A- FRI		

ALL ...

	comp.	Rec. Time	Test No			
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	HY-4048 HY-4052				1050 00.	Total Th
(3)	Steam, Blowdown, S	ample and Drain I	solation	1	<u> </u>	
Ten-	NY-4054 HY-4058 HV-8203 HV-8248 HV-8248 HV-8219- HU- &+19					•
(4)	Auxiliary Feedwater	Isolation				
en- 1	HV-4705 HV-5713_ HV-4713 HV-4730 HV-4731					
Refueling a. RAS (1)	Water Storage Tank Containment Sump Va	ives Open				
	*KY-9303	1				
(2)	ECCS Miniflow Valves	Shut				
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NO 12 - 10080

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

(2)

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

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rield comp.	Rec. Time	Test No.	Relay Time	Test No.	T-4-1
P-141 *HY-4713 *HV-4731 *HV-4054					IOCAI TIME
Aux. F.W. (Steam/	DC Train)		1		
S/G #1 (E089) P-140 HV-4705 HV-4716 HV-4715 HV-4054					
S/G #2 (E088) P-140 HV-4716 HV-4705 HV-4730 HV-4053					

- 1. Pre. rizer Pressure Low
  - a. SIAS (See Safety Injection)
- 2. Safety Injection
  - a. High Pressure Safety Injection

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Field Comp.	Rec. Time	Test No.	Relay Time	Tart Ba	1
*P019 *P018 (If aligned) *HV-9323 *HV-9326 *HV-9329 *HV-9332				iest mo.	Total Time

b. Low Pressure Safety Injection

*7016	
MU-9322	
*KY-9381	

c. Charging Pumps

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1 -1 32		Construction of the second system in the second sys
P-191 (If Altgned)		

3. Containment Isolation

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

4. Containment Spray Pumps

onta ins	ent Emergency Cooling	
	*P-025 (1f Aligned)	
	*P-025 (1f Aligned)	

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

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

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Field Comp.	Rec. Time	Test No.	Relay Time	Test No.	P.4.1 P.
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- 1. Pre. .... Pressure Low
  - e. SIAS (See Safety Injection)
- 2. Safety Injection
  - a. High Pressure Safety Injection

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P-191 (If Aligned)	
ment Isolation	

3. Containment Isolation

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

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CCW Pumps	cooling			
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Same and the second sec	Rec. Time	Test No.	Relay Time		1.
MT-6213		THE REAL PROPERTY AND INCOMENTS	incley lime	Test No.	Total Th
MA-9518				1	
C.C.W. Valves Emerge	ncy Cooler Isolation		L		
HY-6358					
MY-6369					
MV-6373					
Emergency Cooline Fan					
	13				
1 1=401 E-402				1	
Imment Pressure High					1.1.1
<ol> <li>Containment Isola</li> <li>Containment Pressure High H</li> <li>CSAS</li> <li>Containment Spray</li> </ol>	ation (See Items) High				
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(1) Containment Isola Imment Pressure High H CSAS (1) Containment Spray #HV-9358 #HV-6500 Generator Pressure Long	ation (See Items) High				
(1) Containment Isola imment Pressure High H CSAS (1) Containment Spray #HV-9358 #HV-6500 Generator Pressure Lou SIS	ation (See Items) High				
(1) Containment Isola Imment Pressure High H CSAS (1) Containment Spray #HV-9358 #HV-9358 #HV-6500 Generator Pressure Lou SIS 1) Main Steam Isolat	ition (See Items) High				
(1) Containment Isola Inment Pressure High H CSAS (1) Containment Spray #HV-9358 #HV-6500 Generator Pressure Lon SIS 1) Main Steam Isolat HV-8204 HV-8205	tion (See Items)				
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	Field Comp.	Rec. Time	Test Mo.	Relay Tim	16-7-=1-	
	NA-6048		1	netay time	Test M.	Total Th
(3)	Steam, Stoudown, San	ple and Drain I	solation			
	NT-4053			1		
	HTV-8202					
- /	HH-5221 HU- 8421					
(4)	Auxiliary Feedwater	Isolation				
	MY-4705					
-/	WV-4714			Cohere .		
	HV-4715					
selling	Meter Storage Tank					
(1)	Containment Sume Matu					
I	*HV-9302	es Open				
(2)	FCCS Martin			1	1	
T	CCCS MINITION Valves	Shut				
1	MY-9348	1	T	1		
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United and American Street Str

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11. Steam Generator Level-Low (With Either No Pressure-Low Trip or  $\triangle P$ -High)

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(1) Aux. F.W. AC Train

Field Comp.

\*P-504 \*HV-4712 \*HV-4714 \*HV-4053

			R.1 7	CHE T
Rec. Time	Test No.	Relay Time	Test No.	Total Time
			•	

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	REVISION 1		PROCEDURE	\$023-	-11	1-3	
	ATTACIMUNT	8.1		PAGE	7	Of	ł
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RESPONSE TIME TABLE

			Reactor Tri	PS		
EN/Linear Power High	 *	Trip Unit Lo RISC	RISC [Corrected]	Total Response Time	Tech. Spec. Accept. Crit.	Verified
Log Pur High					5 .40 sec*	
PZR Pross High					≤ .45 sec*	
PZR Press Low					≤ .90 sec	
Contast. Press High					≤ .90 sec	
20-1 Press Lev					5 .90 sec	
80-2 Press Lev					≤ .90 sec	
80-1 LVL LOV					≤ .90 sec	
BO-2 LVL LOV					5 .90 sec	
80-1 Low Flow					≤ .90 sec	
Stat Low Flow					≤ .90 sec	
ESSTROICS:					5 .90 800	

amoutron detectors are axaget from response time testing. Response time of the neutron flux signal portion of she channel shall be measured from Hotoclor output or input of first electronic component in channel. ownesponse time shall be measured from the onset of a single CEA drop.

presponse time shell be measured from the onset of a 2 out of 6 Reactor Coolant Pump coestdown.

Simpanonse time shall be measured fine the nutput of the sensor. All response time shall be measured at feest erhosnonse time shall be anasared finm the nutput of the sensor. All response time shall be measured a of the slowest once per 18 months by means of the lenge Gurrent Step Response (LCSR) method. The measured R of the slowest T

offorsponse time shall be measured from the output of the pressure transmitter. The transmitter response time sovisiant shall be less then 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 stop change

And the owner of the local of

BOT PROCEDURE IVISION 1 \$021-11-1.5 ATTACIMUNT 8.1 PAGE & OF RESPONSE TIME TABLE (Continued) 11 Reactor Trips Function CPC Signal RISC Processing Totel I Power Density MI (Currected) Tech. Spec. Response Tim Varified Accept. Cris 1. Ex-Core Detectors Initiel/Pate CEA Positions .68 sec\* CEA Postions - Remaity PActor -68 17 sec ... fx-Onre Detroters +SI Sec CEA Posision .68 8009 Cold Log Tem .68 ..... Pt Los Tenn. .68 ..... RC Pupe Shaft Sound .68 .000# PREATE PREASURE 6. CEA Postibus - fewally Factor .68 sec# ROTE: Cold and Hot Log Temperature sensors are response time tested on a stand .68 sec### .53 Sec 1. Cold Log Imp. Sensors ..... Acceptance Criteria value/units Verified 5.4 680 2. Not Log Tomp, Sensors Initial/date 5.4 800 STOTIOTES: VALUE INIIES initiel/dete amout now detectors are example from interesting. Response time of the mentron flux signal portion of . the channel shall be measured from detector output or input of first electronic component in channel. segargence time shall be musicited from the onset of a single CEA drop. Toosanse time shall be measured from the most of a 2 out of & Resclor Coolant Pump cossidown. mosseness time shall be massured from the output of the sensor. RID response time shall be messured at least nce per 13 months by moans of the loop Current Step Response (LCSK) method. The measured R of the slowest To shall be loss than or equal to 6.11 ancunds. (54 sec. manus allowance for a "Photoconse time shall be monsured from the output of the pressure transmitter. The transmitter response time instant shall be less than or equal to 0.7 seconds where the pressure transmitter response time is equivalent to a time interval required for the transmitter to achieve 63.2% of its total change when subjected to a step change the all spanning was

14 9 22.2 TCN 8 HU-6370, HU-6371, HV-6372, HV-6573 Gue man. 小田及水塘 小田原田 Kil in a me nitial/Pate Peri-Ling and the second 三百四年、二十二 Researse time "metric semingency diese! generator starting delay (spelicable to AC motor operated valves sther when cantained a prove valves), instrumentation and logic response only. Refer to table 3.6-1 for containment 3 Bovement of valves and attainment of pump or blower discharge pressure as applicable • \$23.2 see not 46 \$ stor starting datay (10 sec.) and sequence loading datays for SIAS are included. 5 H.2 890 Note 4 0. ≤ 11.2 sec\* Note 2
and 3 ..... Tech. Spec. 5 31.2 BOC\* < 41.2 sec. < 23.6 sec < 31.2 BOCO < 21.2 80C<sup>0</sup> < #1.0 sec B.C. CON NOT-OFILIONI 1000 INDIALION VAIVAS HV-6212, HV-6213, HV-6218 and HV-6219 CLU Clonad . < 41.C .... 5 23.4 sec. < 31.0 sec\* Mesponse time includes instrumentation, logic, and isolation damper closure times only. ALLACHARKT ... Components Response [ ] m Totel RESPONSE TIME TABLE ESTAS 11014 Alt ClAS-Actuated velves except MSIVs and MFIVs. Trip Unit . .... Pensor Cas reporty & Intelling and CREME. Soray Press Cruth. Soray Pumps Proporto Linciti Lasr. Cig. Fama ONTEN. Press High CPREM. Proce High Orton. Press High Lrsi CHERE, Press NIGh recti Johner Conta., 1801. DER RUM HOW PINEL OR NOT BEALS HIL PER Prose Low Ver Prace Lev 10) 83044 424 ANT PROF LON NO1 83644 624 CON VOIVER CON Parts CONTRACTOR : 18.4.3 in the 40. r. -



	Tech. Spec. Veriried Accept. Scit. Veriried	5 10.7 ane (unite) 5 8.7 40 (unite)	<pre>5 30.9 sec</pre>	5 J0.9 wee	Provide State of the second of
RESPONSE TIME TABLE ESFAS (Continued)	Trip Unit Field Total Le CSIAS Compunents Response Time				<pre>'valves and attainment of pump or blower dischand doiny (10 suc.) and angumence toading delays function and logic response unly. Noter to a strumentation and logic response unly. Noter to the and MrIVs. 'Vs and MrIVs.' 'wweels and Mrecipose Color to to a strumentation and logic response unly. Noter to the transmiss.' Noter to the transmiss.' Noter to the transmiss.' Noter to the transmiss.' 'Noter's to the transmiss.' 'Noter's 'Noter's to the transmiss.' 'Noter's 'Noter'</pre>
	Translan Renar Rev Inoi. Lev Rut Lu Orien. Subs VIVS	A The Line Line Line Line Line Line Line Lin	Mer Lin Low Ann. The Bla./DC Train Bra. IN Ann. IN Ac Trains	BUR. TO THE IN BUR. FOC THEIN BUR. FOC THEIN	1. Response time include movemul of Emergency diesel generatur startin Emergency diesel generatur startin Emergence the includes emergency of the containment purge values). In the containment purge values). In the containment purge values). In the containment includes instruments and movements in includes instruments was

-. × HU 6520, HV-6371, HV 6372 pul HV-6373 are open

- 19 TCN 17 8 a handler and it hereaft ash at a Cational environcy color ce indates when the Bob, HUGSCO, HUGSCO, HUGSCO, HUGSCO, HUGSCO, HUGSCO, HUGSTO Total Page A series of series and Or seconds the fracticies emergency diesel generator starting delay (applicable to AC motor operated valves ather then containment purse valves), instrumentation and logic response only. Refer to table 3.6-1 for containment Response times include movement of valves and attainment of pump or blower discharge pressure as applicable. Charpency diese! gonerator starting delay (10 sec.) and sequence loading delays for SIAS are included. S 11.2 sec Note 2 SASZAL ME Tech. Seec. Accept. Crit 5 31.2 sec 241.2 800 £ 81.2 00C 2 73.6 000 £ 31.2 sec 5 21.2 0000 £ 41.0 sec < 41.0 sec 5 25.4 sec £ 31.0 000 bd. CON non-origical loop faciation values AV-6212, AV-6213, AV-6218 and AV-6219 Dut Closed , Persponse time includes instrumentation, legic, and issistion damper cleaure times only. - 4 8 IN MANUSSIN Response Time 1 Total RESPONSE TIME TABLE Companents ESTAS Tield TRAIN R HU-6371, HV-6372, Bud AV 6373 are gree . AIT CIAS-Actuated valves except MSIVE and MrIVE. Trip Onit Cattor. Sonty Party Creat. Press Nigh Lasr. Cig. Fans CHERT, Press Right CITES, Press Right CHERE, Pross High The first courses Onter. 1301. Pare 1 APRIL 100 ver press to in ..... The Press Low PER Press Low VER Prost Law PER Prose Lav TOALA RCD 100 SOV Parts STREET, STREET, ST 2 f :

of 19 TCN 8 Kyor ward 2 and all the second second the second of the E RIOSE M a second day of the second day Teles Interes 46. Cartemant energency contes can reachin above 40-6566, 41-6869, 41-6369, 40-6369 ----and the second second Response time included marrywary direct generator starting delay (applicable to AC motor aperated values other then containmont purger values), destrimunistion and logic response only. Noter to table 3.6-1 for containmont Response times include arrownit of valves and attainment of pump or blower discharge pressure at applicable. THIS ARE BULLE Emergency disse! generalar sisriften duiny (10 and.) and sequence loading delays for SIAS are included. £ 10.9 sec. Note 2 Tech. Spec. ACCPEL. Crit. £ 21.0 Lec. £ 21.0 MC\* 5 20.9 Mec £ 10.9 800 £ 20.9 Mec AL, CON MAN-OFICIANI TONS TANIACION VAIVAL MY-4212, MY-6213, MY-4218 AND MY-4219 BUY CLOSED, A. B. THUMONI IN Proposes time includes instrumentation, legic and isolation damper cleaves times only. ------Field Tetal RESPONSE TIME TABLE (Cont Imund) 40-6370, HV 8371, HV 8372 Owd HV 6373 Ou ge-ESTAS TRAIN B and a second sec All CIAB-Actuated withen actual ASIV, and MIVE. Trip Unit Ten Centrat Press High Ter Cutat Press High ccw Unlues \*\*\*\*\*\* CREAK, Proce Might Chest. Press Migh Case. Cig. Fans Catas. Press High Net and the state Childe. 1801. Territon W-1 Press Law W-1 Front Law W-P Press Law WW Leel. IPPLINGIAS: AIN AIN .

5.5	Mercies Inicial/Dese		5) 5)				T	2~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~	6368, HV6369
t Table	PELEPPSHE LINE ACCERL. Spec.	£ 30.7 see	5 00.7 000 (Unit 2 50.7 002 (Unit	20.9 mo	5 M0.9 MAC*	£ 30.9 sec	pine er blower discherpe pressure as ap mus lowding delays for SiAS are inclus liev (espileable to AC moor operated v ponse only. Aufor to table J.G-1 for o	all and HV-6219 Que cland.	- where HV 686, 84 6367, HV
RESPONSE TIM ESFAS (Continue	Trip this Tield						the state of the set of the second of the se	tion values MV-6212, MV-6213, MV-6 rumentation, legic, and laolation	and cooler cew redeater
	En-2 Prove Low Penks Mary 1901. Low Mar Line Myn	Con and LM	ALL LAN	Part Lay Lew Ame. Part Lew Blas./Pac Train	AC Train	FLM. FOC Train	Response time factors and Emergency diesel promitica Emergence time includes and the containment purps with the letion with cloure ti All ClAS-Actanted wither a	Reserve tim includes into	6 Containent Daueron H U-6370, HV 6361

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		pop gr
REFERENCE: S0123-VI-1.0 S0123-VI-1.1		ENCODE: AC10A
	TEMPORARY CHANGE	NOTICE (When form filled out
NOTE: Technical Specification Viola	ation if not processed within the stated time l	limits.
rocedure No. SOZ3-TT-	3.3 Revision No. L	TCN No 7
rocedure Title PPS Resco	ne time lest for char	mel C
rocedure Author	PAX(If known, Wri	ter) PAX
1. The following change shall	be in effect. Attach a copy of the effected o	ace(s) if applicable
nee attales	O prover,	
and alocal	rope	0-A 0
2. Heason alled deve	ees, missing prouder	al slepe and
3. Date originated 12-	10- 22 for cloudy	2-11-82 (Ear CDM ! Ise Ophy)
5. Does this change affect FS.	AR or Tech. Spec. commitments? Yes	No X
6. Does this change affect the	nonradiological environment of any offsite a	area previously undisturbed during site preparation and
7. Is the intent of the original	document altered? Yes No	
8. Is the document to be char	nged an Emergency and Abnormal Operating	Instruction? Yes No to
(If the answer to 5, 6, 7 or 8 is	YES, a TCN is NOT Authorized.)	
9. Does this change affect lice	insing commitment requirements as stated in	the Reference Section? Yes No
10. Originator Der	Sterman	
11. Is the TCN to be incord ra	ted into next permanent revision within 60 d	ays of issuance date? Yes No
* One time change only against	Procedure /Station Order No.	Rev. No
12. Copy sent to the Nuclear S	afety Group Lun Gran	ndo 12-21-87
13. Signatures Required	COM SCHATURE	DÂTE C
DEC	21 1982 CDM	ILE MARY
	Com China h	Bisk. Marine
SO1 **(Series)	SO2, SO3, or SO23 (Series)	SO123 ** (Series)
Approved by two OSRC members:	Approved by *** (at least ane (1) S	Approved by two OSRC members
<u>s]</u>	" Quelqy	1)
2)	1 heat the	(1)
Reviewed by entire Committee on. **	Final approval by PW	Reviewed by entire Committee on: **
DATE - MUST BE WITHIN 7 DAYS	Billet	DATE - MUST BE WITHIN 7 DAYS
	COGNIZANT PUNCTIONAL STATION M	Approved by *** (at least one (1) SRO)
	12-15-82	3)
	DATE - MUST BE WITHIN 14 DAYS	
		Approved hu
		Approved by:
		8) COGNIZANT PUNCTIONAL STATION MANAGER
		5) COGNIZANT PUNCTIONAL STATION MANAGER

\*\* 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.

\*\*\* Approval must be by two members of the plant ma: agement 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.)

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Aver avalant and at

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- See

Roge 20216 procedure # 5073-II-3.3 R-1 TCN#7 add following steps: 6.24.27 Disconnect the Bistable test" leads and replace the enput semulator leads on the terminals they were removed from in step 6.24,2

Technician Sati

Reset all bistables. 6.24.28 Echnician Sate

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

UNITS 2 AND 3

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INSTR. AND TEST PROCEDURE SO23-11-3.3 REVISION 1 PAGE 1 OF 11 ATTACHMENT 8.1

# DATA COLLECTION TABLE

DATA COLLECTION TABLE		TCN# 1
DESCRIPTION	VALUE	Roye 32/16
DATA COLLECTION TABLE  DESCRIPTION  PT-0101-2 High Pzr Press PT-0102-3 Low SG-1 Press PT-1013-3 Low SG-2 Press PT-1023-3 Low SG-2 Press LT-1113-3 Low SG-2 Level LT-1123-3 Low SG-2 Level LT-1123-3 Low SG-2 Level PT-0352-3 High High Cont. Press LT-0305-3 Low RWT Level PDT-0978-3 Low SG-2 Flow TE-0112-3 TE-9178-3 TE-9178-3 TE-9178-3 TE-9179-3 RTSG Uncorrected High Linear Power to RTSG High Log Bistable to RTSG High Log Preamp Low Temperature II+12CA TT-9178-3 High Temperature II+12CA TT-9178-3 High Temperature II+12CA TT-9178-3 PT Pressure Excore Power ST 113A W1 RCP Speed ST 133 W3 RCP Speed ST 143 W4 RCP Speed ST 134 W1 RCP Speed ST 135 W2 RCP Speed ST 135 W2 RCP Speed ST 135 W2 RCP Speed ST 136 Press to RTSG ow Pzr Press to RTSG ow SG-1 Level to EFAS-1 ow SG-2 Level to EFAS-2 ow SG-1 Press to RTSG ow SG-1 Level to EFAS-2 ow SG-1 Press to RTSG SW SG-2 Press to	VALUE	TCN# 1 Roge 3) 16 UNITS
gh Cont. Press to CCAS gh Cont. Press to SIAS w SG-1 Flow to RTSG w SG-2 Flow to RTSG gh-High Cont. Press to CSAS		
	DATA COLLECTION TABLE  DESCRIPTION  PT-0101-3 High Pzr Press PT-0102-3 Low SG-1 Press PT-0102-3 Low SG-1 Press PT-1023-3 Low SG-1 Level LT-1113-3 Low SG-2 Level PT-0351-3 High High Cont. Press IT-0305-3 Low SG-1 Flow PDT-0978-3 Low SG-2 Flow IE-0122-3 TE-9178-3 TE-9178-3 TE-9178-3 TE-9179-3 RTSG Uncorrected High Linear Power to RTSG High Log Bistable to RTSG High Log Bistable to RTSG High Log Preamp Low Temperature <u>TI+10244</u> TT-9178-3 High Temperature <u>TI+10244</u> TT-9178-3 Pzr Pressure Excore Power ST 113A W1 RCP Speed ST 123 W2 RCP Speed ST 123 W2 RCP Speed ST 133 W3 RCP Speed ST 133 W3 RCP Speed ST 143 W4 RCP Speed ST 133 W3 RCP Speed ST 143 W4 RCP Speed ST 143 W4 RCP Speed ST 143 W4 RCP Speed ST 143 W2 RCP Speed ST 143 W4 RCP Speed ST 143 W2 RCP Speed ST 145 VC RTSG ow SG-1 Level to RTSG ow SG-1 Level to RTSG Sow SG-1 Level to RTSG Sow SG-2 Level to RTSG Sow SG-1 Level to RTSG Sow SG-2 Level to RTSG Sow SG-2 Press to RTSG Som SG-2 Press to RTSG Sow SG-2 Press to RTSG Som	DATA COLLECTION TABLE       DESCRIPTION     VALUE       PT-0101-2 High Prr Press     Press       PT-0102-3 Low SG-1 Press     Press       PT-1013-2 Low SG-1 Press     Press       PT-1013-3 Low SG-1 Level     LT-1113-3 Low SG-2 Level       LT-1113-3 Low SG-2 Level     Pr-0052-3 High High Cont. Press       PT-0305-3 Low SG-1 Flow     Press       PT-0305-3 Low SG-2 Flow     TE-0112-3       TE-0112-3     TE-9178-3       TE-0122-3     TE-9178-3       TE-0122-3     TE-9178-3       TE-0122-3     TT-9178-3       TE-0122-3     TE-9178-3       TE-0122-3     TT-9178-3       TE-9179-3     RISG Uncorrected       High Linear Power to RISG     High Linear Power to RISG       High Log Bistable to RISG     High Temperature_ILI22CH TT-9178-3       Low Temperature_ILI22CH TT-9178-3     Press to RISG       SUM TEMPErature_ILI22CH TT-9178-3     Press to RISG       Nigh Temperature_ILI22CH TT-9178-3     Press to RISG       Nigh Temperature_ILI22CH TT-9178-3     Press to RISG       Now Temperature_ILI22CH TT-9178-3     Press to RISG       Nigh Var Press to RISG     Now Press to RISG       Now Press to RISG     Now Press to RISG       Now Press to RISG     Now SG-1 Level to RISG       Now SG-1 Level to RISG     Now SG-2 Press t

- Pressurizer Pressure Low 1.
  - SIAS (see Safety Injection) a.
- 2. Safety Injection
  - High Pressure Safety Injection 4.

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

Low Pressure Safety Injection 5.

*P015	
*HV-9325	
*HV-9328	

c. Charging Pumps

	and the second se
P-190	
P-191 (If Aligned)	
Inment Isolation	

3. Conta

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

4. Containment Spray Pumps

1-6	-102	
Containment	Emergency Cooling	

CCW Pumps

5.

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

S023-II-3.3 Poge 49/6 R-1 TCN#7

TRAIN A

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

Field Comp.	Per Time		1	1-1	TCNA /
	Rec. IIme	Test No.	Relay Time	Test No.	Total Time
HV-6212 HV-6218					

SO23-TI-3,3.

Poge 50016

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

HV-6366	 	
HV-6367		
HV-6370		
HV-6371		

d. Emergency Cooling das

*F_ 200		 	
L=399			
*E-401			
 the second s	and a second sec		

### 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

*HV-9367		T	
*HV-6501			
	and the first state of the second	A CONTRACT THE DAY	

8. Steam Generator Pressure Low

a. MSIS

(1) Main Steam Isolation (MSIV)

HV-8204			
HV-8205		1964 Sec. 1. N.	

SO23-II-3.3\_ Poge 60/16 R-1 TCN# 57

### (2) Main Feedwater Isolation

Field Comp. Rec. Time Test No. Relay Time Test No. Total Time HV-4048 HV-4052

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

HV-4054	 	
HV-4058		
HV-8203		
HV-8248		
HV-8219		

# (4) Auxiliary Feedwater Isolation

HV-4705		 	and the second se	
HV-5713				
HV-4730				
HV-4731				
11-4/31				

# 9. Refueling Water Storage Tank

#### a. RAS

1

(1) Containment Sump Valves Open

*HV-9303		 
(2) ECCS Miniflow Valves	Shut	

### \*HV-9306 \*HV-9307

# 10. 4.16 KV. Emergency Bus Undervoltage

a. LOV (Loss of voltage and degraded voltage)

SO23-II-5,3 poye 7:916 RI TCN#7

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

EFAS a.

1

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

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

SO23-II-3.3 fby 28 g16 R-1 TCN# 17

Field Comp.	Rec. Time	Test No.	Relay Time	Test No.	Total Time
*P019 *P018 (If aligned) *HV-9323 *HV-9326 *HV-9329 *HV-9332					

TRAIN B

#### b. Low Pressure Safety Injection

the second se	the second s	the state of the state of the second state of		
*P016 *HV-9322 *HV-9331				

c. Charging Pumps

Contraction of the second seco	A DESCRIPTION OF THE OWNER OWN	and the second state of th		
P-192				
P-191 (If Aligned)				计输出 经工具
have and an		And the second se	a da ser de la companya de la compa	States ( Addition of the

#### 3. Containment Isolation

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

#### 4. Containment Spray Pumps

*P-103		 	

#### 5. Containment Emergency Cooling

a. CCW Pumps

*P-026	
P-025 (If Aligned)	

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

al Time	Total	Test No.	Relay Time	Test No.	Rec. Time	Field Comp.
			THE REAL PROPERTY OF THE			HV-6213 HV-6219
						HV-6219

3005 11-3,5

5 14 7 10ge 9 9/16

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

HV-6368		 
HV-6369		
HV-6372		
HV-6373		

d. Emergency Cooling Fans

and the second sec		
*E-400		 
*E-401		
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

*HV-9368		and a state of the	
*HV-6500			
	1 1		

### 8. Steam Generator Pressure Low

a. MSIS

(1) Main Steam Isolation (MSIV)

	and the second
HV-8204	
HV-9205	
HV-0203	

Main Feedwater Isolation

Field Comp.	Rec. Time	Tart No.		1-1 1	10 /
HV-4048	1	Test NO.	Relay Time	Test No.	Total Time
HY-4052					

S023-I-53

Page 10 g 16

(3) Steam, Blowdown, Sample and Drain Isolation

HV-4053 HV-4057		1	T
HV-8202			1. Sec. 19 (1963)
HV-8249		1	
HV-8221			1999-001-01-01
	and the second		A second s

(4) Auxiliary Feedwater Isolation

HV-4706	 1	
H¥-5712		
HV-4714		
HV-4715		
	1	

- 9. Refueling Water Storage Tank
  - RAS .
    - (1) Containment Sump Valves Open

*HV-9302	1	
L		

(2) ECCS Miniflow Valves Shut

And and a state of the state of	The second se		
<b>*HV-9347</b>		and the second se	and the second sec
*HV-9348			

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

(2)

SU23-II-3.3 Parge 11 of 16 RI TON # 17

- 11. Steam Generator Level-Low (With Either No Pressure-Low Trip or △P-High)
  - - (1) Aux. F.W. AC Train

Field Comp.	Rec. Time	Tost No		1.1	
*P-504	1	Test NO.	Relay Time	Test No.	Total Time
*HV-4712 *HV-4714 *HV-4053					

IN UCHERALING STATION -UNITS 2 .

INSTRUMENT AND TEST PROCEDURE S023-11-3 3 REVISION 1 PAGE 7 OF 11 ALTACHMENT 8.1

Parga 12286

to RISG

•Neutron detectors are exempt from rosponso time testing. Response time of the neutron flux signal portion of the channel shall be measured from dictustor output or input of first electronic component in channel. e-Masponse time shall be measured from the onset of a single CEA drop.

. . .

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

##Mesponse time shall be monutured from the output of the sensor. RID response time shall be measured at least once per 18 months by means of the lump furrent Step Hesponse (LCSR) method. The measured R of the slowest T

All Response time shall be munsured from the output of the pressure transmitter. The transmitter response time constant shall be less than or equal to 0.7 seconds vhere 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

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UNITS 2 , SCHERALING STATION 1

INSTRUMENT AND TEST PROCEDURE SO23-11-3.3 REVISION 1 PAGE 8 OF 11 ATTACHMENT 8.1

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1. 4.

		INSTRUM REVISIO ATTACIM	NT AND TEST PROCEDURE	S023-11-3 3 PAGE 8 OF 11	Roge 13816
했는 영화에서 이 것이 같은 것이다.	RESPONSE TIME	ABLE (Continued)			
	React	or Trips			TIN#M
Function	CPC Signal RTS	G Total	Tech Same		101-1
Local Power Density Hi	I Corre	cted) Response Time	Accept. Crit.	Verified Initiel/Date	
1. Ex-Core Detectors					
2. CEA Positions			.68 #ec*		
DHOR LOY			-53 60C**		
1. Ex-Core Detectors					
2. CEA Position			.68 sec*		
3. Cold Leg Temp.			.68 sec**		
4. Hot Lag Temp.			.68 sec##		
5. RC Pump Shaft Speed			.68 sec##		
6. PRSRZR Pressure			.68 sec#		
MOTE: Cold and Hot Leg Temperat basis. Record the time of	ture sensors are respo	nse time tested on a st	.68 sec###		
1. Cold Log lowp. So	value/units	Acceptance Criteria 5.4 sec	Verified		
2. Hot Leg lomp. Sun	5018		initial/date		
DINOILS:	value units	5.4 Bec	initial/date		
Neutron detectors are usingt from to	sponso time tosting.	Response time of the			
Response time shall be mentalized from	a the onset of a similar	of first electronic co	mponent in channel.	tion of	
tesponse time shall be must the		o cen arop.			

measured from the easet of a 2 out of 4 Reactor Coolant Pump coastdown.

##Response time shall be measured from the output of the sensor. RID response time shall be measured at least once per 18 months by means of the Loop Current Step Response (LCSK) method. The measured R of the slowest RTD shall be loss than or equal to 6.0 soconds. (5.4 sec. mater allowance for a +/- accuracy of the test equ staresponse 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

JULLAN VENERATING STATION INITS 2 AND 3

INSTRUMENT AND TEST PROCEDURE S023-11-3.3 POGE 14086 REVISION 1 ATTACHMENT 8.1 TCN# M

RESPONSE TIME TABLE

ESFAS

Function	Sensor	LO ESFAS	Components	Total Response Time	Tech. Spec. Accept. Crit	Verified
PZR Press Low HPSI					< 31.2 sec*	THILIPI/PELS
PZR Press Low					≤ 41.2 sec*	
PZR Press Low Cntmt. Isol.					≤ 11.2 sec* Note 2	
PZR Press Low Cotet. Spray Pumps					and 3 ≤ 25.6 sec*	
PZR Press Low COM Pumps					≤ 31.2 sec*	
PZR Press Low COM Valves					2 1.2 sec Note 4 a	
CCW Values					≤23.2 sec note 4 b	
Cntat. Press High					5 k1 0 sect	
Cotat. Press High					< 41.0 sec*	
Cotet. Press High Cotet. Spray Pumps					< 25.4 sec*	
Cotet. Press High COM Pumps					≤ 31.0 sec*	

#### FOOINOTES:

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 2. 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.

A C CCW non-critical loop isolation valves HV-6212, HV-6213, HV-6218 and HV-6219 are closed .

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

46. Containment emerymen cooler cew isolation valves 40-6366, 40-6367, 40-6369, 40-6369, 40-6369, 40-6369, 40-6370, 40-6371, 40-6372, 40-6573 Gre man.
INSTRUMENT AND TEST PROCEDURE S023-11-3 3. REVISION 1 PAGE 10 OF 11

Poge 152816 TCN# 07

# RESPONSE TIME TABLE

#### ESFAS

### (Continued)

Function	Senser	to Estas	Field Intel	
Cotat Press High			Components Response Time	Accept, Crit, Initial/Date
Cotat. Press High Emer. Cig. Fans				\$ 11.0 BBC NOLE 4
Cotat. Press High Cotat. Isol.				≤ 21.0 sec*
Cotat. Press High- High Cotat. Spray		•		≤ 10.9 sec* Note 2
SG-1 Press Low MSIV				≤ 21.0 sec*
BO-1 Press Low MFW Isol.				≤ 20.9 sec
BO-2 Press Low				≤ 10.9 sec
EQQINOTES:				≤ 20.9 sec

1.

TIJ Z AIL

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

Emergency dissel gamoratur starting dutay (10 sec.) and sequence loading delays for SIAS are included. Response time includes unergancy direct generator starting delay (applicable to AC motor operated valves other 2. 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 MFIVE.

AQUE CON NON-Critical loop isolation valvus HV-6212, HV-6213, HV-6218 and HV-6219 are closed, 3. Response time includes instrumentation, logic and isolation damper closure times only.

46 Containment emergency cooler ccw isolation ublives 40-6366, 40-6367, 40-6368, 40689. 40-6370, 40-6371, 40-6372 and 40-6373 are open

TINSTRUMENT AND TEST PROCEDURE SO23-11-33 REVISION 1 ATTACHMENT 8.1 TW#7

40-6369

# RESPONSE TIME TABLE

MIIS 2 M- 3

12

### ESFAS

## (Continued)

Function	Sensor	to ESFAS	Field Components	Totel Response Time	Tech. Spec.	Verified
MFW Isol.					- recope. crite.	Initiel/Dete
Low MWT LVL Cntmt. Sump VLVs Open					≤ 10.9 sec*	
ECCS Miniflow VLVs Shut					≤ 40.7 sec* (W	nitz)
00-1 LVL LOW					≤ 50, 7 sec* (un	it3)
AC Trains					≤ 40.9 sec*	·. ·
Ant. FV Ant. FV Stm./DC Train					≤ 30.9 sec	
Aux. IN AC Trains					≤ 40.9 sec*	
G-2 LVL LOW Aux. FW Stm./UC Train					≤ 30.9 sec	
DOINOILS:						
Response timos inc		1.05.001000				
Emergency diesel o	UDOCALOF BLA	t in virvas and	attainment of	pump or blower disc	charge pressure as a	pplicable.
Response time incl	udes emproved	CY diment	nuc.) and saque	ence loading delays	for SIAS are Inclu	ded.
then containment p isolation veive ci	osure times.	, instrumentatio	n and logic rea	ponse unly. Refer	AC motor operated to table 3.6-1 for	valves other containment
All CIAS-Acturted	valves except	MSIVE and MILV	s.			
CON non-oritical I	oop isolation	Valves HV-6212	HV-6213, HV-6	218 and HV care at	0 0	
Response time incli	udes instrume	intation, logic.	and isolation	dama HV-0219000	e closed,	
636				damper closure tim	es only.	
46. Containin	unt ener	genery code	n cc w isol	Latin volu	2 HU-6366, M	48-6367, 40-63
40 0510	00-05/1	60-6372 per	d HU-6373	are open		
					2.70	

- SAN ONOFRE NUCLEAR	GENERATING STATION
UNITS 2 AND 3	
EFFECTIVE DATE:	JUN 2 1 1982

INSTRUMENT AND TEST PROCEDURE S023-II-3.3 REVISION 1 PAGE 1 CDM ENCODE NO. NC119-TRP

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

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### PLANT PROTECTION SYSTEM RESPONSE TIME TEST FOR CHANNEL C (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

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

### 3.0 PREREQUISITES

- 3.1 The Watch Engineer's approval is required prior to the beginning of the work.
- 3.2 Equipment clearance(s) or permission, as applicable, must be obtained from the Control Operator Before beginning work.
- 3.3 An approved equipment outage request (OD-16) if required, is on file in the Control Room.
- 3.4 Check the applicable radiation and contamination survey 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.

### 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 H20
- .2 Pressure Transmitter Validyne DP15TL or equivalent
- .3 Recorder dual trace (frequency response 100 Hz)
- .4 DVM Fluke 9500A 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-18
- 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)
  - .6 Assorted test leads, coaxial cables
- 3.5 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.

UNITS 2 AND 3

#### 4.0 PRECAUTIONS

- 4.1 Observe proper electrical precautions when working on energized equipment.
- 4.2 Follow proper procedures when connecting and disconnecting the 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
- 4.4 Nuclear instrument cable connectors must be kept clean during safety channel testing.
- 4.5 Advise operations of the status of all signal outputs from a transmitter prior to tagging the transmitter out of service and isolate the signal outputs as necessary to maintain the plant in a safe condition.
- 4.5 Do not open the ID-100 "sight gauge/fill" valve when the unit is pressurized.
- 4.7 The rated pressures and currents of the transmitters and components being tested should not be exceeded.
- 4.9 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 C calibration S023-II-5.1

Technician Date

UNITS 2 AND 3

SAN ONOFRE NUCLEAR GENERATING STATION INSTRUMENT AND TEST PROCEDURE SO23-11-2-3-REVISION 2 PAGE 5

5.0 CHECK-OFF LIST

+

5.1.2 Pressurizer pressure wide range channel 0102-3 calibration S023-II-9.503

> Date Technician

5.1.3 Pressurizer pressure wide range channel 0102-3 calibration S023-II-9.504

Date Technician

5.1.4 S/G pressure (PPS and ESFAS) calibration S023-II-9.512

Date / Technician

S/G level (PPS and ESFAS) calibration S023-II-9.513 5.1.5

5.1.6 RWT level (ESFAS) calibration S023-II-9.515

Date / Technician

5.1.7 Containment press (PPS and ESFAS) calibration S023-11-9.511

5.1.8 S/G differential pressure calibration S023-II-9.591

Date Technician

5.1.9 Reactor coolant system differential pressure calibration SD\_3-II-9.540

5.1.10 Reactor coolant system hot leg temperature to CPCS calibration S023-II-9.509

Date Technician

SAN ONDERE NUCLEAR GENERATING STATION INSTRUMENT AND TEST PROCEDURE S023-11-3.3 UNITS ? AND 3

### REVISION O PAGE 6

#### 5.0 CHECK-OFF LIST

5.1.11 Reactor coolant system cold leg temperature to CPCS calibration S023-II-9.509

> Technician Date

5.1.12 CPC calibration S023-11-6.2.2



5.1.13 CEAC calibration S023-II-5.2.4



- 5.0 PROCEDURE
  - 5.1 Equipment Setup

Disconnect transmitter wiring at the Foxboro cabinets 5.1.1 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 junpers to the contact input terminals with the normal input leads lifted.

### CHANNEL A

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 1-36/37	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	Lo∢ SG-1 Press. SG-1 P	L-121 TB 1-33/34	3.50 VDC	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 Lo. Flow	L-121 TB 3-19/20	5.00 VDC	Date Tech

UNITS 2 AND 3

SAN ONOFRE NUCLEAR GENERATING STATION INSTRUMENT AND TEST PROCEDURE SO23-11-3.3 REVISION O PAGE 7

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## 5.0 PROCEDURE

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### 6.1.1 (Continued)

CHANNEL A (Continued)

Transmitter	PPS Parameter	Terminal Board Location	Initial Signal Value/Status	
Contact	DN3R Trip	TBA2-62/63	CLOSED	/ Date Tech
Contact	DN3R Pretrip	TBA2-64/55	CLOSED	/ Date Tech
Contact	LPD Trip	TBA2-66/67	CLOSED	Date Tech
Contact	LPD Pretrip	TBA2-58/59	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	T3A7-42/43	CLOSED	/ Date Tech
PT-1023-1	Low SG-2 Press. SG-2 P	L-121 TB 1-30/31	3.70 VDC	Date Tech
PT-0351-1	High Cont. Press. RPS High Cont. Press. ESF	L-121 T3 1-43/44	1.00 VDC	/ Date Tech
PT-0352-1	Hi-Hi Cont. Press.	L-121 TB 1-45/47	1.00 VDC	/ Date Tech
LT-0305-1	Low RWT Level	L-121 TB 1-27/23	2.50 VDC	/ Date Tech

# CHANNEL B

Transmitter	PPS Parameter	Terminal Board Location	Initial Signal Value/Status	
PT-0101-2	High Pzr. Press.	L-125 TB 1-39/40	4.00 VDC	/ Date Tech

SAN ONOFRE NUCLEAR GENERATING STATION INSTRUMENT AND TEST PROCEDURE SO23-11-3.3 UNITS 2 AND 3

REVISION O PAGE 8

# 6.0 PROCEDURE

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# 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-035?-2	Hi-Hi Cont. Press.	L-125 TB 1-46/47	1.00 VDC	Date Tech
LT-0305-2	Low RWT Level	L-125 T3 1-35/37	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	T382-62/63	CLOSED	/ Date Tech
Contact	DN3R Pretrip	TBB2-54/65	CLOSED	/ Date Tech
Contact	LPD Trip	TBB2-56/57	CLOSED	/ Date Tech
Contact	LPD Pretrip	TBB2-58/69	CLOSED	/ Date Tech

SAN ONOFRE NUCLEAR GENERATING STATION INSTRUMENT AND TEST PROCEDURE S023-11-3.3 UNITS 2 AND 3

REVISION O PAGE 9

# 5.0 PROCEDURE

. .

# 6.1.1 (Continued)

# CHANNEL B (Continued)

Transmitter	PPS Parameter	Terminal Board Location	Initial Signal Value/Status		
Contact	CWP	T382-70/71	CLOSED	Date	/ Tech
Contact	Turbine Trip	TB32-123/124	CLOSED	Date	/ Tech
Contact	55% Power	TBB7-24/25	CLOSED	Date	/ Tech
Contact	10-4% CPC Bypass	T337-42/43	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	Lov Pzr. Press. Pzr. Press. Bypass	L-129 T3 1-39/40	1.00 VDC	Date Tech
LT-1113-3	Lo∵ 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-123 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-127 T8 1-33/34	3.70	/ Date Tech

UNITS 2 AND 3

SAN ONOFRE NUCLEAR GENERATING STATION INSTRUMENT AND TEST PROCEDURE S023-11-3.3 REVISION O PAGE 10

## 6.0 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-9305-3	Low RWT Level	L-129 TB 1-30/31	2.50 VDC	/ Date Tech
PDT-0979-3	SG-1 Low Flow	L-129 TB 3-13/14	5.00 100	Date Tech
PDT-0379-3	SG-2 Low Flow	L-129 TB 3-19/20	5.00 VDC	Date Tech
Contact	DNBR Trip	T3C2-52/53	CLOSED	Date Tech
Contact	DNBR Pre-trip	TBC2-54/55	CLOSED	Date Tech
Contact	LPD Trip	TBC2-65/67	CLOSED	/ Date Tech
Contact	LPD Pre-trip	TBC2-69/59	CLOSED	/ Date Tech
Contact	CWP	TBC2-70/71	CLOSED	/ Date Tech
Contact	Turbine Trip	TBC2-123/124	CLOSED	/ Date Jech
Contact	55% Power	TBC7-24/25	CLOSED	/ Date lech
Contact	10-4% CPC Bypass	T3C7-42/43	CLOSED	/ Date Tech

UNITS 2 AND 3

SAN ONOFRE NUCLEAR GENERATING STATION INSTRUMENT AND TEST PROCEDURE S023-11-3.3 REVISION O PAGETT

# 5.0 PROCEDURE

5

# 5.1.1 (Continued)

		CHANNEL D		
Transmitter	PPS Parameter	Terminal Board Location	Initial Signal Value/Status	
PT-0101-4	High Pzr. Press.	L-133 TB 1- 7/9	4.00 VDC	/ Date 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	/ Date 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	1.00 400	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-0973-4	SG-1 Low Flow	L-133 TB 3-13/14	5.00 VDC	/ Date Tech
PDI-0979-4	SG-2 Low Flow	L-133 TB 3-19/20	5.00 VDC	Date Tech
Contact	DN3R Trip	T3D2-52/53	CLOSED	/ Date Tech
Contact	DNBR Pre-trip	TBD2-64/65	CLOSED	/ Date Tech

INSTRUMENT AND TEST PROCEDURE S023-II-3.3 REVISION 0 PAGE 12

5.0 PROCEDURE

. .

5.1.1 (Continued)

CHANNEL D (Continued)

Transmitter	PPS Parameter	Terminal Board Location	Initial Signal Value/Status		
Contact	LPD Trip	T302-55/57	CLOSED	Date	/ Tech
Contact	LPD Pre-trip	TBD2-08/69	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	Date	/ Tech
Contact	10-4% CPC Bydass	TBD7-42/43	CLOSED	Date	/ Tech

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

Date / Technician

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.

Date Technician

SAN ONOFRE NUCLEAR GENERATING STATION

INSTRUMENT AND TEST PROCEDURE S023-11-3.3 REVISION 0

6.0 PRULEDUKE

6.1.4

Install jumpers in 2L034 and 2L035 on TB-55, TB-55, TB-75, and TB-85 between the following terminals: 25 and 27, 23 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.

5.1.5

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.

.1 Connect a regulated supply of pressurized gas to the 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.



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



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

Technician Date

SAN ONOFRE NUCLEAR GENERATING STATION

- 5.0 PRUCEDURE
  - 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.



- 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.

Date Technician

2.0 Phose DUNE

1

6.1.5.6

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

Date Technician

ATTO IN

.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	CLUSED

Gauge Isolation OPEN

Pressurize INITIAL

Signal Isolation OPEN

Pressure Bleed CLOSED

Vent/Drain CLOSED

Sight Gauge/Fill CLOSED

Drain CLOSED

Technician

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

Date

o Drain valve

o Process sensor vent

o Reference Transducer bleed port (use allen wrench supplied with the unit)

o Close the process transmitter bypass valve (if applicable)

Date Technician

INSTRUMENT AND TEST PROCEDURE S023-11-3.3 REVISION 0

SAN ONOFRE NUCLEAR GENERATING STATION UNITS 2 AND 3

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5.1.5.9

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

6.0

INSTRUMENT AND TEST PROCEDURE SO23-11-3.3 REVISION C

	Drain	/ Technician
	Deain	CLOSED
	Sight Gauge/Fill	CLOSED
5.1.5.10	Drain/Vent	CLOSED
		and the second

.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.



.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

INSTRUMENT AND TEST PROCEDURE S023-11-3.3 REVISION 0

SAN ONOFRE NUCLEAR GENERATING STATION UNITS 2 AND 3

5.0 IRUNEUUNE

5.1.5.13

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.



.14 Install a 5 psid diaphragm and 0.5% accuracy pressure 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 b 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.

Response Time Testing of High Pressurizer Pressure Sensor

5.2 Response 11 PT-0101-2

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.

INSTRUMENT AND TEST PROCEDURE S023-II-3.3 REVISION 0 PAGE 19

1.0 100000.RE

6.2.1

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

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

Date Technician

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.

Date Technician

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 6.2.2 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).

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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.

SAN ONOFRE NUCLEAR GENERATING STATION INSTRUMENT AND TEST PROCEDURE S023-II-3.3 UNITS 2 AND 3 PAGE 20

0.0	6.2.3	(Continue:	1)
	NOTE:	Use the definition following step	itions and equations below to help perform the ps:
		Definitions	time is
		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	<ul> <li>The pressure on the hydraulic accumulator, reference transducer, and process sensor at the beginning of the test.</li> </ul>
		PDRIVE	<ul> <li>The pressure in the pneumatic accumulator at the beginning of the test.</li> </ul>
		Span	- The absolute range of the pressure senor.
		UP -RAMP	
		PINITIA	L = PSETPT05 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.
		DOWN-R	AMP
		PINITI	AL = PSETPT + .05 span
		PORTVE	= PINITIAL5 span
	6.	2.4 Close by slo to Psi Table trans	the PRESSURE BLEED valve and pressurize the unit owly opening the GAS ISOLATION valve. Pressurize ETPT or PINITIAL, whichever is greater. I of Appendix C lists the specific values for each mitter.
			/

	/
Date	Technician

# INSTRUMENT AND TEST PROCEDURE S023-II-3.3 REVISION O

SAN ONOFRE NUCLEAR GENERATING STATION UNITS 2 AND 3

6.2.6

### Adjust the SPAN control for maximum output or null U.U PROULOUL point + 10 VDC, whichever is less. 5.2.5

Technician Date

Pressurize the unit to PINITIAL.



Operate REFERENCE XMTR BIAS and PROCESS XMTR BIAS controls to place the recorder traces in an appropriate position on the recorder chart. For an 5.2.7 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

5.2.9

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.



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

Date / Technician

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INSTRUMENT AND TEST PROCEDURE S023-II-3.3 REVISION O

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 9 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.

Opening the PRESSURE BLEED valve provides a vent NOTE: 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 6.2.10

Line up the valves on the hydraulic signal generator as .1 follows:

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

INSTRUMENT AND TEST PROCEDURE S023-11-3.3 REVISION 0

6.2.10.1 Vent/Drain

414

Sight Gauge/Fill

Drain

CLOSED / Date Technician

CLOSED

CLOSED

6.2.11 Up Ramp Generation

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

Date Technician

.2 Slowly open the "signal isolation" valve.

Date Technician

.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.

Date / Technician

.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

INSTRUMENT AND TEST PROCEDURE S023-II-3.3 REVISION O

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SAN ONOFRE NUCLEAR GENERATING STATION UNITS 2 AND 3

6.0 PRUSEUUILE

6.2.11.5

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 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 point of intersection with the raference 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, <sup>D</sup>Drive, <sup>P</sup>Setpt, signal rate setting, fluid level, timing mark interval, date, chart drive speed, and the words: "diagnostic self-test."

Date Technician

INSTRUMENT AND TEST PROCEDURE S023-II-3.3 REVISION O

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SAN ONOFRE NUCLEAR GENERATING STATION UNITS ? AND 3

.10

Perform the diagnostic self-test twice and compare PRODECURE 5.0 the results with the signal traces for the same tests 5.2.11.9

supplied with the unit.

Date	
Examine the trace of each signal for th qualitative waveform characteristics. results are acceptable as follows:	e following Verify the

- Linear wichin a visual "best fit" from (a) to PSETPT. P
- Complete absence of high frequency components (b) (noise).
- Sharp and clearly defined "knee" on leading (c) edge of test signal.
- The signal ramp rate has not decreased more than 5% of the ramp rate of the original base (d)
  - line signal traces supplied with the unit.

Technician Date

6.2.12

If diagnostic self-test is satisfactory, produce another dual trace as in step 5.2.11.9. 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 "High Pressurizer Pressure Sensor," "PT-0101-3"

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Date	Technician
	the norma

6.2.13

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

Technician Date

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6.3

INSTRUMENT AND TEST PROCEDURE S023-II-3.3 REVISION 0 PAGE 26

 ROCEDURE	and and anorator is vented and
5.2.14	Ensure the hydraulic signal generators itter. disconnect it from the process transmitter.
	1

Date Technician

5.2.15 Following appropriate procedures, return process transmitter to service.

echnician Date

Response Time Testing of Low Pressurizer Pressure Sensor PT-0102-3

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.

5.3.1 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.

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Date	Technician

INSTRUMENT AND TEST PROCEDURE S023-II-3.3 REVISION O

SAN ONOFRE NUCLEAR GENERATING STATION UNITS 2 AND 3

TOCEDURE

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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 5.3.2 and with the same polarity (e.g., if the voltage on 6.3.2 was -15'IV, adjust the ZERO control for a reading of -15MV).



to avoid exceeding the pressure range of CAUTION 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 to be determined (usually PSETPT 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 at the beginning of the PORIVE 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.

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6.3.3 (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 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.



6.3.6 Pressurize the unit to PINITIAL.



6.3.7 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.



5.3.8

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.

Date Technician

SAN ONOFRE NUCLEAR GENERATING STATION

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6.3.9

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 9 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.

- 5.3.10 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

INSTRUMENT AND TEST PROCEDURE S023-11-3.3 REVISION 0 PAGE 30

6.3.10.1 (Continued)

Drain/Vent

Sight Gauge/Fill

Drain

an an

CLOSED

CLOSED

CLOSED

Date Technician

6.3.11

Down-Ramp Generation

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

Date Technician

.2 Slowly open the "signal isolation" valve.

Date Technician

.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.

Date Technician

.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

### 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.

.7 The unit is ready to generate the appropriate 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

### 5.0 PROCEDURE

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

> \_\_\_\_/ 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.



6.3.12 If diagnostic self-test is satisfactory, produce another dual trace as in step 6.3.11.9. 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 "Low Pressurizer Pressure Sensor," "PT-0102-3"



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



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

Technician Date

5.3.15 Following appropriate procedures, return process transmitter to service.

Date / Technician

- 5.4 Response Time Testing of Low SG-1 Pressure Sensor PT-1013-3
  - 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 counterclock vise position. Note the reading on the DVM.

Date Technician
SAN ONOFRE NUCLEAR GENERATING STATION INSTRUMENT AND TEST PROCEDURE S023-11-3.3 UNITS 2 AND 3

### 5.0 PROCEDURE

5.4.3

Adjust the SPAN control to the fully clockwise position. Adjust the ZERO control until the DVM indicates the voltage noted in paragraph 5.4.2 and with the same polarity (e.g., if the voltage in 5.4.2 was -15%V, adjust the ZERD 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 PSETPT 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 accunulator 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.

5.4.9

INSTRUMENT AND TEST PROCEDURE SO23-II-3.3 REVISION 0 PAGE 35

6.0 PROCEDURE

6.4.3 DOW'-RA'P

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 PSETPT 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.



6.4.6 Pressurize the unit to PINITIAL.

Date Technician

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.



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.



INSTRUMENT AND TEST PROCEDURE S023-II-3.3 REVISION 0 PAGE 35

6.0 PROCEDURE

5.4.9

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 slover 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.

- 6.4.10 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 SAN DNOFRE NUCLEAR GENERATING STATION INSTRUMENT AND TEST PROCEDURE S023-11-3.3 UNITS 2 AND 3 REVISION 0 PAGE 37

- 5.0 PROCEDURE
  - 6.4.10.1.1 Pressure Bleed CLOSED Drain/Vent CLOSED Sight Gauge/Fill CLOSED Drain CLOSED

Date Technician

- 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.

Date Technician

INSTRUMENT AND TEST PROCEDURE S023-II-3.3 REVISION 0 PAGE 38

- 6.0 PROCEDURE
  - 5.4.11.6 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.
- .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

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# 5.0 PROCEDURE

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

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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

6.4.12

If diagnostic self-test is satisfactory, produce another dual trace as in step 6.4.11.8. 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 "Lo SG-1 Pressure Sensor," "PT-1013-3"



6.4.13

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



UNITS 2 AND 3

### 6.0 PROCEDURE

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

5.4.15 Following appropriate procedures, return process transmitter to service.

6.5 Response Time Testing of Low SG-2 Pressure Sensor PT-1023-3

- 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

6.5.2

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

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# 5.0 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 5.5.2 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.

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- 5.0 PROCEDURE
  - 5.5.3 DOWN-RA'1P

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 PSETPT or PINITIAL, whichever is greater. Table 1 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.



6.5.6 Pre

Pressurize the unit to PINITIAL.

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.



5.5.8 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.



6.0 PROCEDURE

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5.5.9

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 9 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 slover 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
  - .1 Line up the valves on the hydraulic signal generator as follows:

Gas Isolation CLOSED Gauge Isolation OPEN Pressurize DRIVE Signal Isolation CLOSED SAN ONOFRE NUCLEAR GENERATING STATION INSTRUMENT AND TEST PROCEDURE S023-11-3.3 UNITS 2 AND 3

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- 6.0 PROCEDURE
  - 5.5.10.1 Pressure Bleed CLOSED Drain/Vent CLOSED Sight Gauge/Fill CLOSED Drain CLOSED.

6.5.11 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

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.

.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

INSTRUMENT AND TEST PROCEDURE S023-HI-3.3 REVISION 0 PAGE 45

- 6.0 PROCEDURE
  - 6.5.11.5 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, <sup>P</sup>Drive, <sup>P</sup>Setpt, signal rate setting, fluid level, timing mark interval, date, chart drive speed, and the words: "diagnostic self-test."

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Date	Technician

## 6.0 PROCEDURE

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

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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

5.5.12 If diagnostic self-test is satisfactory, produce another dual trace as in step 5.5.11.9. 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 "Low SG-2 Pressure Sensor," "PT-1023-3"



5.5.13



Disconnect all test leads and reconnect the normal

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

Date Technician

6.5.15 Following appropriate procedures, return process transmitter to service.

- 5.6 Response Time Testing of Low SG-1 Level Sensor LT-1113-3
  - 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.
  - 5.5.1 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.



INSTRUMENT AND TEST PROCEDURE SD23-II-3.3 REVISION 0 PAGE 43

## 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 6.6.2 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.

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- 5.0 PROCEDURE
  - 6.6.3 DOW:1-RA'1P

PINITIAL = PSFTPT + .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 1 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.

6.6.5 Pressurize the unit to PINITIAL.

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.

6.6.8

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.

6.0 PROCEDURE

6.6.9

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

Date echnician

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 10-100
  - .1 Line up the valves on the hydraulic signal generator as follows:

Gas Isolation CLOSED Gauge Isolation OPEN Pressurize DRIVE Signal Isolation CLOSED

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5.0 PROCEDURE

6.6.10.1

Pressure Bleed CLOSED

Drain/Vent CLOSED

Sight Gauge/Fill CLOSED

Drain CLOSED

Date Technician

6.5.11

Down-Ramp Generation

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

Slowly open the "signal isolation" valve.



.2

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Date Technician

.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.

Date / Technician

.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.

/ lechnician Date

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- 6.0 PROCEDURE
  - 6.6.11.6 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.
- .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."

## 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.

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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 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

5.5.12 If diagnostic self-test is satisfactory, produce another 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-1113-3"

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

Date lechnician

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

Date / Technician

6.6.15 Following appropriate procedures, return process transmitter to service.



- 5.7 Response Time Testing of Low SG-2 Level Sensor LT-1123-3
  - 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.
  - 5.7.1 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 10NITOR switch in the REFERENCE XMTR position. Adjust the SPAN control to the fully counterclockwise position. Note the reading on the DVM.

/ Technician Date

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# 5.0 PROCEDURE

5.7.3

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).

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 fulloying 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.

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- 5.0 PROCEDURE
  - 5.7.3 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.



6.7.6 Pressurize the unit to PINITIAL.

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.

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.

Date lechnician

### 5.0 PROCEDURE

5.7.9

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 SLEED 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.

- 6.7.10 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 SAN ONOFRE NUCLEAR GENERATING STATION INSTRUMENT AND TEST PROCEDURE SO23-11-3.3 UNITS 2 AND 3

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- 5.0 PROCEDURE
  - 5.7.10.1 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.

.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.

Date Technician

# 6.0 PROCEDURE

- 6.7.11.6 Slowly open the GAS ISOLATION value 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."

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## 6.0 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.

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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 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

6.7.12 If diagnostic self-test is satisfactory, produce another dual trace as in step 6.7.11.9. 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-2 Level Sensor," "LT-1123-3"

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Date	Technician

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

Date lechnician

- 5.0 PROCEDURE
  - 5.7.14 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.



- 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.
  - 6.3.1 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

6.9.2

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.

lechnician Date

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## 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 6.8.2 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

- 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.
- <sup>D</sup>DRIVE The pressure in the pneumatic accumulator at the beginning of the test.
- Span The absolute range of the pressure senor.

UP -R AMP

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.

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6.0 PROCEDURE

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6.8.3 DO.N-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 PSEIPT or PINITIAL, whichever is greater. Table 1 of Appendix C lists the specific values for each transmitter.

6.8.5 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.

6.8.8 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.

Date Technician

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 9 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.

- 6.8.10 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

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5.0 PROCEDURE

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6.8.10.1 Pressure Bleed CLOSED

Drain/Vent CLOSED

Sight Gauge/Fill CLOSED

Drain CLOSED

Date Technician

- 5.8.11 Up-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.

Date Technician

.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.

Date / Technician

.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.

Date Technician

6.0 PROCEDURE

5.9.11.6

- 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 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, PDRIVE, PSETPT, signal rate setting, fluid level, timing mark interval, date, chart drive speed, and the words: "diagnostic self-test."

## 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.

> \_\_\_\_/ 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 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

5.8.12 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-6 shows calculation method for time delay (response time). Also record on the chart "Hi Containment Pressure Sensor," "PT-0351-3"

Date / Technician

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

Technician Date

INSTRUMENT AND TEST PROCEDURE SO23-11-3.3 REVISION 0 PAGE 68

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



6.8.15 Following appropriate procedures, return process transmitter to service.

Date Technician

- 6.9 Response Time Testing of Hi-Hi Containment Pressure Sensor PI-0352-2
  - 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

5.9.2

1

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.



SAN ONOFRE NUCLEAR GENERATING STATION

- 6.0 PROCEDURE
  - 5.9.3
- Adjust the SPAN control to the fully clockwise position. Adjust the ZERO control until the DV:1 indicates the voltage noted in paragraph 6.9.2 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).



- 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 preumatic 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.
INSTRUMENT AND TEST PROCEDURE S023-11-3.3 REVISION 0 PAGE 70

6.0 PROCEDURE

1. 2 "

6.9.3 DOWN-RA'P

PINITIAL = PSETPT + .05 spen

PDRIVE = PINITIAL - .5 span

5.9.4 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.

Date Technician

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

6.9.6 Pressurize the unit to PINITIAL.

Date Technician

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.

5.9.8 Vary unit pressure between PINITIAL and PSCTOT 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

A ...

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 Isolation	CLOSED

# INSTRUMENT AND TEST PROCEDURE \$223-11-3.3 REVISION 0 PAGE 72

- 6.0 PROCEDURE
  - 6.3.10.1 Pressure Bleed CLOSED

Drain/Vent CLOSED

Sight Gauge/Fill CLOSED

Drain CLOSED



- 5.9.11 Up-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.

### INSTRUMENT AND TEST PROCEDURE S023-11-3.3 REVISION 9 PAGE 73

5.0 PROCEDURE

5.9.11.6

- 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. Prenature opening of this valve will invalidate the test. Verify both traces are in appropriate positions.



.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.
- 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."

Technicia Date

INSTRUMENT AND TEST PROCEDURE S023-11-3.3 REVISION 0 PAGE 74

# 6.0 PROCEDURE

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

	/
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 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 / lechnician

6.9.12 If diagnostic self-test is satisfactory, produce another dual trace as in step 6.9.11.8. 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-0352-3"

Technician Date

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

Date lechnician

# INSTRUMENT AND TEST PROCEDURE SO23-11-3.3 REVISION 0 PAGE 75

5.0 PROCEDURE

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



6.9.15 Following appropriate procedures, return process transmitter to service.



- 5.10 Response Time Testing of Low Refueling Water Tank Level Sensor
  - 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

Orain CLOSED

5.10.2

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 counterclock vise position. Note the reading on the DVM.

INSTRUMENT AND TEST PROCEDURE S023-11-3.3 REVISION 0 PAGE 76

6.0 PROCEDURE

6.10.3

Adjust the SPAN control to the fully clockwise position. Adjust the ZERO control until the DVM indicates the voltage noted in paragraph 5.10.2 and with the same polarity (e.g., if the voltage in 6.10.2 was -154V, adjust the ZERO control for a reading of -15MV).

Date echnician

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
	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.

INSTRUMENT AND TEST PROCEDURE SO23-11-3.3 REVISION 0 PAGE 77

6.0 PROCEDURE

6.10.3 DOWN-RA'P

PINITIAL = PSETPT + .05 span

PDRIVE = PINITIAL - .5 span

6.10.4 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.



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

5.10.6 Pressurize the unit to PINITIAL.



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.

6.10.8 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.

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Date	Technician

SAN ONOFRE NUCLEAR GENERATING STATIL I INSTRUMENT AND TEST PROCEDURE S023-11-3.3

# REVISION O PAGE 73

6.0 PROCEDURE

> Adjust the signal rate to the value specified in 6.10.9 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 determined from sample trace.

- 6.10.10 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 SO23-11-3.3 UNITS 2 AND 3 REVISION 0 PAGE 79

5.0 PROCEDURE

6.10.10.1 Pressure 3leed CLOSED

Drain/Vent CLOSED

Sight Gauge/Fill CLOSED

Drain CLOSED

\_\_\_\_\_/ Date Technician

- 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.



.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.

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INSTRUMENT AND TEST PROCEDURE S023-11-3.3 REVISION 0 PAGE 80

### 6.0 PROCEDURE

- 5.10.11.5 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."

# INSTRUMENT AND TEST PROCEDURE S023-11-3.3 REVISION 0 PAGE 81

# 5.0 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.

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 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-6 shows calculation method for time delay (response time). Also record on the chart "Low RWT Level Sensor," "LT-0305-3"



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



INSTRUMENT AND TEST PROCEDURE SO23-11-3.3 REVISION 0 PAGE 82

6.0 PROCEDURE

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

Date Technician

6.10.15 Following appropriate procedures, return process transmitter to service.

Date Technician

6.11 Response Time Testing of LOW SG-1 Flow Sensor PDT-0378-3

NOTE: REFERENCE TRANSDUCER AND PROCESS TRANS'AITTER 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.

5.11.1 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

5.11.2 Open the PRESSURE BLEED valve to ensure system pressure is at zero. Place DV1 MONITOR switch in the REFERENCE XMTR position. Adjust the SPAN control to the fully counterclockwise position. Note the reading on the DVM.

Date echnician

SAN ONOFRE NUCLEAR GENERATING STATION INSTRUMENT AND TEST PROCEDURE SO23-11-3.3 UNITS 2 AND 3

REVISION O PAGE 83

5.0 PROCEDURE

1. 1.

Adjust the SPAN control to the fully clockwise 5.11.3 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 6.11.2 was -15'IV, 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	<ul> <li>The pressure at which the response time is to be determined (usually the pressure at which the sensor output causes a specific action).</li> </ul>
PINITIAL	<ul> <li>The pressure on the hydraulic accumulator, reference transducer, and process sensor at the beginning of the test.</li> </ul>
PDRIVE	<ul> <li>The pressure in the pneumatic accumulator at the beginning of the test.</li> </ul>
Span	- The absolute range of the pressure senor.
UP -R AMP	

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.

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- 6.0 PROCEDURE
  - 6.11.3 DO:/N-RA'P

PINITIAL = PSETPT + .05 span

# PDRIVE = PINITIAL - .5 span

5.11.4 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.

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Date	Technician	n

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

Technician Date

6.11.6 Pressurize the unit to PINITIA: .

Date Technician

6.11.7 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 guarter of the chart. The process trace should always be slightly below the reference trace.

Technician Date

6.11.8 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.

Date lechnician

SAN ONOFRE NUCLEAR GENERATING STATION INSTRUMENT AND TEST PROCEDURE S023-II-3.3 UNITS 2 AND 3

REVISION O PAGE 85

#### 5.0 PROCEDURE

6.11.9 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 9 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.

- 5.11.10 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

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5.0 PROCEDURE

5.11.10.1 Pressure Bleed CLOSED

Drain/Vent CLOSED

Sight Gauge/Fill CLOSED

Drain CLOSED

Date Technician

- 6.11.11 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.

Date Technician

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



.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 INSTRUMENT AND TEST PROCEDURE SO23-11-3.3 UNITS 2 AND 3

### REVISION O PAGE 87

- 5.0 PROCEDURE
  - 6.11.11.5 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."

Date Technician

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# 6.0 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.



- .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.



5.11.12 If diagnostic self-test is satisfactory, produce another dual trace as in step 5.11.11.8. 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-6 shows calculation method for time delay (response time). Also record on the chart "LOW SG-1 Flow Sensor 2PDT-0978-3"



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



6.0 PROCEDURE

The state

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-0379-3
  - NOTE: REFERENCE TRANSDUCER AND PROCESS TRANSMITTER DUTPUT 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.

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echnician Date

INSTRUMENT AND TEST PROCEDURE S023-11-3.3 REVISION 0 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 5.12.2 and with the same polarity (e.g., if the voltage in 5.12.2 was -15'1V, 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.

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- 6.0 PROCEDURE
  - 6.12.3 DOWN-RA'P

PINITIAL = PSETPT + .05 span

PDRIVE = PINITIAL - .5 span

Close the PRESSURE BLEED valve and pressurize the 5.12.4 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.



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

Pressurize the unit to PINITIAL. 6.12.6

Operate REFERENCE XMTR BIAS and PROCESS XMTR BIAS 5.12.7 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 6.12.8 controls to maintain the traces on the recorder chart and in the same relative position. Repeat until no further adjustments are necessary.

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5.0 PROCEDURE

6.12.9

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 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.

- 5.12.10 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 UNITS ? AND 3

SAN ONOFRE NUCLEAR GENERATING STATION INSTRUMENT AND TEST PROCEDURE S023-II-3.3 REVISION O PAGE 93

5.0 PROCEDURE

> 6.12.10.1 Pressure 31eed CLOSED

> > Drain/Vent CLOSED

Sight Gauge/Fill CLOSED

Drain CLOSED



5.12.11 Down-Ramp Generation

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



Slowly open the "signal isolation" valve. .2



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 PSFTPT.



.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.

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- 5.0 PROCEDURE
  - 6.12.11.6 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.
- .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

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## 6.0 PROCEDURE

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

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 .11 If diagnostic self-test is satisfactory, produce another dual trace as in step 5.12.11.8. 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



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

Flow Sensor 2PDT-0979-3"



## 6.0 PROCEDURE

5.12.11.13 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.



- 6.13 Test Equipment Set Up for Loop Current Step Response Testing of Resistance Temperature Detectors
  - NOTE: The LCSR Analyzer and Response Tesc 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.
  - 6.13.1 Position the front controls on the ERT-1 as follows:
    - .1 Voltmeter selector switch to position "D".
    - .2 Trim switch in UP position.
    - .3 Power Supply internal-external switch in the "INT" position.

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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:

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

Date / Technician

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

Date / Technician

5.13.5 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.

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Date	Technician

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- 6.0 PROCEDURE
  - 6.13.7 Allow 10 minutes for equipment to warm up.

	/	
Date	Technician	

- 5.14 Loop Current Step Response Testing of Hot Leg Temperature Sensor TE-0112-3
  - NOTE: For most consistent results, the temperature of the reactor coolant should be approximately 540°F.
  - 5.14.1 In Spec. 200 cabinet L-129, remove the RTD leads from terminals 18 and 17 of TB-1 and connect them to the sensor connector strip on the ERT-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

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

Date / Technician

SAN ONOFRE NUCLEAR GENERATING STATION INSTRUMENT AND TEST PROCEDURE S023-11-3.3 UNITS 2\$3

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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.

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.
- Move the voltmeter selector switch on ERT-1 to the "B" 5.14.5 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.

5.14.7 Repeat steps 6.14.5 and 5.14.6 until no further adjustments are necessary. Allow at least three minutes for the meadings to stabilize.

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

> Date Technician

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

Date Technician

INSTRUMENT AND TEST PROCEDURE S023-II-3.3 REVISION 0 PAGE 100

6.0 PROCEDURE

- 6.14.10 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-18, the ELC-18 digital indicator should read approximately 4095 when ELC-18 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.

	1
Date	Technician

5.14.11 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.

6.14.13 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.

5.14.14 Allow the bridge to return to a balanced condition.

Date Technician

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5.0 PROCEDURE

5.14.15 Repeat steps 5.14.13 and 5.14.14 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.

- 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.



6.14.17 In Spec. 200 cabinet L-129, replace the RTD leads on terminals 18 and 17 of TB-1.

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

Date / Technician

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

Date / Technician

SAN ONOFRE NUCLEAR GENERATING STATION INSTRUMENT AND TEST PROCEDURE SO23-II-3.3 UNITS 2%3 REVISION 0 PAGE 102

### 6.0 PROCEDURE

- 6.15 Loop Current Step Response Testing of Cold Leg Temperature Sensor TE-9178-3
  - NOTE: For most consistent results, the temperature of the reactor coolant should be approximately 540°F.
  - 5.15.1 In Spec 200 cabinet L-129, remove the RTD leads from terminals 8 and 7 of TB-1 and connect them to the sensor connector steep 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.

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 DNDERE NUCLEAR GENERATING STATION INSTRUMENT AND TEST PROCEDURE S023-II-3.3 REVISION 0 PAGE 103

- 5.0 PROCEDURE
  - 6.15.5 Move the voltmeter selector switch on ERT-1 to the "3" 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.

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

6.15.8 Nove 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.

- 5.15.10 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-13 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.

Date echnician

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INSTRUMENT AND TEST PROCEDURE S023-II-3.3 REVISION 0 PAGE 104

- 5.0 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.

6.15.12 Ensure the "AVERAGE/SINGLE SHOT" selector switch on the ELC-13 is in the "AVERAGE" position.

6.15.13 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.

5.15.15 Repeat steps 6.15.13 and 6.15.14 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-13 will go the "DISPLAY" mode.

- 5.15.15 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.

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- 5.0 PROCEDURE
  - 5.15.17 In Spec 200 cabinet L-129, replace the RTD leads on terminals 8 and 7 of TB-1.

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

Date / Technician

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

Date Technician

- 6.15 Loop Current Step Response Testing of Hot Leg Temperature Sensor TE-0122-3
  - NOTE: For most consistent results, the temperature of the reactor coolant should be approximately 540°F.
  - 5.16.1 In Spec 200 cabinet L-129, remove the RTD leads from terminals 13 and 12 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
INSTRUMENT AND TEST PROCEDURE S023-II-3.3 REVISION 0 PAGE 105

- 6.0 PROCEDURE
  - 5.15.3 Place the "TRIM" switch in the DOWN position.

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

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.

- 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.
- 6.15.5 Nove the voltmeter selector switch on ERT-1 to the "3" or "C" position and adjust the supply voltage to approximately 60 Vdc. This provides 50 made through the RTD assuming the bridge is still balanced. Allow three minutes for stabilization time.

6.15.7 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.

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

Date Technician

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#### 6.0 PROCEDURE

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



- 5.15.10 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-18 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.

Place current selector switch in "LOW" position and 5.15.11 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-13 is in the "AVERAGE" position.

6.15.13 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-18 should return to the "READY" mode.

INSTRUMENT AND TEST PROCEDURE S023-II-3.3 REVISION 0 PAGE 103

6.0 PROCEDURE

6.15.14 Allow the bridge to return to a balanced condition.

5.15.15 Repeat steps 5.15.13 and 6.15.14 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-18 will go the "DISPLAY" mode.

- 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.

5.15.17 In Spec 200 cabinet L-129, replace the RTD leads on terminals 13 and 12 of TB-1.

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

6.15.19 Press the "RESET" pushbutton on the ELC-18 and verify that the analyzer returns to the "READY" mode.



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#### 5.0 PROCEDURE

- 5.17 Loop Current Step Response Testing of Cold Leg Temperature Sensor 2TE-9179-3
  - NOTE: For most consistent results, the temperature of the reactor coolant should be approximately 540°F.
  - 5.17.1 In Spec 200 cabinet L-129, remove the RTD leads from terminals 3 and 2 of TB-1 and connect them to the sensor connector strip on the ERT-1.

- Date / Technician

- 5.17.2 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.

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

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

Date Technician

6.17.5 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.

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#### 6.0 PROCEDURE

6.17.5 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.

6.17.7 Repeat steps 6.17.6 and 5.17.7 until no further adjustments are necessary. Allow at least three minutes for the readings to stabilize.

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

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

- 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-18, the ELC-13 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.

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- 6.0 PROCEDURE
  - Place current selector switch in "LOW" position and 6.17.11 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 5.17.12 ELC-13 is in the "AVERAGE" position.

With the ELC-1B in the "READY" mode, press the "START" 6.17.13 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-18 should return to the "READY" mode.

6.17.14 Allow the bridge to return to a balanced condition.

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

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### 5.0 PROCEDURE

- 6.17.15 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-129, replace the RTD leads on terminals 3 and 2 of TB-1.

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

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

- 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 social of the Response Time Test.

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5.0 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.
- CAUTION Always discharge DC signal cables before connecting to the input jack. During reactor ....... operation, normal champer 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 15 of the safety channel drawer.

# 5.13 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.

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# 6.0 PROCEDURE

5.19.1 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	
TC3-1 (GRN)	TB1301-5	TB1305-1	Date Completed/ Technician
TCB-2 (GRN)	T31301-3	TB1305-1	Data Completed/ Technicity
TCB-3 (GRN)	TB1302-13	TB1307-1	
TCB-4 (GRN)	TB1302-15	TB1307-1	Date Completed/ Technician
TC3-5 (GRN)	TB1302-3	TB1305-1	Date Completed/ Technician
TCB-6 (GRN)	TB1301-17	TB1306-1	Date Completed/ Technician
TCB-7 (GRN)	TB1303-10	T81307-1	Date Completed/ Technician
TCR R (CRN)	TP1202 12	T01207-1	Date Completed/ Technician
103-3 (UKN)	131303-13	131307-1	Date Completel/ Jechnician

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#### 6.0 PROCEDURE

6.19.2 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 TC3 5, 6, 7 and 9.

6.13.4 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.

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

- 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.

# INSTRUMENT AND TEST PROCEDURE S023-11-3.3 REVISION 0 PAGE 116

5.0 PROCEDURE

6.19.1 Isolate the RTSG leads from the following terminals located in the back of each PPS cabinet.

.1	Bay A: TBA? terminals 20, 21		1
		Date	Technican
.2	Bay B: TBB2 terminals 20, 21		/
		Date	Technican
.3	Bay C: TBC2 terminals 20, 21		1
		Date	Technican
.4	Bay D: TBD2 terminals 20, 21		,
		Date	Technican
.2	Connect an LED (6 volt, 20 ma)	in series	with a 6 Vdc

5.19.2 Connect an LED (6 volt, 20 ma) in series with a 6 Vdc power supply across the terminals listed in 6.19.1 for bay A on the cabinet side of the terminal board.

Date	Technician

5.19.3 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

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- 5.0 PROCEDURE
  - 6.19.5 At the rear of the safety channel, disconnect the high voltage cable from J-3 and connect this cable to the high voltage discharge 1-4.

Disconnect plug P-8 from J-8 and place a grouding cap on 5.19.7 the plug.

> echnician Date

5.19.8 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.

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

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

5.19.11 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 (J9) of the PA501 preamp.

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

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INSTRUMENT AND TEST PROCEDURE S023-11-3.3 REVISION 0 PAGE 119

- 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.

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

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.

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

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

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

6.19.19 Attach the optical detector pickups over the four temporary LED's installed in steps 6.19.2 and 5.19.3.

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### 6.0 PROCEDURE

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

- 6.19.21 Position the stop lamp toggle switches of the C-E test box as follows:
  - .1 "L1" "ON"
  - .2 "L2" "ON"
  - .3 "L3" "ON"
  - .4 "L4" "ON"
  - .5 "L5" "OFF"
  - .6 "L6" "OFF"



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

5.19.22 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 '3' bistable control panel.

SAN ONOFRE NUCLEAR GENERATING STATION INSTRUMENT AND TEST PROCEDURE S023-11-3.3 UNITS 243 REVISION 0 PAGE 120

- 6.0 PROCEDURE
  - 6.19.23 Energize the test equipment and allow it to stabilize.

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

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

6.19.25 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.

Date Technician

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

5.19.29 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'.

INSTRUMENT AND TEST PROCEDURE SC23-II-3.3 REVISION 0 PAGE 121

- 5.0 PROCEDURE
  - 6.19.30 On channel 'C' SAFETY CHANNEL DRAWER, place the "LINEAR CALIBRATE" switch in the "2002" position. Verify channel 'C' "HIGH LINEAR POWER" trip light is energized on the bistable control panel.

6.19.31 Repeat steps 6.19.24 through 5.19.27.

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.

5.19.35 Record the largest value of steps 5.19.27, 5.19.31, 6.19.34 in the "DATA COLLECTION TABLE".

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



INSTRUMENT AND TEST PROCEDURE S023-II-3.3 REVISION 0 PAGE 122

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

5.19.38 Reset all bistables from the bistable control panels.

Date Technician

- 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 (S609) on the bistable control panel through the tripping of the rotary relays.
  - 5.20.1 On the bistable control panel being tested, rotate the bistable selector switch to position number 2.

Date Technician

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

Value Units			/
		Date	Technicial

5.20.3 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 echnician

INSTRUMENT AND TEST PROCEDURE S023-II-3.3 REVISION 0 PAGE 123

#### 5.0 PROCEDURE

6.20.5 Rotate the coarse potentiometer (RSOI) on the bistable control panel while holding down the bistable pushbutton until the digital voltage indicator reads approximately .IV on the tripped side of the setpoint recorded in step 5.22.2. Then release the bistable pushbutton and record the adjusted voltage.

1	/ Volts		1
Value	Units	Date	Technicial

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



"STOP LAMPS" section at "L1, L2, L3 and L4".

Date Technician

## INSTRUMENT AND TEST PROCEDURE S023-II-3.3 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 5.21.3.

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

5.20.10 Insert an extender card into the Test and Calibration card slot and place a hook probe from pin 51 of the Test and Calibration connector to the red (+) jack of the "EXT 10V 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

INSTRUMENT AND TEST PROCEDURE S023-11-3.3 REVISION 0 PAGE 125

6.0 PROCEDURE

5.20.14 Reset the bistable.

Date echnician

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

Date echnician

- 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/D'BR 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.
- CAUTION DETECTOR POWER SUPPLY VOLTAGES UP TO 1000 V 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 SIGUAL 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 JACKS J9, 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 may damage the unit.

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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" lamp DS-1 is extinguished.

5.20.18 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 S1M-C and chassis ground.

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

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

SAN DHOFRE NUCLEAR GENERATING STATION INSTRUMENT AND TEST PROCEDURE 5023-11-3.3 UNITS 283

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- 5.0 PROCEDURE
  - Attach a second channel of the high speed recorder to 6.20.22 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)

On the safety channel drawer front, turn the "LOG 5.20.23 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 3.2 volt signal is sent to the trip circuit.
- Set the high speed recorder chart speed at approximately 5.20.24 20 inches per second (IPS) or more as required to provide an analyzable chart trace.

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.

INSTRUMENT AND TEST PROCEDURE S023-II-3.3 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 echnician

- 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.
  - .9 Chart speed



6.20.28 Record the response time in the DATA COLLECTION TABLE.

Date lechnician

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.

## INSTRUMENT AND TEST PROCEDURE SO23-11-3.3 REVISION 0 PAGE 129

5.0 PROCEDURE

5.20.29 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.

Date Technician

- 6.21 Positions 3 and 4 High LPD and Low DNBR
  - NOTE: The High Local Power Density and Low Opparture 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 5.22.
- 6.22 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.
  - 6.22.1 Initialization of CPC/CEAC for Testing
    - .1 Set the CALCULATOR SELECT switch on the operator's module to load the CPC (CEAC) calculator.

Date echnician

NOTE: When one calculator is selected, in channels 8 and C, the other calculator is memory protected. No changes can be made to the protected calculator. SAN ONDERE NUCLEAR GENERATING STATION INSTRUMENT AND TEST PROCEDURE SO?3-II-3.3 UNITS 283 REVISION 0 PAGE 130

5.0 PROCEDURE

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

.1 Turn ON the AED Floppy Disk Drive.

Date Technician

.2 Set the drive select switches so that drive A is unit 0, drive 3 is unit 1 and drive C is unit 2.

Date / Technician

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.

Date / Technician

.4 Set the INIT and WP switches UP.

Date / Technician

.5 Lift the IPL switch.

Date Technician

6.22.3 Place the CPC Coldstart Loader paper tape into the 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-II-3.3 UNITS 243 REVISION 0 PAGE 131

### 6.0 PROCEDURE

6.22.4 Hit the "FUNCTION" button, then hit the "LOCATION" button to stop the calculator.

	/
Date	Technician

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

and the second	ents
30 000	00
32 000	0
34 000	0
36 005	0
50 D50	0
52 000	F
54 430	0
55 008	0
78 023	4



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

Date Technician

6.22.7 Start the processor at location 30.

Date Technician

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

Date Technician

6.22.9 Respond to the TEST TRACK prompt with 55.

2.1

Date Technician

## INSTRUMENT AND TEST PROCEDURE S023-II-3.3 REVISION 0 PAGE 132

- 6.0 PROCEDURE
  - 5.22.10 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.



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



5.22.12 Verify that the TRIP BYPASS switch is OFF.

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

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

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.

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6.0 PROCEDURE

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

	1
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.

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

Date echnician

- 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.
- 5.22.19 Set the CALCULATOR SELECT rotary switch on the OPERATOR'S MODULE to load the CPC (CEAC) calculator. The calculator not selected is memory protected.

Date / Technician

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

.1 Turn ON the AED Floppy Disk Drive.



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# 5.0 PROCEDURE

20.

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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.

.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.

.5 Lift the IPL switch.

Place the CPC Coldstart Leader paper tape into the 6.22.21 teletypewriter (TTY) paper tape reader and connect the TTY to the CPC calculator A cable connection point indicated.

Date Technician

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

The sheet was a second out of the

	/
Date	Technician

INSTRUMENT AND TEST PROCEDURE S023-11-3.3 REVISION 0 PAGE 135

5.0 PROCEDURE

1

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

Location	Contents
30	0000
32	0000
34	0000
35	0050
50	D500
52	OOCF
54	4300
55	0090
78	0294

Date echnician

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

Date Technician

6.22.25 Start the processor at location 30.

Date Technician

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

Date Technician

6.22.27 Respond to the TEST TRACT prompt with 55.

Date Technician

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6.0 PROCEDURE

6.22.23 Verify that the MEMORY PROTECT keyswitch is OFF

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

5.22.30 Remove the disk from the AED 2500 disk drive.

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

- 5.23.2 Enter the following on the TTY keyboard to check the operation of the TTY-CPCP interface:
  - \*EX TC1
  - \*EX TC2
  - \*EX TH1
  - \*EX TH2

The resultant printout is as indicated in Table F1 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 ONOFRE NUCLEAR GENERATING STATION INSTRUMENT AND TEST PROCEDURE SO23-11-3.3 UNITS 283

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- 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 (TC1).

On the C-E test box, plug the meter into the "VOLTAGE, 6.23.4 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.
- Using the potentiometers under "RESISTANCE" in the 5.23.5 "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 DV'4 when the STEPPED FUNCTIONS STEP toggle switch is in the RESET position. Note the value.

	/ Volts		/
Value	Units	Date	Technicial

5.23.5 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		/
Value	Units	Date	Technicial

5.23.7 Disconnect the meter and return the STEPPED FUNCTIONS STEP toggle switch to the RESET position.



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- 6.0 PROCEDURE
  - 6.23.8 At the Foxboro Spec. 200 cabinet L-129, remove the leads that go to the temperature transmitter from terminals 8 and 7 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.
- 6.23.9 Connect the resistance test leads from the C-E RTT test box to the leads removed in the step above.

5.23.10 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 DNBR respectively) on the Bistable Control Panel. Leave in place for the remainder of the channel test.

5.23.11 Place the other end of the optical pickups cables to all six STOP LAMP jacks on the C-E RTT test box.

5.23.12 Turn the switches next to these lamp jacks to ON.

NOTE: If the base line data is desired, turn three switches to OFF and run the test twice.

#### 6.0 PROCEDURE

6.23.13 Ensure that the STOP TIMER MODE switch is in the increasing or low to high mode.

Date

- 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 TC1,559, IN, BOTH CR to make the parameter TC1 (Loop 1 Cold Leg Temperature) live input.

Date / Technician

6.23.15 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).

Date Technician

6.23.15 On the C-E RTT Test Box, reset the timer to ZERO.

Date Technician

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- 5.0 PROCEDURE
  - 5.23.17 At the CPC/CEAC TTY, enter the command GO CR. Verify that the point I.D. displayed is 043 and the value is +33.000.

5.23.18 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.

6.23.20 Wien the timer stops incrementing, note the value in the "JATA COLLECTION TABLE."

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:

5.23.22 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

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

/ Technician Date

5.23.25 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 o'ms as read on the DV'1 then the STEDDED FUNCTION toggle switch is in the RESET position. Note the value.

and the state of the	/ Volts		/
Value	Units	Date	Technicial
	011163	Da CC	icciiii) ciai

5.23.25 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.

At the Foxboro Spec. 200 cabinet L-125, remove the leads 6.23.28 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.
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#### 6.0 PROCEDURE

5.23.23 Connect the resistance test leads from the C-E RTT test box to the leads removed in the step above.

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

6.23.31 Verify that the switches next to the six step lamp jacks are DN.

6.23.32 Ensure that the STOP TIMER MODE switch is in the increasing or low to high mode.

- 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.

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- 6.0 PROCEDURE
  - 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.

6.23.34 At the CPC/CEAC TTY, enter the command LI TC2,569, IN, BOTH CR to make the parameter TC2 (Loop 2 Cold Leg Temperature) a live input.

6.23.35 At the CPC/CEAC TTY, enter the command NOP TC1 to revert the live input to a constant input.

5.23.36 At the CPC/CEAC TTY, enter the command ST CR. Only TC2 should be a live input.

5.23.37 Reset the C-E RTT test box timer to zero.

5.23.39 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 DN3R/LPD trip conditions on the Bistable Control Panel of the PPS.

Date lechnician

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5.0 PROCEDURE

6.23.40 Toggle the "STEP" switch to "START." When the timer stops incrementing, note the value and enter in the "DATA COLLECTION TABLE."

Date Technician

6.23.41 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.

Date Technician

5.23.43 On the C-E test box, verify that the "FUNCTION SELECT" switch is set to RESISTANCE.

Date Technician

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

Date Technician

5.23.45 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.

SAN ONDERE NUCLEAR GENERATING STATION INSTRUMENT AND TEST PROCEDURE \$023-11-3.3

## REVISION O PAGE 145

- 6.0 PROCEDURE
  - Adjust the final resistance in the C-E test box so that 6.23.45 the value is 452 ohms as read on the DVM when the START switch is actuated. Note the value.

Disconnect the meter and return the STEPPED FUNCTIONS 5.23.47 STEP toggle switch to the RESET position.

At the Foxboro Spec. 200 cabinet L-129, remove the leads 5.23.49 that go to the temperature transmitter from terminals 18 and 17 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.
- 5.23.43 Connect the resistance test leads from the C-E RTT test box to the leads removed in the step above.

Place three optical pickups over the three LED's in 6.23.50 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.

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- 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.
- 6.23.53 Reset the CPC calculator trip by pushing the white (SPARE) pushbutton on the Operator's Module and entering an "R" (for Restart) when promoted by the TTY.

Date / Technician

6.23.54 At the CPC/CEAC TTY, enter the command LI TH1,613, IN, BOTH CR to make the parameter TH1 (Loop 1 Hot Leg Temperature) a live input.

Technician Date

SAN DUOFRE NUCLEAR GENERATING STATION INSTRUMENT AND TEST PROCEDURE S023-11-3.3

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- S.O PROCEDURE
  - 6.23.55 At the CPC/CEAC TTY, enter the command NOP TC2 to revert the live input to a constant input.

At the CPC/CEAC TTY, enter the command ST CR . Only 6.23.55 THI should be a live input.

Reset the C-E RTT test box timer. 5.23.57

5.23.59 At the CPC/CEAC TTY, type in the command GD to start the program. Verify that the point I.D. displayed is D43 and the value is +33.000.

Reset all DNBR/LPD trip conditions on the Bistable 6.23.59 Control Panel of the PPS.

Toggle the "STEP" switch to "START." When the timer 5.23.60 stops incrementing, note the value and enter in the "DATA COLLECTION TABLE."

> Date Technician

Return the STEPPED FUNCTIONS STEP toggle switch to the 5.23.61 RESET position.

> Date echnician

NOTE: Leave the test setup unchanged except as follows:

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## REVISION O PAGE 148

5.0 PROCEDURE

Reconnect all the leads in the Spec. 200 cabinets that 6.23.52 were removed for the above test.



5.23.53 On the C-E test box, verify that the "FUNCTION SELECT" switch is set to RESISTANCE.

Date / Technician

On the C-E test box, plug the meter into the "VOLTAGE, 6.23.54 HIGH CURRENT, FREQUENCY, RESISTANCE" jacks in the "FUNCTION SIGNAL OUTPUT" section.

Using the potentiometers under "RESISTANCE" in the 5.23.65 "STEPPED FUNCTIONS" section, adjust the initial resistance in the C-E test box so that the resistance value is 440 ohns as read on the DVM when the STEP switch is in the RESET position. Note the value.

6.23.55 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.

5.23.57 Disconnect the meter and return the STEPPED FUNCTIONS STEP toggle switch to the RESET position.

At the Foxboro Spec. 200 cabinet L-129, remove the leads 6.23.68 that go to the temperature transmitter from terminals 13 and 12 on terminal strip TB-1.

Date	Technician	-

INSTRUMENT AND TEST PROCEDURE S023-11-3.3 REVISION 0 PAGE 143

5.0 PROCEDURE

5.23.68

- 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.
- 5.23.69 Connect the resistance test leads from the C-E RTT test box to the leads removed in the step above.

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.

5.0 PROCEDURE

5.23.72

- 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 3E ENERGIZED IS THAT PART BEING TESTED.
- 5.23.73 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

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.

5.23.75 At the CPC/CEAC TTY, enter the command NOP TH1 to revert the live input to a constant input.

Date Technician

6.23.76 At the CPC/CEAC TTY, enter the command ST CR . Only TH2 should be a live input.

Date Technician

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 I.D. displayed is 043 and the value is +33.00.

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6.0 PROCEDURE

6.23.79 Reset all DN33/LPD trip conditions on the Bistable Control Panel of the PPS.



5.23.80 Toggle the "STEP" switch to "START." When the timer stops incrementing, note the value and enter in the "DATA COLLECTION TABLE."

Date Technician

6.23.81 Return the STEPPED FUNCTIONS STEP toggle switch to the RESET position.

/ Technician Date

NOTE: Leave the test setup unchanged except as follows:

6.23.32 Reconnect all the leads in the Spec. 200 cabinets that were removed for the above test.

Date Technician

- 5.23.33 Pressurizer Pressure CPC I/O RTT
- 5.23.93.1 On the C-E RTT box, rotate the function select switch 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.

Date Technician

.2 Short circuit the output at the jacks.

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Date	Technician	

INSTRUMENT AND TEST PROCEDURE S023-11-3.3 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 16 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.

- .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).

echnician Date

INSTRUMENT AND TEST PROCEDURE S023-11-3.3 REVISION 0 PAGE 153

## 6.0 PROCEDURE

5.23.33.10 At the Foxboro Spec. 200 cabinet L-130, remove the leads that go to the pressurizer pressure I/E converter (PY-0101-33) input terminals nest 3, slot 3A (+ and -).

.11 Connect the high current test output jacks to the I/E terminals (+ and -).

.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.

- 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.

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#### 5.0 PROCEDURE

5.23.83.13 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 L5.

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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, DN32 CR to make the parameter PR (pressurizer pressure) a live input.

Date Technician

.15 At the CPC/CEAC TTY, enter the command NOP TH2 to revert the live input to a constant input.



all At the CPC/CEAC TTY, enter the command ST CR. Only the parameter PR should be a live input.

.13 Reset the C-E RTT box timer to zero.

19 At the CPC/CEAC TTP, enter the command GO to start the test. Verify that the POINT I.D. displayed is 043 and the value is +33.000.

Date Technician

100

# INSTRUMENT AND TEST PROCEDURE S023-11-3.3 REVISION 0 PAGE 155

## 5.0 PROCEDURE

5.23.83.20 Reset all low DNBR trip conditions on the Bisteble 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

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## 5.0 PROCEDURE

5.21.81.5 Turn the switch at jack number 1 to "C" (calibrate). The meter should indicate current.

Move the momentary contact STEP switch in the STEPPED .6 FUNCTIONS section to RESET and release. The RESET light should turn ON.

Set the initial current value to 0.65 milliamperes by .7 adjusting the VOLTAGE CURRENT, FREQUENCY "INITIAL" potentiometer until the mA meter reads the desired value. Note the value.

Move the momentary contact STEP switch to START and .3 release. The START light should illuminate and the timer should start incrementing. Stop the timer.

Set the final current value to 0.91 milliamperes by .9 adjusting the VOLTAGE, CURRENT, FREQUENCY "FINAL" potentiometer until the mA meter reads the desired value. Note the value.

	/ Volts		/
Value	Units	Date	Technicial

.10 Hove the momentary contact STEP toggle switch to RESET and release.

# INSTRUMENT AND TEST PROCEDURE S023-11-3.3 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.

.13 Repeat all steps from 5.23.4.4 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 6.23.4.4 through 6.23.4.11 inclusive for jack number 3.

The initial value is amperes.

The final value is \_\_\_\_\_ amperes.

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.

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6.0 PROCEDURE

6.23.91.15

- CAUTION . THIS TEST, IF NOT PROPERLY CONDUCTED, MAY CAUSE A TRIP OF THE RPS REACTOR TRIP ...... SWITCHGEAR. FOR THIS TEST, WITH THE CEA M-S SETS NOT RUNNING, THE ONLY PORTION OF THE PPS THAT NEED BE ENERGIZED IS THAT PART SEING 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.

.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 DI (Upper Excore Neutron Flux Detector) a live input.

.20 At the CPC/CEAC 1

		Date	/ Technician	
At the CPC/CI BOTH CR to Neutron Flux	AC TTY enter make the par Detector) a	the command ameter D2 (Mi live input.	LI D2,124,IN, iddle Excore	

Date Technician

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### 6.0 PROCEDURE

5.23.84.21 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 Ceset the C-E RTT box timer to zero.

Date Technician

## INSTRUMENT AND TEST PROCEDURE S023-11-3.3 REVISION 0 PAGE 150

#### 5.0 PROCEDURE

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6.23.94.26 At the CPC/CEAC TTY, enter the command GD to start the test. Verify that the point I.D. displayed is 043 and the value is +33.000.

/ Technician Date

.27 Reset all Low DNBR and Hi LPD trip conditions on the Bistable Control Panel of the PPS.

Date / Technician

.28 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 DN.

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

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6.0 PROCEDURE

6.23.84.33 Disconnect the test cable from jack J-8 and reconnect the system cable.



.34 Disconnect the test cable from jack 1-9 and reconnect the system cable.

Date Technician

.35 Disconnect the high voltage cable from jack J-4 and reconnect to jack J-3.



.35 Disconnect the ground wires from the chassis at the J-8, J-9 and J-10 plugs.

Date / lechnician

.37 Return all caps and other equipment to the condition in - which found before the start of the test.

Date Technician

.38 Place the "AC POWER" switch in the safety channel drawer to the DN position.

Date / Technician

6.23.85 Reactor Coolant Pump Speed - CPC I/O RTT

.1 On the C-E RTT box, rotate the function select switch to the FREQUENCY position. Output from the C-E RTT box is now available at the F1 and F2 jacks in the CALIBRATION section and at the "VOLTAGE, HIGH CURRENT, FREQUENCY, RESISTANCE" banana jacks in the FUNCTION SIGNAL OUTPUTS section.

Date Technician

6.0 PROCEDURE

5.23.85.1

- 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 F1 test jack when the FUNCTION SELECT switch is in the FREQUENCY position.
- NOTE: Steps 5.23.5.2, 6.23.5.3, 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, FREQUENCY, RESISTANCE" banana jacks in the FUNCTION SIGNAL OUTPUTS section.

Date Jechnician

.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 \_\_\_\_\_\_30X local impedance connected. If it is not, refer to the technical manual for the C-E RTT 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.

	/
Date	Technician

UNITS 283

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## 6.0 PROCEDURE

6.23.35.6 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 859 Hz. Note the value.

	/ Volts	-	/
Value	Units	Date	Technicial

Move the STEP switch to START position and release. .7 The START light should illuminate and the timer should start incrementing. Stop the timer.

Using the FREQUENCY meter on the front panel, adjust .8 the final frequency by using the FINAL potentiometer in the VOLTAGE, CURRENT, FREQUENCY section to a value of 782 Hz. Note the value.

Verify that the TIMER MODE STOP switch is in the .9 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 wolt power supply to each pulse shaper unit.

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## 5.0 PROCEDURS

5.23.95.12 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.



.13 In the cabinet L-91, remove transmitter cables on terminals 39 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 38.

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 L5 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

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### 5.0 PROCEDURE

5.23.35.15 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, DV33 CR to make the parameter V1, Reactor Coplant Pump 1 Speed (in counts per second) a live input. See Response Time Test Software User's Manual for explanation.

Date Technician

.18 At the CPC/CEAC TTY enter the command ST CR . The only input that should be live is parameter W1.

Date / Technician

.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.

Date Technician

.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.

A second the second second

Date Technician

100 1 10

# INSTRUMENT AND TEST PROCEDURE S023-11-3.3 REVISION 0 PAGE 155

## 6.0 PROCEDURE

6.23.35.23 When the timer stops incrementing, note the value and enter in the "DATA COLLECTION TABLE."

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Date	Technician

.24 Disconnect the test leads in cabinet L-91 and reconnect the normal system leads.

Date Technician

.25 Nove 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, cneck the voltage between terminal 41 and ground using any portable voltmeter. The voltage should be +15 volts DC. Record the voltage. Vdc.

Date / Technician

.27 In the cabinet L-91, remove the transmitter cables (but leave the pulse shaper cables) from terminal strip DT x 4. Connect the C-E RTT box cable signal lead to terminal 43 and the other cable to terminal 42.

Date / Technician

.28 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

.29 At the CPC/CEAC TTY enter the command NOP W1 to return that parameter to constant input.

Date Technician

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## 6.0 PROCEDURE

5.23.85.30 At the CPC/CEAC TTY enter the command LI W?,2599, IN DNBR CR to make the parameter live.



.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 DN3R 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.

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Technician

INSTRUMENT AND TEST PROCEDURE S023-11-3.3 REVISION 0 PAGE 153

#### 6.0 PROCEDURE

6.23.85.37 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 45.

and the second se	/
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 W3,2599, IN, DVBR 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.

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Date	Technician

# INSTRUMENT AND TEST PROCEDURE SO23-11-3.3 REVISION 0 PAGE 169

#### 5.0 PROCEDURE

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5.23.85.44 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.



.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 lead.



.43 'fove the momentary contact STEPPED FUNCTIONS STEP switch to RESET and release. The RESET light should be turned DN.



.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.

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Date	Technician

INSTRUMENT AND TEST PROCEDURE S023-11-3.3 REVISION 0 PAGE 170

## 6.0 PROCEDURE

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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.



.52 At the CPC/CEAC TTY enter the command NOP W3 to return that parameter to constant input.

.53 At the CPC/CEAC TTY enter the command LI W4,2539, 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, enter 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

UNITS 283

#### SAN ONOFRE NUCLEAR GENERATING STATION INSTRUMENT AND TEST PROCEDURE 5023-11-3.3 REVISION O PAGE 171

## 5.0 PROCEDURE

6.23.85.58 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.

> Date Technician

.60 Do not break down test equipment if the next section is to follow inneciately.

5.23.95 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 reconnended that two or more persons be assigned stations for the test.
- .1 'love the momentary contact STEPPED FULCTIONS STEP switch to RESET and release. The RESET light should be turned DN.

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 DUTPUTS section. The black terminal is reference.

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Date lechnician SAN DNOFRE NUCLEAR GENERATING STATION INSTRUMENT AND TEST PROCEDURE S023-11-3.3 UNITS 2\$3

REVISION O PAGE 172

### 5.0 PROCEDURE

2.4.

6.23.85.3 Connect the C-E RTT box digital voltmeter (DVM) across the output jacks.

.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.

/ Volts			/
Value	Units	Date	Technicial

.5 Place the START switch in the TIMER MODE section in the low to high position.

.o Move the momentary contact STEP switch to START and release. The START light should illuminate and the timer should star incrementing. Stop the timer.

.7 Set the final voltage value to a voltage of 8.333 volts by adjusting "VOLTAGE, CURRENT, FREDUENCY" FINAL potentiometer until the desired voltage is obtained. This value is equivalent to 100.0 inches withdrawn. Note the value.

	/ Volts		1
Value	Units	Date	Technicial

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.8 Repeat the above steps as necessary to obtain the voltages desired, then disconnect the meter and remove the leads.

INSTRUMENT AND TEST PROCEDURE S023-11-3.3 REVISION 0 PAGE 173

#### 5.0 PROCEDURE

6.23.85.9 'Nove 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 RTT hox 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.

Technician Date

.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 DN3R). Insert other ends in the six STOP LAMPS banana jacks and turn ON all stop lamp switches.

	1	
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.



UNITS 283

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#### SAN ONOFRE NUCLEAR GENERATING STATION INSTRUMENT AND TEST PROCEDURE S023-11-3.3 REVISION O PAGE 174

### 6.0 PROCEDURE

6.23.85.13 Connect a TTY to the channel C 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 C 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.

.15 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.

Date Technician

.18 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."

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Date	Technician

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SAN ONOFRE NUCLEAR GENERATING STATION INSTRUMENT AND TEST PROCEDURE S023-II-3.3 UNITS 2&3 REVISION O PAGE 175

# 6.0 PROCEDURE

# 6.23.35.20 Repeat steps 5.23.5.12 through 5.23.5.19 for the following parameters"

		OT	B1		
arameter Number XX	CEA Number	Signal	Reference		
SGOI	3	3	. 4	P	erformed
SG02	5	7	8	Date	/ Technician
SG03	9	11	12	Date	/ Technician
SG04	14	15	16	Data	/ Technician
\$\$05	15	19	20	Date	/
SG05	21	23	24	0100	/
SG07	25	27	28	Date	/
SG09	30	31	32	Date	
\$609	31	35	36	Uate	/
SG10	37	39	40	Date	Technician
SG11	39	43	44	Date	Technician /
SG12	45	47	48	Date	Technician /
6012	50	51	52	Date	Technician
2013	50	51	52	Date	Technician

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# CHANNEL C

SAN ONOFRE NUCLEAR GENERATING STATION INSTRUMENT AND TEST PROCEDURE S023-11-3.3 UNITS 253

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5.0 PROCEDURE

6.23.85.20

1.1

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		CHANNEL C	(Continued)		
Parameter		OTB1			
Number XX	CEA Number	Signal X	Reference		
SG14	51	55	55		1
				Date	Technician
SG15	57	59	60		1
				Date	Technician
SG16	51	63	51		1
				Date	Technician
SG17	62	57	63		1
				Date	Technician
SG18	70	71	72		1
				Date	Technician
SG19	71	75	76		1
				Date	Technician
SG20	72	73	80		1
				Date	Technician
Parameter		OTA	2		
Number	CEA	Signal	Reference		
<u>XX</u>	Number	<u>X</u>	<u> </u>		
SS21	80	3	4		1
				Date	Technician
SG22	83	7	8		1
				Date	Technician
SG23	89	11	12		1
				Date	Technician

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SAN ONOFRE NUCLEAR GENERATING STATION INSTRUMENT AND TEST PROCEDURE S023-II-3.3 UNITS 2&3 REVISION 0 PAGE 177

#### 6.0 PROCEDURE

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6.23.85.21 RTT Part ? - 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.

- .2 Set up the AED 2500 Floppy Disk Drive as follows:
  - 2.1 Turn ON the AED Floppy Disk Drive.



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

2.3 Place the floppy disk containing the Part 2 RTT software into the AED 2500 Floppy Disk Drive.

2.4 Set the INIT and WP switches UP.

Date Technician

2.5 Lift the IPL switch.

Sulfrey at the balance

Technician Date

2.3 Place the CPC Coldstart Loader paper tape into the TTY paper tape reader and connect the TTY to the CPC (CEAC) calculator.

Technician Date
#### INSTRUMENT AND TEST PROCEDURE S023-11-3.3 REVISION O PAGE 178

6.0 PROCEDURE

2.5

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6.23.95.21.4 Hit "FUNCTION" button, then hit "LOCATION" button on the Hexadecimal Display Panel. 1

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	Dat	ta	Technici	an
.5 Set up t Interdat	he following men a Hexadecimal Di	nory loca isplay Pa	ations via anel:	the
Location	Contents			
30 32 34 36 50 52 54 55 78	0000 0000 0050 0500 000 4300 0090 0294			
			1	
	Dat	e	Technicia	17

Read through these same locations to verify the .6 correct contents.



.7 Start the processor at location 30.

Date / Technician

Start the TTY paper tape reader by setting the .8 READER/PUNCH switch to the "MANUAL START" position.

-- c ...

Date Technician

.9 Respond to the TEST TRACK prompt with 55.

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Date	Technician

SAN ONOFRE NUCLEAR GENERATING STATION INSTRUMENT AND TEST PROCEDURE S023-11-3.3 UNITS 2&3 REVISION 0 PAGE 179

## 6.0 PROCEDURE

5.23.36.21.10 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.

.14 Attach the TEST REPORT printout to this procedure as a record of the test.

Date Technician

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VJS:19535/js/mr Continued from 19525 Continued to 19545 SAT ONDERE NUCLEAR GEVERATING STATION INSTRUMENT AND TEST PROCEDURE SO23-11-3.3 PUNITS 2&3 REVISION 0 PAGE 180

## 5.0 PROCEDURE

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6.23.95.22 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 RIT box for the previous test will be satisfactory for this test. If not, repeat steps 5.23.5.2 through 5.23.5.11.
- .22.2 On the Bay C Operator's Module, select the CPC calculator.
- .22.3 To set up the TTY's, connect one TTY to the channel C, 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 C Operator's Module, select the SEAC calculator. The CPC memory in channel is now protected.
- .22.5 Connect another TTY to the channel C 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 C 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 DWDFRE NUCLEAR GENERATING STATION INSTRUMENT AND TEST PROCEDURE S023-11-3.3 UNITS 2&3 REVISION 0 PAGE 181

## 6.0 PROCEDURE

- 5.23.35.22.7 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 C, and to an isolation amplifier for transmission to CEA calculator No. 2 in Bay C. 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 C, column three (Hi Local Power) and column four (Lov DN3R). 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 C, Operator's Module, select the CPC calculator.
  - .22.11 At the CPC TTY, type in the command LI PF2 BOTH CR to make the parameter Penalty Factor 2 from CEAC No. 2 a live input. PF2 will be used when checking channel C at the CPC TTY, type in the command "GO".
  - .2?.12 Reset the SEAC calculator trip by pushing the white (SPARE) pushbutton on the Operator's Module and entering an R (for Restart) when promoted 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.

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SAN DHOFRE NUCLEAR GENERATING STATION INSTRUMENT AND TEST PROCEDURE S023-11-3.3 UNITS 2&3 REVISION 0 PAGE 192

# 6.0 PROCEDURE

- 6.23.85.22.14 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.
  - .22.15 Reset the Low DNBR and Hi LPD trips on the Bistable Control Panel of the PPS.
  - .22.17 Reset the C-E RTT box digital timer to zero.
  - .22.18 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.

#### 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 C.

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CEAC #1 CPC CHANNEL C

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NUMBER		SIGNAL	SIGNAL	PERFORMED INITIAL/DATE
CEA DI	OTC2-	15	15	/
CEA 02	0101-	3	4	1
CE4 03	OTDI -	3	4	//
CEA 04	OTC2-	7	8	/
CEA 05	OTC1 -	19	20	//
CEA 05	OTC2-	7	8	/
CEA 07	- ICTC	23	24	/
CEA 08	OTC2-	11	12	/
CEA 09	OTC1 -	27	23	/
CEA 10	OTC2-	11	12	/
SEA 11	OTD1 -	31	3?	/
CEA 12	-SQLG	15	16	/
CEA 13	OTC2-	17	20	/
CEA 14	OTC1 -	35	36	/
CEA 15	OTC1 -	39	40	/
CEA 15	OTC2-	15	16	/
SEA 17	OTC2-	19	20	/
CEA 18	OTB1 -	43	44	/
CEA 19	OTD1 -	47	48	/
CEA 20	OTC2-	23	24	/
CEA 21	OTC1 -	51	52	/
CEA 22	OTC2-	23	24	/

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CEAC #1 CPC CHANNEL C

PARAMETER NUMBER	•	SI GHAL	ST GVAL	PERFORMED INITIAL/DATE
CEA 23	DT32-	55	55	/
CEA 24	OTA1 -	27	28	/
CEA 25	0T32-	53	50	/
CEA 25	OT 1-	27	28	/
CEA 27	OT32-	53	54	/
CEA 28	OTAI -	31	32	/
CEA 29	OT 41 -	35	35	
CEA 30	OT92-	57	53	/
CEA 31	DTA2-	71	72	/
CEA 32	0Т31-	31	32	/
CEA 33	DT 1-	35	35	/
CEA 34	OT9?-	75	76	/
CEA 35	OTB2-	73	90	/
CEA 36	0T 41 -	39	40	/
CEA 37	OT33-	3	4	/
CEA 38	OTB3-	7	9	/
CEA 39	OT31 -	33	40	1
CEA 40	0731	43	44	/
CEA 41	OTB3	11	1?	/
CEA 42	OTB3-	15	16	/

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# CEAC #1 CPC CHANNEL C

NUMBER		SI GNAL	SI G'VAL	PERFORMED
CEA 43	0T41-	43	44	/
CEA 44	- TATO	47	48	/
CEA 45	0733-	19	20	/
CEA 45	0731 -	47	48	/
CE4 47	OT33-	23	21	4 1
CEA 49	OTA1 -	51	52	/
CFA 19	STAL-	55	55	/
CEA 50	0T83-	27	28	/
CEA SI	OT33-	31	3?	/
CEA 52	0T31-	51	52	/
CEA 53	OT31-	55	55	/
CEA 54	OT33-	35	36	/
CEA 55	OT93-	39	40	/
CEA 56	OTA1 -	59	50	/
CEA 57	OT33-	43	44	1
CEA 59	0731 -	59	50	/
CEA 59	OT83-	47	43	/
CEA 60	OTA1-	53	64	/
CEA 61	OTB3-	43	44	/
CEA 62	OTB3-	59	60	/
CEA 63	OTB1-	47	49	/

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# CEAC #1 CPC CHANNEL C

		SIGNAL	SIGNAL	PERFORMED INITIAL /DATE
CEA 54	OT31-	53	51	/
CEA 65	OTB3-	63	54	/
CEA 55	0733-	43	41	/
CEA 67	OTA1 -	59	50	/
CEA 53	OTAI -	47	49	/
CEA 69	OTA1 -	63	64	/
CEA 70	OT33-	43	44	/
CEA 71	0 TB 3 -	59	60	/
CEA 72	OT33-	47	49	/
CEA 73	0T31-	71	72	/
CEA 74	OTB1-	75	75	/
CEA 75	0131-	79	90	/
CEA 75	OT93-	79	80	/
CEA 77	0TB5-	53	54	/
CEA 78	DT35-	57	53	/
CEA 79	OTA1 -	79	80	/
CEA 90	OT 42-	?	3	/
CEA 81	OTA2-	5	7	/
CEA 82	OTB5 -	51	52	/
CEA 83	0TB5-	55	66	/
CEA 84	OTB2-	3	4	/

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CEAC #1 CPC CHANNEL C

PARAMETER NUMBER XX		SI GNAL	SI GNAL	PERFORMED INITIAL/DATE
CEA 95	OT32-	7	7	1
CEA 85	OTB5-	59	70	
CEA 97	OT35-	73	74	/
CEA 88	OTA2-	10	11	/
CEA 89	0TB5-	77	79	/
CEA 90	0T32-	11	12	/
CEA 91	OT35-	91	8?	/

## 5.0 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.
- 6.24.1 Ensure the temporary LED's are installed across the rotary relay contacts per steps 6.19.1 through 6.19.3.



6.24.2 Remove the PPS input simulator box leads from terminals 42 and 43 on TB-1 of L129, if not already removed.



6.24.3 Connect the "Bistable Test" leads of L151 to terminals 42 and 43 on TB-1 of L123, if not already connected.

Date Technician

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5.0 PROCEDURE

6.24.4 On the bistable control panel being tested, rotate the bistable selector switch to position number 5.

Date / Technician

5.24.5 Rotate the meter input selector switch to the "TRIP SP" position.

Date Technician

6.24.6 Record the value indicated on the bistable control panel digital indicator.

Volts / Value/Units Date Technician

6.24.7 Rotate the meter input selector switch to the "INPUT" position.

Date / Technician

5.24.8 In the "Bistable Test" section of L151 place the toggle switch in the "OPEN" position. The LED should extinguish.

Date Technician

6.24.9 Adjust the "HIGH COARSE" and the "HIGH FINE" potentioneters in the "Bistable Test" section of [15] until the digital indicator at the bistable control panel reads 4.00 Vdc +.1 Vdc.

Date / Technician

5.24.10 In the "Bistable Test" section of L151, place the toggle switch in the "CLOSE" position. The LED should energize.

Date / Technician

6.24.11 Adjust the "LOW COARSE" and "LOW FINE" 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 6.24.6.

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- 5.0 PROCEDURE
  - 5.24.1? Record the adjusted voltage.

Volts		1
Value/Units	Date	Technician

Connect the optical end of a C-E test box pickup cable 6.24.13 to the "Bistable Test" section LED of L151.

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.

6.24.15 Connect the optical end of four pickup cables to the temporary LED's installed in steps 5.17.1 through 5.17.3.

- 5.24.16 Connect the other end of these four pickup cables to the "L1", "L?", "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.
  - "L1", "L2", "L3", "L4" stop lamps toggle switches are in .1 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.

.4 Stop "TIMER MODES" switch is in the step up position.

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Date	Technician

SAN ONOFRE NUCLEAR GENERATING STATION INSTRUMENT AND TEST PROCEDURE S023-11-3.3 UNITS 2&3 REVISION 0 PAGE 190

6.0 PROCEDURE

5.24.17.5 "L5" and "L5" stop lamps toggle switches are in the "OFF" position.

Date Technician

6.24.18 Adjust the input simulator box potentiometer in channel 'A' corresponding to bistable number 5 until the bistable is tripped.

6.24.19 Ensure the toggle switch in the "Bistable Test" section of 2L151 is in the "OPEN" position.

5.24.20 Ensure the C-E test box timer is reset.

6.24.21 After the test equipment has stabilized, place the "Bistable Test" section toggle switch on 21151 in the "CLOSED" position. The timer should start.

6.24.22 Record the response time.

Volts	10 h	/
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 5.1.1.
- 6.24.24 Reset bistable number 5 in channel A.

6.24.25 Repeat steps 6.24.18 through 6.24.24 substituting channel 'B' in place of channel 'A'.

Volts		/
Value/Units	Date	Technician

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- 6.0 PROCEDURE
  - 5.24.25 Repeat steps 5.24.13 through 5.24.24 substituting channel 'D' in place of channel 'B'.

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.
  - 5.25.1 Ensure the temporary LED's are installed across the entary relay contacts per steps 5.19.1 through 5.19.3.

Date Technician

6.25.2 Remove the PPS input simulator box leads from terminals 39 and 40 on TB-1 of L-129, if not already removed.



6.25.3 Connect the "Bistable Test" leads of L151 to terminals 39 and 40 on TB-1 of L-129, if not already connected.



6.25.4 On the bistable control panel being tested, rotate the bistable selector switch to position number 6.

Date Technician

6.24.5 Rotate the meter input selector switch to the "TRIP SP" position.

Date Technician

SAN ONOFRE NUCLEAR GENERATING STATION INSTRUMENT AND TEST PROCEDURE S023-11-3.3 UNITS 2\$3

REVISION 2 PAGE 192

6.0 PROCEDURE

Record the value indicated on the bistable control panel 5.25.6 digital indicator.

Volts	-	1
Value/Units	Date	Technician

Rotate the meter input selector switch to the "INPUT" 6.25.7 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 potentioneters in the "Bistable Test" section of 21151 until the digital indicator on the bistable control panel reads approximately .1 VDC on the tripped side of the value recorded in step 5.25.5.

5.25.10 In the "Bistable Test" section of L151, place the toggle switch in the "CLOSE" position. The LED should energize.

Adjust the "LOW COURSE" and "LOW FINE" potentiometers in 6.25.11 the "Bistable Test" section of L151 until the digital indicator on the bistable control panel reads 4.00 VDC +.1 VOC.

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6.25.12 Record the adjusted voltage.

> Volts Value/Units Date Technician

SAN ONOFRE NUCLEAR GENERATING STATION INSTRUMENT AND TEST PROCEDURE SO23-11-3.3 UNITS 283 REVISION O PAGE 193

- 5.0 PROCEDURE
  - 6.25.13 Connect the optical end of a C-E test box pickup cable to the "Bistable Test" section LED of L151.

Date Technician

5.25.14 Connect the other end of this pickup cable to the "LED 1" jacks in the "START LA'IPS" section of the C-E test box.

6.25.15 Connect the optical end of four pickup cables to the temporary LED's installed in steps 6.21.1 through 5.21.3.

- 6.25.15 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.
- 5.25.17 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 DOWN position.

Date Technician

.4 Stop "TIMER MODES" switch is in the step up position.

Date Technician

SAN ONOFRE NUCLEAR GENERATING STATION INSTRUMENT AND TEST PROCEDURE S023-II-3.3 UNITS 283 REVISION 0 PAGE 194

- 5.0 PROCEDURE
  - 6.25.17.5 "L5" and "L5" 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 5 until the bistable is tripped.

Date Technician

5.25.19 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 C bistable is reset.

Date Technician

6.25.21 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.

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Volts / Value/Units Date Technician

6.25.23 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.

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6.25.24 Reset bistable number 5 in channel A.

Date Technician

SAN ONOFRE NUCLEAR GENERATING STATION INSTRUMENT AND TEST PROCEDURE S023-II-3.3 UNITS 283 REVISION 0 PAGE 195

# 6.0 PROCEDURE

5.25.25 Repeat steps 5.25.13 through 5.25.24 substituting channel 'B' in place of channel 'A'.

Volts	-	/
Value/Units	Date	Technician

5.25.25 Repeat steps 5.25.18 through 5.25.21 substituting channel 'D' in place of channel 'A'.

5.25.27 Disconnect the "Bistable Test" leads and replace the input simulator leads on the terminals they were removed from in step 5.25.1

6.25.29 Reset all bistables.

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5.25.29 Record the largest response time value of steps 5.25.22, 5.25.25, 5.25.25 in the Data Collection Table.

- 5.25 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 LISI) 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 40 and 39 on TB-1 of L129, if not already removed.

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5.0 PROCEDURE

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6.25.2 Connect the "Bistable Test" leads of L151 to terminals 39 and 40 on TB-1 of L129, if not already connected.

Date Technician

6.25.3 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)

5.25.4 In bay 5 of cabinet B (L035), connect an LED jumper cable in series with a six volt DC pover supply across terminals 25 and 27 on terminal strip TB55. This monitors contacts on the mechanical relay 'MR13. (SIAS)

6.25.5 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.

6.25.6 Connect the optical end of a second stop cable to the LED installed in step 5.26.4 and connect the double banana plug end to the "L2" jacks of the C-E test box.

6.26.7 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.

INSTRUMENT AND TEST PROCEDURE S023-11-3.3 REVISION PAGE 137-

# 6.0 PROCEDURE

5.25.3 On channel 'C' 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.

Volts / Value/Units Date Technician

5.25.11 Rotate the meter input selector switch to the "INPUT" position.

Date Technician

6.26.12 In the "Bistable Test" section of L151 place the toggle switch in the "OPEN" position. The LED should extinguish.

Date Technician

6.25.13 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 5.26.10.

Date / Technician

6.26.14 In the "Bistable Test" section of L151, place the toggle switch in the "CLOSED" position. The LED should energize.

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Date / Technician

SAN ONOFRE NUCLEAR GENERATING STATION INSTRUMENT AND TEST PROCEDURE SO23-11-3.3 UNITS 233

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5.0 PROCEDURE

Adjust the "LOW COARSE" and "LOW FINE" potentiometers in 6.25.15 the "Bistable Test" section of L151 until the digital indicator on the bistable control panel reads 4.00 +.1 VDC.

6.26.16 Record the adjusted voltage.

- Energize the C-E test box and ensure the following 6.25.17 switches are in the correct positions.
  - .1 "L1" and "L2" stop lamps toggle switches are in the "ON" position.

.2 "L3", "L4", "L5", "L5" 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 down position.

.5 Stop "Timer Modes" switch is in the step up position.

SAN ONOFRE NUCLEAR GENERATING STATION INSTRUMENT AND TEST PROCEDURE S023-II-3.3 UNITS 243 REVISION 0 PAGE 199

6.0 PROCEDURE

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6.25.18 Adjust the input simulator box potentiometer in channel 'A' corresponding to bistable number 6 until the bistable is tripped.

Date Technician

6.26.19 Ensure the toggle switch in the "Bistable Test" section of L151 is in the "CLOSED" position.

Date / Technician

5.25.20 Ensure the C-E test box timer is reset and the bistable is reset in channel 'C'.

Date / Technician

6.25.21 After the test equipment has stabilized, place the "Bistable Test" section toggle switch on L151 in the "OPEN" position. The timer should start.

Date Technician

5.25.22 Record the response time.

Value/Units Date Technician

- 5.26.23 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 5 in channel 4.

Date / Date Technician Repeat steps 6.26.18 through 6.26.24 substituting

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6.26.25 Repeat steps 6.26.18 through 6.26.24 substituting channel 'B' in place of channel 'A'.

Value/Units Date Technician

SAN ONOFRE NUCLEAR GENERATING STATION INSTRUMENT AND TEST PROCEDURE \$023-11-3.3 UNITS 2&3 REVISION 0 PAGE 200

5.0 PROCEDURE

6.25.25 Repeat steps 5.25.19 through 5.25.24 substituting channel 'D' in place of channel 'A'.

Value/Units	Date	Technician
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6.26.27 Reset all bistables.

6.26.28 Record the largest response time value of steps 6.25.22, 5.25.25, 5.26.26 in the "Data Collection Table".

6.26.29 In bay 6 of cabinet A (LO34), move the optical pickup setup to terminals 43 and 45 on terminal strip 65. This monitors contacts on the solid state relay SSRIA. (CCAS)

5.25.30 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)

5.25.31 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 "CLOSED" position.

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Date echnician

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SAN ONOFRE NUCLEAR GENERATING STATION INSTRUMENT AND TEST PROCEDURE S023-11-3.3 UNITS 2%3 REVISION 0 PAGE 201

S.O PROCEDURE

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5.23.33 Ensure the C-E test box timer and the channel 'C' 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.

5.25.35 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 5.1.1.

6.26.37 Reset bistable number 6 in channel 'A'.

Date Technician

6.25.38 Repeat steps 5.25.31 through 6.26.37 substituting channel 'B' in place of channel 'A'.

6.26.39 Repeat steps 6.26.31 through 6.26.37 substituting channel 'D' in place of channel 'A'.

SAN ONOFRE NUCLEAR GENERATING STATION INSTRUMENT AND TEST PROCEDURE S023-11-3.3 UNITS 2&3 REVISION 0 PAGE 202

6.0 PROCEDURE

5.25.40 Disconnect the "Bistable Test" leads and replace the input simulator leads on the terminals they were removed from in step 6.26.1.

Date Technician

6.26.41 Reset all bistables.



5.25.42 Record the largest response time value of steps 5.26.35, 6.25.33, 5.25.39 in the "Data Collection Table".

Date Technician

6.27 Low SG-1 Level to RTSG Response Time

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- 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.
- 5.27.1 Ensure the temporary LED's are installed across the rotary relay contacts per steps 5.19.1 through 6.19.3.



5.27.2 Remove the PPS input simulator box leads from terminals 21 and 25 on TB-1 of L129.

Date / Technician

6.27.3 Connect the "Bistable Test" leads of L151 to terminals 24 and 25 on TB-1 of L129.

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SAN ONOFRE NUCLEAR GENERATING STATION INSTRUMENT AND TEST PROCEDURE S023-11-3.3 UNITS 2%3 REVISION 0 PAGE-293

#### 5.0 PROCEDURE

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6.27.4 On the bistable control panel being tested, rotate the bistable selector switch to position number 7.

Date Technician

6.27.5 Rotate the meter input selector switch to the "TRIP Sp" position.

Date Technician

5.27.6 Record the value indicated on the bistable control panel digital indicator.

Volts		/
Value/Units	Date	Technician

5.27.7 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.

Date Technician

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.

5.27.10 In the "Bistable Test" section of L151, place the toggle switch in the "CLOSE" position. The LED should energize.

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Date Technician

SAN ONOFRE NUCLEAR GENERATING STATION INSTRUMENT AND TEST PROCEDURE S023-11-3.3 UNITS 283 REVISION 0 PAGE 204

6.0 PROCEDURE

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5.27.11 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.



5.27.12 Record the adjusted voltage.



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 6.10.1 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 echnician

SAN ONOFRE NUCLEAR GENERATING STATION INSTRUMENT AND TEST PROCEDURE S023-II-3.3 UNITS 2&3 REVISION 0 PAGE 205

6.0 PROCEDURE

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5.27.17.2 "START LAMPS" toggle switch is in the "1/1" position.

Date . Technician

.3 Start "TIMER MODES" switch is in the step up 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.

5.27.18 Adjust the input simulator box potentiometer in channel 'A' corresponding to bistable number 7 until the bistable is tripped.

5.27.19 Ensure the toggle switch in the "Bistable Test" section of L151 is in the "OPEN" position.

5.27.20 Ensure the C-E test box timer is reset.

5.27.21 After the test equipment has stabilized, place the "Bistable Test" section toggle switch on L151 in the "CLOSED" position. The timer should start.

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INSTRUMENT AND TEST PROCEDURE S023-11-3.3 REVISION 0 PAGE 205

# 5.0 PROCEDURE

6.27.22 Record the response time.

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Value/Unite	Date	Tochnician
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- 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 5.27.24 substituting channel 'B' in place of channel 'A'.

Technician

5.27.25 Repeat steps 6.27.19 through 6.27.24 substituting channel 'D' in place of channel 'B'.

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Value Units	Date	Technician

5.27.27 Disconnect the "Bistable Test" leads and replace the input simulator leads on the terminals they were removed from in step 5.27.1

Date Technician

- NOTE: This step may be omitted if section 5.28 is to be performed next.
- 6.27.28 Reset all bistables.

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Date Technician

## 5.0 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 L121. If not a ready connected.

5.28.2 Connect the "Bistable Test" leads of L151 to terminals 24 and 25 on TB-1 of L121, if not already removed.

5.28.3 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 TB65. This monitors contacts on the solid state relay SSRIA. (EFAS-1)

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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)

INSTRUMENT AND TEST PROCEDURE S023-11-3.3 REVISION 0 PAGE 203

## 6.0 PROCEDURE

6.23.5 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

6.28.6 Connect the optical end of a second stop cable to the LED installed in step 5.29.4 and connect the double banana plug end to the "L2" jacks of the C-E test box.

5.28.7 Connect the optical end of a start cable to the LED installed in the "Bistable Test" section of L151 and connect the double binana plug end to the "LED 1" jacks on the C-E test box.

5.28.8 On the channel 'A' bistable control panel, rotate the bistable selector switch to position number 7.

Date Technician

6.28.9 Rotate the meter input selector switch to the "TRIP SP" position.

Date Technician

6.28.10 Record the value indicated on the bistable control panel digital indicator.

Volts		1
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value/units	Date	Technician

6.23.11 Rotate the meter input selector switch to the "INPUT" position.

Date Technician

INSTRUMENT AND TEST PROCEDURE SO23-11-3.3 REVISION 0

# 5.0 PROCEDURE

5.23.12 In the "Bistable Test" section of L151, place the toggle switch in the "OPEN" position. The LED should extinguish.

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Date	Technician

6.28.13 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

6.28.14 In the "Bistable Test" section of L151, place the toggle switch in the "CLOSED" position. The LED should energize.

5.28.15 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 6.28.10.

6.29.16 Record the adjusted voltage.



- 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 "DQ" position.

SAN ONOFRE NUCLEAR GENERATING STATION INSTRUMENT AND TEST PROCEDURE S023-11-3.3 UNITS 253 REVISION 0 PAGE 210

5.0 PROCEDURE

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6.28.17.2 "L3", "L4", "L5" and "L5" stop lamps toggle switches are in the "OFF" position.

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TART	LAMPS	toggle	switch	is i	n the	"1/1"	position.	
						1		
				Date	2	Teo	hnician	2
art	"TIMER	MODES"	switch	is in	the	step up	position.	
						1		

Date

.5 Stop "TIMER MODES" switch is in the step up position.

Technician

6.28.18 Adjust the input simulator box potentiometer in channel 'A' corresponding to bistable number 7 until the bistable is tripped.

Date Technician

5.28.19 Ensure the toggle switch in the "Bistable Test" section of 2L151 is in the "OPEN" position.

6.28.20 Ensure the C-E test box timer is reset, and channel 'C' bistable is reset.

6.28.21 After the test equipment has stabilized, place the "Bistable Test" section toggle switch on L151 in the "CLOSE" position. The timer should start.

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SAN ONOFRE NUCLEAR GENERATING STATION INSTRUMENT AND TEST PROCEDURE SO23-II-3.3 UNITS 233 REVISION 0 PAGE 211

## 5.0 PROCEDURE

5.23.22 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 5.1.1.
- 5.28.24 Reset bistable number 7 in channel 4.

Date Technician

6.28.25 Repeat steps 6.28.18 through 5.28.24 substituting channel 'B' in place of channel 'A'.

Volts		/
Value/Units	Date	Technician

5.23.25 Repeat steps 5.23.13 through 5.23.24 substituting channel 'D' in place of channel 'A'.

Volts		1	
Value/Units	Date	Technician	-

5.23.27 Disconnect the "Bistable Test" leads and replace the input simulator leads on the terminals they were removed from in step 5.29.1

Date Technician

5.28.23 Reset all bistables.

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Date Technician

6.28.29 Record the largest response time value of steps 5.28.22, 6.23.25, 5.23.25 in the "Data Collection Table".

Date Technician

SAN ONOFRE NUCLEAR GENERATING STATION INSTRUMENT AND TEST PROCEDURE SO23-11-3.3 UNITS 233 REVISION 0 PAGE 212

# 6.29 Low SG-2 Level to RTSG Response Time

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- 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 5.21.1 through 5.21.3.

5.29.2 Remove the PPS input simulator box leads from terminals 21 and 22 on TB-1 of L129.

6.29.3 Connect the "Bistable Test" leads of L151 to terminals 21 and 22 on TB-1 of L123.

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.

6.29.6 Record the value indicated on the bistable control panel digital indicator.

Volts / Value/Units Date Technician

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SAN ONDERE NUCLEAR GENERATING STATION INSTRUMENT AND TEST PROCEDURE SO23-11-3.3 UNITS 2&3 REVISION 0 PAGE 213

6.0 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 <u>+</u>.1 VDC.

6.29.10 In the "Bistable Test" section of L151, place the toggle switch in the "CLOSE" position. The LED should energize.

5.29.11 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 6.29.6.

6.29.12 Record the adjusted voltage.

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6.29.13 Connect the optical end of a C-E test box pickup cable to the "Bistable Test" section LED of L151.
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# 5.0 PROCEDURE

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6.23.14 Connect the other end of this pickup cable to the "LED 1" jacks in the "START LAMPS" section of the C-E test box.

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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 5.19.3.

- 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-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.

.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.

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Date Technician

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#### 5.0 PROCEDURE

6.27.18 Adjust the input simulator box potentiometer in channel 'A' corresponding to bistable number 8 until the bistable is tripped.



6.29.19 Ensure the toggle switch in the "Bistable Test" section of L151 is in the "OPEN" position.

5.29.20 Ensure the C-E test box timer is reset.

Date Technician

5.29.21 After the test equipment has stabilized, place the "Bistable Test" section toggle switch on 2L151 in the "CLOSE" position. The timer should start.



5.29.22 Record the response time.



- 6.23.23 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 9 in channel 'A'.

Date / Technician

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6.29.25 Repeat steps 6.29.18 through 6.29.24 substituting channel 'B' in place of channel 'A'.

Value/Units Date

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#### 6.0 PROCEDURE

6.23.26 Repeat steps 5.23.18 through 5.23.24 substituting channel 'D' in place of channel 'A'.

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Value/Units	Date	Technician

6.29.27 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.



5.29.29 Record the largest response time value of steps 5.29.22, 5.23.25, 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 129, if not already removed.

Date echnician

SAN ONOFRE NUCLEAR GENERATING STATION INSTRUMENT AND TEST PROCEDURE S023-11-3.3 UNITS 233 REVISION 0 PAGE 217

- 5.0 PROCEDURE
  - 5.30.2 Connect the "Bistable Test" leads of L151 to terminals 21 and 22 on TB-1 of L129, 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 TB65. This monitors contacts on the solid state relay SSR14. (EFAS-2)

5.30.4 In bay 5 of cabinet B (LO35), 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)

6.30.5 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.

6.30.6 Connect the optical end of a second stop cable to the LED installed in step 6.23.4 and connect the double banana plug end to the "L2" jacks of the C-E test box.

5.30.7 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.

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5.40.17.4 Start "TIMER MODES" switch is in the step up position.

.5 Stop "TIMER MODES" switch is in the step up position.

5.40.18 Adjust the input simulator box potentiometer in channel 'A' corresponding to bistable number 20 until the bistable is tripped.

.40.19 Ensure the toggle switch in the "Bistable Test" section of L151 is in the "OPEN" position.

.40.20 Ensure the C-E test box timer is reset.

40.21 After the test equipment has stabilized, place the "Bistable Test" section toggle switch on L151 in the "CLOSE" position. The timer should start.

40.22 Record the response time.

0.23 Adjust the input simulator box potentioneter 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 AND TEST PROCEDURE \$023-11-3.3 UNITS 283

#### 6.0 PROCEDU

Adjust the "LOW COARSE" and "LOW FINE" potentiometers in 6.30.15 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 5.30.10.

5.30.15 Record the adjusted voltage.

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Value/Units	Date	Technician	

- Energize the C-E test box and ensure the following 5.32.17 switches are in the correct positions.
  - .1 "Ll" and "L2" stop lamps toggle switches are in the "O'" 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.

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6.8 PROCESSIRE

6.33.13 Affust the lipit of hex potentiometer in channel 

Date Technician

Ensure the toggle switch in the "Bistable Test" section 6.30.12 of L151 is in the "OPFA" position.

5.30 20 Ensure the 0-5 test bor timer is reset.

After the test equipment has stabilized, place the 5.30.21 "Sistable Test" section toggle switch on L151 in the "CLOSE" position. The fact should start.

5.30.2? Record the response time.

Nate Value/Units Technicia

- 5.33.23 Adjust the input simulator box potentiometer in channel "A' corresponding to pistable number 3 until the bistable input is returned to the value adjusted for in step 6.1.1.
- Reset bistable number 8 in channel 'A'. 6.30.21

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6.30.25 Repeat steps 6.30.19 through 6.30.24 substituting channel D' in place of changel 'A'.

Date Technician Value/Units

SAN DNOFRE NUCLEAR GENERATING STATION INSTRUMENT AND TEST PROCEDURE SD23-11-3.3 UNITS 283 REVISION O PAGE 221

5.0 PROCEDURE

# 6.30.25 Repeat steps 5.30.19 through 5.30.21 substituting channel 'D' in place of channel 'A'.

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Value/Units	Date	Technician	

5.30.27 Disconnect the "Bistable Test" leads and replace the input simulator leads on the terminals they were removed from in step 5.30.1

Date Technician

5.30.28 Reset all bistables.



5.30.29 Record the largest response time value of steps 5.30.22, 5.30.25, 5.30.25 in the "Data Collection Table".

Date / Technician

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.

6.31.1 Ensure the temporary LED's are installed across the rotary relay contacts per steps 5.19.1 through 5.19.3.

Technician Date

6.31.2 Remove the PPS input simulator box leads from terminals 35 and 37 on TB-1 of L129.

Date lechnician

SAN OWOFRE NUCLEAR GENERATING STATION INSTRUMENT AND TEST PROCEDURE S023-II-3.3 UNITS 253 REVISION O PAGE 222

#### 5.0 PROCEDURE

5.31.3 Connect the "Bistable Test" leads of L151 to terminals 35 and 37 on TB-1 of L129.

Date Technician

6.31.4 On the bistable control panel being tested, rotate the bistable selector switch to position number 11.

5.31.5 Rotate the meter input selector switch to the "TRIP SP" position.

Date Technician

6.31.6 Record the value indicated on the bistable control panel digital indicator.

6.31.7 Rotate the meter input selector switch to the "INPUT" position.

Date Technician

6.31.8 In the "Bistable Test" section of L151 place the toggle switch in the "OPEN" position. The LED should extinguish.



5.31.9 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 6.31.5.

Date lechnician

SAN ONOFRE NUCLEAR GENERATING STATION INSTRUMENT AND TEST PROCEDURE SD23-II-3.3 UNITS 243 REVISION O PAGE 223

# 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.

Date Technician

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.

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.

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# 5.0 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.

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# 6.0 PROCEDURE

5.31.20 Ensure the C-E test box timer is reset .

Technician

After the test equipment has stabilized, place the 6.31.21 "Bistable Test" section toggle switch on L151 in the "OPEN" position. The timer should start.

6.31.22 Record the response time.

- 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.
- 5.31.21 Reset bistable number 11 in channel 'A'.

Repeat steps 5.31.18 through 5.31.24 substituting 6.31.25 channel '3' in place of channel 'A'.

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value/unit	s Date	Technician

Repeat steps 5.31.13 through 5.31.24 substituting 6.31.25 channel 'D' in place of channel 'A'.

Volts		/
Value/Units	Date	Technician

Disconnect the "Bistable Test" leads and replace the 5.31.27 input simulator leads on the terminals they were removed from in step 6.31.1

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5.0 PROCEDURE

NOTE: This step may be omitted if section 5.32 is to be performed next.

6.31.23 Reset all bistables.

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Date	Technician

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6.31.29 Record the largest response time value of steps 6.31.22, 6.31.25, 5.31.25 in the "Data Collection Table".

Date Technician

- 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 35 and 37 on TB-1 of L129, if not already removed.

Date / Technician

5.32.2 Connect the "Bistable Test" leads of L151 to terminals 35 and 37 on TB-1 of L129, if not already connected.

Date / Technician

6.32.3 In bay 6 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. ('ISIS)

Date / Technician

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# 6.0 PROCEDURE

In bay 5 of cabinet 3 (LO35), connect an LED jumper 5.32.4 cable in series with a six volt DC power supply across terminals 31 and 35 on terminal strip TB55. This monitors contacts on the solid state relay SSRIB. (MSIS)

5.32.5 Connect the optical end of a stop cable to the LED installed in step 5.32.3 and connect the houble banana plug end to the "L1" jacks of the C-E test box.

Connect the optical end of a second stop cable to the 5.32.6 LED installed in step 5.32.4 and connect the double banana plug end to the "L2" jacks of the C-E test box.

Connect the optical end of a start cable to the LED 6.32.7 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.

5.32.8 On the channel 'A' bistable control panel, rotate the bistable selector switch to position number 11.

Rotate the meter input selector switch to the "TRIP SP" 6.32.9 position.

Record the value indicated on the bistable control panel 6.32 10 digital indicator.



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#### 6.0 PROCEDURE

6.32.11 Rotate the meter input selector switch to the "INPUT" position.

In the "Bistable Test" section of L151, place the toggle 6.32.12 switch in the "OPEN" position. The LED should extinguish.

Adjust the "HIGH COARSE" and the "HIGH FINE" 5.32.13 potentiometers in the "Bistable Test' section of L151 until the digital indicator on the tostable control panel reads approximately .1 VDC on the tripped side of the value recorded in step 6.32.5.

In the "Bistable Test" section of L151, place the toggle 6.32.14 switch in the "CLOSED" position. The LED should energize.

Adjust the "LOW COARSE" and "LOW FINE" potentiometers in 6.32.15 the "Bistable Test" section of L151 until the digital indicator on the bistable control panel reads 3.70 VDC +.1 VDC.

5.32.15 Record the adjusted voltage.

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# 5.0 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 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.

.4 Start "TIMER MODES" switch is in the step DOWN position.

.5 Stop "TIMER MODES" switch is in the step up position.

5.32.18 Adjust the input simulator box potentiometer in channel 'A' corresponding to bistable number 11 until the bistable is tripped.

6.32.19 Ensure the toggle switch in the "Bistable Test" section of L151 is in the "CLOSED" position.

Date Technician

6.32.20 Ensure the C-E test box timer is reset.

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# 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.

Date Technician

6.32.22 Record the response time.

- 5.32.23 Adjust the input simulator box potentiometer in channel 'B' 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'.



channel '3' in place of channel 'A'.



5.32.25 Repeat steps 5.32.18 through 5.32.24 substituting channel 'D' in place of channel 'B'.

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Value/Units	Date	Technician	

5.32.27 Disconnect the "Bistable Test" leads and replace the input simulator leads on the terminals they were removed from in step 6.32.1

6.32.23 Reset all bistables.

Date echnician

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5.0 PROCEDURE

5.32.29 Record the largest response time value of steps 5.32.22, 6.32.25, 5.32.26 in the "Data Collection Table".

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Date	Technician

- 5.33 Lov 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.
  - 6.33.1 Ensure the temporary LED's are installed across the rotary relay contacts per steps 5.13.1 through 6.13.3.



5.33.2 Remove the PPS input simulator box leads from terminals 32 and 34 on TB-1 of L129, if not already removed.

Date Technician

5.33.3 Connect the "Bistable Test" leads of L151 to terminals 33 and 34 on TB-1 of L129, if not already connected.

Date / Technician

6.33.4 On the bistable control panel being tested, rotate the bistable selector switch to position number 12.

Date Technician

6.33.5 Rotate the meter input selector switch to the "TRIP SP" position.

Date / Technician

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# 6.0 PROCEDURE

5.33.5 Record the value indicated on the bistable control panel digital indicator.

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Value/Units	Date	Technician	-

5.33.7 Rotate the meter input selector switch to the "INPUT" position.

6.33.8 In the "Bistable Test" section of L151 place the toggle svitch in the "OPEN" position. The LED should extinguish.

6.33.9 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 6.33.6.

6.33.10 In the "Bistable Test" section of L151, place the toggle switch in the "CLOSE" position. The LED should energize.

6.33.11 Adjust the "Low Course" and "Low Fine" potentiometers in the "Bistable Test" section of L151 until the digital indicator at the bistable control panel reads 3.70 VDC +.1 VDC.

6.33.12 Record the adjusted voltage.



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5.0 PROCEDURE

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5.33.13 Connect the optical end of a C-E test box bickup cable to the "Bistable Test" section LED of Li51.

Date Technician

5.33.14 Connect the other end of this pickup cable to the "LED 1" jacks in the "START LAMPS" section of the C-E test box.

5.33.15 Connect the optical end of four pickup cables to the temporary LED's installed in steps 5.13.1 through 6.21.3.

Date / Technician

- 5.32.16 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.
- 5.33.17 Energize the C-E test box and ensure the following switches are in the correct positions.
  - .1 "L1", "L2", "L3", "L4" stop lands toggle switches are in the "ON" position.

Date Technician

.2 "START LAMPS" toggle witch is in the "1/1" position.

Date Technician

.3 Start "TIMER MODES" switch is in the step DOWN position.

\_\_\_\_\_/ Date Technician

.4 Stop "TIMER MODES" switch is in the step up position.



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- 6.0 PROCEDURE
  - 6.33.17.5 "L5" and "L6" stop lamps toggle switches are in the "OFF" position.

Date Technician

6.33.18 Adjust the input simulator box potentiometer in channel '4' corresponding to bistable number 1? until the bistable is tripped.

Date Technician

6.33.19 Ensure the toggle switch in the "Bistable Test" section of L151 is in the "CLOSED" position.



5.33.20 Ensure the C-E test box timer is reset.

6.33.21 After the test equipment has stabilized, place the "Bistable Test" section toggle switch on L151 in the "OPEN" position. The timer should start.

5.33.22 Record the response time.

- 6.33.23 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 6.1.1.
- 6.33.24 Reset bistable number 12 in channel '4'.

Date lechnician

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# 6.0 PROCEDURE

6.33.25 Repeat steps 5.33.18 through 5.33.24 substituting channel 'B' in place of channel 'A'.

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Value/Units	Date	Technician

6.33.25 Repeat steps 6.33.19 through 6.33.24 substituting channel 'D' in place of channel 'A'.

		/
Value/Units	Date	Technician

5.33.27 Disconnect the "Bistable Test" leads and replace the input simulator leads on the terminals they were removed from in step 5.32.1

Date Technician

- NOTE: This step may be omitted if section 6.34 is to be performed next.
- 5.33.2 Reset all bistables.

Date Technician

6.33.29 Record the largest response time value of steps 6.33.22, 6.33.25, 6.33.25 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.

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#### 6.0 PROCEDURE

6.34.1 Remove the input simulator box leads from terminals 33 and 34 on TB-1 of L129, if not already removed.

Date Technician

6.34.2 Connect the "Bistable Test" leads of L151 to terminals 30 and 31 on T3-1 of L121, if not already connected.

Date / Technician

6.34.3 In bay 6 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 TB55. 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 yolt DC power supply across terminals 34 and 36 on terminal strip TB55. This monitors contacts on the solid state relay SSR13. (MSIS)

5.34.5 Connect the optical end of a stop cable to the LED installed in step 5.34.3 and connect the double banana plug end to the "Ll" jacks of the C-E test box.

6.34.6 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.

Technician Date

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#### 6.0 PROCEDURE

6.34.7 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.



5.34.8 On the channel 'C' bistable control panel, rotate the bistable selector switch to position number 12.

5.34.9 Rotate the meter input selector switch to the "TRIP SP" position.

6.34.10 Record the value indicated on the bistable control panel digital indicator.

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 6.34.5.

Date echnician

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## 5.0 PROCEDURE

5.34.14 In the "Bistable Test" section of L151, place the toggle switch in the "CLOSED" position. The LED should energize.

Date Technician

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.

Date Technician

6.34.15 Record the adjusted voltage.

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Value/Units	Date	Technician	

- 5.34.17 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 "O'" position.

Date Technician

.2 "13", "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.

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INSTRUMENT AND TEST PRUCEDURE S023-11-3.3 REVISION 0 PAGE 230

# 6.0 PROCEDURE

6.34.17.5 Stop "TIMER MODES" switch is in the step up position.

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6.34.19 Adjust the input simulator box potentiometer in channel 'A' corresponding to bistable number 12 until the bistable is tripped.



5.34.19 Ensure the toggle switch in the "Bistable Test" section of L151 is in the "CLOSED" position.

5.34.20 Ensure the C-E test box timer is reset.

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.

5.34.22 Record the response time.

- 5.34.23 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 6.1.1.
- 5.31.24 Reset bistable number 12 in channel 4.

Technician Date

SAN ONDERE NUCLEAR GENERATING STATION INSTRUMENT AND TEST PROCEDURE S023-11-3.3 UNITS 283 REVISION 0 , PAGE 240

# 5.0 PROCEDURE

6.34.25 Repeat steps 5.34.18 through 5.34.24 substituting channel 'B' in place of channel 'A'.

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Value/Units	Date	Technician

5.34.25 Repeat steps 5.31.19 through 5.34.21 substituting channel 'D' in place of channel 'A'.

5.31.27 Disconnect the "Bistable Test" leads and replace the input simulator leads on the terminals they were removed from in step 6.34.1

5.34.28 Reset all bistables.

6.34.23 Record the largest response time value of steps 6.34.22, 6.34.25, 6.34.25 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.
  - 6.35.1 Ensure the temporary LED's are installed across the rotary relay contacts per steps 6.19.1 through 6.19.3.

SAN ONOFRE NUCLEAR GENERATING STATION INSTRUMENT AND TEST PROCEDURE S023-11-3.3 UNITS 243 REVISION D PAGE 241

#### 5.0 PROCEDURE

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5.35.2 Remove the PPS input simulator box leads from terminals 46 and 47 on TB-1 of L129, if not already removed.

Date Technician

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6.35.3 Connect the "Bistable Test" leads of L151 to terminals 45 and 47 on T3-1 of L123, if not already connected.

5.35.4 On the bistable control panel being tested, rotate the bistable selector switch to position number 13.

6.35.5 Rotate the meter input selector switch to the "TRIP SP" position.

6.35.5 Record the value indicated on the bistable control panel digital indicator.

Volts / Value/Units Date Technician

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5.35.7 Rotate the meter input selector switch to the "INPUT" position.

6.35.8 In the "Bistable Test" section of L151 place the toggle switch in the "OPEN" position. The LED should extinguish.

SAN ONOFRE NUCLEAR GENERATING STATION UNITS 283

INSTRUMENT AND TEST PROCEDURE SO23-11-3.3. REVISION 0 PAGE 242

#### 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.

5.35.10 In the "Bistable Test" section of L151, place the toggle switch in the "CLOSE" position. The LED should energize.

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.



5.35.12 Record the adjusted voltage.

5.35.13 Connect the optical end of a C-E test box pickup cable 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 6.19.1 through 6.19.3.

Date lechnician

SAN ONOFRE NUCLEAR GENERATING STATION INSTRUMENT AND TEST PROCEDURE SO23-11-3.3 UNITS 283

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#### 5.0 PROCEDURE

- Connect the other end of these four pickup cables to the "L1", "L2", "L3" and "L4" jacks in the "STOP LAMPS" 5.35.15 section of the C-E test box.
- Energize the C-E test box and ensure the following 6.35.17 switches are in the correct positions.
  - .1 "L1", "L2", "L3", "L4" stop lamps toggle switches are in the "ON" position.

.2 "START LAMPS" toggle switch is in the "1/1" position.

.3 Start "TIMER MODES" switch is in the step up position.

.4 Stop "TIMER MODES" switch is in the step up position.

echnician Date

.5 "L5" and "L5" stop lamps toggle switches are in the "OFF" position.

Adjust the input simulator box potentiometer in channel 5.35.13 'A' corresponding to bistable number 13 until the bistable is tripped.

> Date Technician

Ensure the toggle switch in the "Bistable Test" section 5.35.19 of L151 is in the "OPEN" position.

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SAN ONOFRE NUCLEAR GENERATING STATION INSTRUMENT AND TEST PROCEDURE S023-II-3.3 UNITS 283 REVISION 0 PAGE 244

#### 6.0 PROCEDURE

6.35.20 Ensure the C-E test box timer is reset.

Date Technician

6.35.21 After the test equipment has stabilized, place the "Bistable Test" section toggle switch on L151 in the "CLOSED" position. The timer should start.

5.35.22 Record the response time.

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- 6.35.23 Adjust the input simulator box potentiometer in channel 'A' corresponding to bistable number 13 until the bistable input is returned to the value adjusted for in step 5.1.1.
- 5.35.24 Reset bistable number 13 in channel 'A'.

Date Technician

5.35.25 Repeat steps 6.35.13 through 6.35.24 substituting channel 'B' in place of channel 'A'.

6.35.26 Repeat steps 5.35.18 through 5.35.24 substituting channel 'D' in place of channel 'A'.

Value/Units Date Technician

5.35.27 Disconnect the "Bistable Test" leads and replace the input simulator leads on the Terminals they were removed from in step 6.35.1

NOTE: This step may be omitted if section 6.36 is to be performed next.

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INSTRUMENT AND TEST PROCEDURE SO23-II-3.3 REVISION 0 PAGE 245

6.0 PROCEDURE

6.35.23 Reset all bistables.

Date Technician

6.35.29 Record the largest response time value of steps 6.35.22, 5.35.25, 5.35.25 in the Data Collection Table.

Date Technician

5.35 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.
- 6.36.1 Remove the input simulator box leads from terminals 46 and 47 on TB-1 of L129.

Date / Technician

5.35.2 Connect the "Bistable Test" leads of L151 to terminals 45 and 47 on TS-1 of L123.

Date / Technician

6.35.3 In bay 6 of cabinet A (LO34), connect an LED jumper 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 'IRIA. (CIAS)

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Date	Technician

SAN ONOFRE NUCLEAR GENERATING STATION UNITS 283

INSTRUMENT AND TEST PROCEDURE S023-II-3.3 REVISION 0 , PAGE 245

#### 6.0 PROCEDURE

5.35.4 In bay 5 of cabinet B (L035), connect an LED jumper cable in series with a six volt DC power supply across terminals 28 and 30 on terminal strip TB55. This monitors contacts on the mechanical relay MRID.: (CIAS)

5.35.5 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.

5.35.6 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.

5.35.7 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.

6.36.8 On the channel 'C' bistable control panel, rotate the bistable selector switch to position number 19.

5.35.9 Rotate the meter input selector switch to the "TRIP SP" position.

6.35.10 Record the value indicated on the bistable control panel digital indicator.

Volts / Value/Units Date Technician UNITS 283

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- 5.0 PROCEDURE
  - 6.35.11 Rotate the meter input selector switch to the "INPUT" position.

Date Technician

5.35.12 In the "Bistable Test" section of L151, place the toggle switch in the "OPEN" position. The LED should extinguish.

Jate / Technician

6.35.13 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.

5.35.14 In the "Bistable Test" section of L151, place the toggle switch in the "CLOSED" position. The LED should energize.

Adjust the "LOW COARSE" and "LOW FINE" potentiometers in 6.35.15 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 6.36.10.

6.35.16 Record the adjusted voltage.

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5.0 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.

Date Technician

.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 19 until the bistable is tripped.

6.36.19 Ensure the toggle switch in the "Bistable Test" section of L151 is in the "OPEN" position.

6.36.20 Ensure the C-E test box timer is reset.

Date Technician

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# 6.0 PROCEDURE

5.35.21 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

6.35.22 Record the response time.

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Value/Units	Date	Technician
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- 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.
- 5.35.24 Reset bistable number 18 in changel 'A'.



6.36.25 Repeat steps 5.36.18 through 6.35.24 substituting channel 'S' in place of channel 'A'.



Repeat steps 5.35.19 through 5.36.24 substituting 5.35.25 channel 'D' in place of channel 'A'.

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5.35.27 Reset all bistables.

6.36.23 Record the largest response time value of steps 6.35.22, 5.36.25, 5.35.25 in the "Data Collection Table."

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SAN ONDFRE NUCLEAR GENERATING STATION UNITS 283

# INSTRUMENT AND TEST PROCEDURE S023-II-3.3 REVISION 0 PAGE 250

# 6.0 PROCEDURE

5.35.29 In bay 5 of cabinet A (LO34), move the optical pickup setup to terminals 43 and 45 on terminal strip 65. This monitors contacts on the solid state relay SSRIA. (CCAS)

- Date / Technician

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)

- 5.35.31 Adjust the input simulator box potentiometer in channel 'A' corresponding to bistable number 13 until the bistable is tripped.
- 5.35.32 Ensure the toggle switch in the "Bistable Test" section of L151 is in the "OPEN" position.



5.35.33 Ensure the C-E test box timer and the channel 'C' bistable are both reset.



5.35.34 Place the "Bistable Test" section toggle switch on L151 in the "CLOSE" position. The timer should start.



5.35.35 Record the response time.

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5.36.35 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. SAN DROFRE NUCLEAR GENERATING STATION INSTRUMENT AND TEST PROCEDURE S023-11-3.3 UNITS 283 REVISION 0 PAGE 251

### 6.0 PROCEDURE

5.35.37 Reset bistable number 13 in channel 'A'.

Date Technician

5.35.39 Repeat steps 6.35.31 through 6.35.37 substituting channel '3' in place of channel 'A'.

Date Technician

6.35.39 Repeat steps 6.35.31 through 6.35.37 substituting channel 'D' in place of channel 'A'.

Date / fechnician

6.36.40 Reset all bistables.

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6.35.41 Record the largest response time value of steps 5.35.35, 5.35.38, 5.35.39 in the "Data Collection Table".

Date Technician

5.35.42 In bay 6 of cabinet A (LO34), move the optical pickup setup to terminals 25 and 27 on terminal strip 55. This monitors contacts on the mechanical relay MRIA. (SIAS)



6.35.43 In bay 5 of cabinet B (L035), move the optical pickup setup to terminals 25 and 27 on terminal strip 55. This monitors contacts on the mechanical relay MRIB. (SIAS)



6.35.44 Adjust the input simulator box potentiometer in channel 'A' corresponding to bistable number 18 until the bistable is tripped. SAN DNDFRE NUCLEAR GENERATING STATION INSTRUMENT AND TEST PROCEDURE S023-11-3.3 UNITS 233 REVISION 0 PAGE 252

## 6.0 PROCEDURE

5.35.45 Ensure the toggle switch in the "Bistable Test" section of L151 is in the "OPEN" position.

Date Technician

6.35.45 Ensure the C-E test box timer and the channel 'C' bistable are both reset.

6.35.47 Place the "Bistable Test" section toggle switch on L151 in the "CLOSE position. The timer should start.

5.36.48 Record the response time.

- 5.35.47 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.
- 5.36.50 Reset bistable number 19 in channel '4'.

Date Technician

6.36.51 Repeat steps 6.36.44 through 6.36.50 substituting channel 'B' in place of channel 'A'.



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SAN DNOFRE NUCLEAR GENERATING STATION INSTRUMENT AND TEST PROCEDURE SO23-11-3.3 UNITS 2&3 REVISION 0 PAGE 253

6.0 PROCEDURE

5.35.53 Disconnect the "Bistable Test" leads and replace the input simulator leads on the terminals they were removed from in step 6.36.1

6.35.54 Reset all bistables.

5.35.55 Record the largest response time value of steps 6.35.35, 5.35.33, 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.
  - 5.37.1 Ensure the temporary LED's are installed across the rotary relay contacts per steps 5.13.1 through 5.19.3.



5.37.2 Remove the PPS input simulator box leads from terminals 13 and 14 on TB-3 of L129.

Date Technician

6.37.3 Connect the "Bistable Test" leads of L151 to terminals 13 and 14 on TB-3 of L123.

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### 6.0 PROCEDURE

6.37.4 On the bistable control panel being tested, rotate the bistable selector switch to position number 15.

> Technician Date

6.37.5 Rotate the meter input selector switch to the "TRIP SP" position.

> Technician Date

Record the value indicated on the bistable control panel 5.37.6 digital indicator.

5.37.7 Rotate the meter input selector switch to the "INPUT" position.

In the "Bistable Test" section of L151 place the toggle 5.37.3 switch in the "OPEN" position. The LED should extinguish.

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 6.37.5.

In the "Bistable Test" section of L151, place the toggle 5.37.10 switch in the "CLOSE" position. The LED should energize.

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INSTRUMENT AND TEST PROCEDURE S023-11-3.3 REVISION 0 PAGE 255

#### 5.0 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.

6.37.12 Record the adjusted voltage.

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Value/Units	Date	Technician	-

5.37.13 Connect the optical end of a C-E test box pickup cable to the "Bistable Test" section LED of L151.

5.37.14 Connect the other end of this pickup cable to the "LED 1" jacks in the "START LAMPS" section of the C-E test box.

6.37.15 Connect the optical end of four pickup cables to the temporary LED's installed in steps 5.19.1 through 5.19.3.

- 6.37.15 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.
- 5.37.17 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.

Date Technician

.2 "START LAMPS" toggle switch is in the "1/1" position.

Date Technician

SAN ONOFRE NUCLEAR GENERATING STATION INSTRUMENT AND TEST PROCEDURE S023-11-3.3 UNITS 2&3 REVISION 0 PAGE 255

6.0 PROCEDURE

5.37.17.3 Start "TIMER MODES" switch is in the step down 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

6.37.18 Adjust the input simulator box potentiometer in channel "A corresponding to bistable number 15 until the bistable is tripped.



5.37.19 Ensure the toggle switch in the "Bistable Test" section of L151 is in the "CLOSE" position.

Date Technician

5.37.20 Ensure the C-E test box timer is reset.

Date / Technician

6.37.21 After the test equipment has stabilized, place the "3istable Test" section toggle switch on L151 in the "OPEN" position. The timer should start.

\_\_\_\_/ Date Technician

6.37.22 Record the response time.

Value/Units Date Technician

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SAN DADFRE NUCLEAR GENERATING STATION UNITS 283

# 5.0 PROCEDURE

- 5.37.23 Adjust the input simulator box potentioneter in channel 'A' corresponding to bistable number 15 until the bistable input is returned to the value adjusted for in step 5.1.1.
- 5.37.21 Reset bistable number 15 in channel A.

Date Technician

6.37.25 Repeat steps 5.35.18 through 5.35.24 substituting channel '3' in place of channel 'A'.

Value/Units	Date	Technician

5.37.25 Repeat steps 6.37.19 through 5.37.21 substituting channel 'D' in place of channel 'A'.

Value/Units Date Technician

5.37.27 Disconnect the "Bistable Test" leads and replace the input simulator leads on the terminals they were removed from in step 5.37.1

Date Technician

6.37.23 Reset all bistables.

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Date / Technician

5.37.29 Record the largest response time value of steps 5.37.22, 5.37.25, 5.37.25 in the "Data Collection Table".

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Date	Technician

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INSTRUMENT AND TEST PROCEDURE S023-11-3.3 REVISION 0 PAGE 253

# 5.0 PROCEDURE

- 5.33 Low SS-2 Flow to RTSS 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.
  - 5.38.1 Ensure the temporary LED's are installed across the rotary relay contacts per steps 5.19.1 through 5.19.3

Date Technician

5.38.2 Remove the PPS input simulator box leads from terminals 13 and 20 on T3-3 of L129.

5.38.3 Connect the "Bistable Test" leads of LISI to terminals 19 and 20 on TB-3 of L129.

5.33.4 On the bistable control panel being tested, rotate the bistable selector switch to position number 15.

5.38.5 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.

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5.33.7 Rotate the meter input selector switch to the "INPUT" position.

Date lechnician

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# 5.0 PROCEDURE

6.33.8 In the "Bistable Test" section of L151, place the toggle switch in the "OPEN" position. The LED should extinguish.

Jate Technician

6.38.9 Adjust the "HIGH COARSE" and the "HIGH FINE" potentiometers in the "distable 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 6.38.5.

Date Technician

5.38.10 In the "Distable Test" section of L151, place the toggle switch in the "CLOSE" position. The LED should energize.

6.33.11 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 <u>+</u>.1 VDC.

5.38.12 Record the adjusted voltage.

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Volts		/
Value/Units	Date	Technician

6.33.13 Connect the optical end of a C-E test box pickup cable to the "Bistable Test" section LED of L151.

Date Technician

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.

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#### 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.

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Date	Technician

- 5.38.15 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.
- 5.39.17 Energize the CoE 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.

.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 "L5" stop lamps toggle switches are in the "OFF" position.

6.38.18 Adjust the input simulator box potentiometer in channel 'A' corresponding to bistable number 15 until the bistable is tripped.

Date Technician

SAN DNOFRE NUCLEAR GENERATING STATION INJIRUHENT AND TEST PROCEDURE S023-11-3.3

#### 6.9 PROCEDURE

Ensure the toggle switch in the "Bistable Test" section 5.39.17 of L151 is in the "CLOSED" position.

Date Technician

5.38.20 Ensure the C-E test box timer is reset.

Date Technician

After the test equipment has stabilized, place the 5.39.21 "Bistable Test" section toggle switch on L151 in the "OPEN" position. The timer should start.

5.38.22 Record the response time.

Value/Units Date Technician

- Adjust the input simulator box potentiometer in channel 5.33.23 '3' corresponding to bistable number 16 until the bistable input is returned to the value adjusted for in step 5.1.1.
- Reset bistable number 15 in channel 'A'. 6.33.24

Date / Technician

6.38.25 Repeat steps 6.38.18 through 6.38.24 substituting channel '3' in place of channel 'A'.

Value/Units Date Technician

5.39.25 Repeat steps 5.33.18 through 5.33.24 substituting channel 'D' in place of channel 'A'.

Value/Units Date

Technician

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5.0 PROCEDURE

Disconnect the "Bistable Test" leads and replace the 5.33.27 input simulator leads on the terminals they were removed from in step 6.38.1

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Date	Technician

6.39.29 Reset all bistables.

Record the largest response time value of steps 5.39.22, 6.39.29 6.33.25, 5.39.25 in the "Data Sollection Table".

- 6.39 High-Kigh Containment Pressure to ESFAS Pesponse Time
  - NOTE: The fullowing section measures the response time from the simulation of a trip signal into the Forboro cabinet (using the PPS Response Time Tast panel L151) to the time when the solid state relays trip. The C-E Lest box will be used as the response time measuring device.
  - Remove the input simulator box leads from terminals 49 5.39.1 and 50 on TB-1 of L129.



Connect the "Bistable Test" leads of L151 to terminals 6.39.2 49 and 50 on TB-1 of L129.



6.39.3 In bay 6 of cabinet A (L034), connect an LED jumper cable in series with a six VDC power supply across terminals 46 and 48 on terminal strip TE55. This monitors contacts on the solid state relay SSRIA (CCAS)



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6.0 PROCEDURE

6.39.11 Rotate the meter input selector switch to the "INPUT" position.

> / . Technician Date

In the "Bistable Test" section of L151, place the toggle 6.39.12 switch in the "OPEN" position. The LED should extinguish.

Adjust the "HIGH COARSE" and the "HIGH FINE" 6.39.13 potenticmeters in the "Bistable Test" section of L153 until the digital indicator at the bistable control panel reads 1.00 VDC + .1 VDC.

In the "Bistable Test" section of L151, place the Loggle 6.39.14 switch in the "CLOSED" position. The LED should energize.

Date / Technician

Adjust the "LOW COARSE" and "LOW FINE" potentiometers in 5.39.15 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 6.39.10.

5.33.15 Record the adjusted voltage.

Energize the C-E test box and ensure the following 6.39.17 switches are in the correct po: cions.

SAN DNOFRE NUCLEAR GENERATING STATION INSTRUMENT AND TEST PROCEDURE S023-11-3.3 REVISION 0

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# 6.0 PROCEDURE

5.37.17.1 "L1" and "L"" 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.

Date Technician

5.39.19 Ensure the toggle switch in the "Bistable Test" section of L151 is in the "OPEN" position.

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Date Technician

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5.39.20 Ensure the C-E test box timer is reset.

Date Technician

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SAN ONOFRE NUCLEAR GENERATING STATION INSTRUMENT AND TEST PROCEDURE \$023-11-3.3. UNITS 2%3 REVISION 0 PAGE 265

### 5.0 PROCEDURE

5.39.21 After the test equipment has stabilized, place the "Bistable Test" section toggle switch on L151 in the "CLOSE" position. The timer should start.

Technician

6.39.22 Record the response time.

		/
Value/Units	Date	Technician

- 5.37.23 Adjust the input simulator box potentiometer in channel 'A' corresponding to bistable number 19 until the bistable input is returned to the value adjusted for in step 6.1.1.
- 5.39.24 Reset bistable number 19 in channel 'A'.



Value/Units	Date	Technician

Date

5.39.25 Repeat steps 5.39.18 through 5.39.24 substituting channel 'D' in place of channel 'B'.

		/	
Value/Units	Date	Technician	

6.33.27 Disconnect the "Bistable Test" leads and replace the input simulator leads on the terminals they were removed from in step 6.39.1.

Date Technician

6.39.23 Reset all bistables.

Date / Technician

SAN ONOFRE NUCLEAR GENERATING STATION UNITS 233

### 6.0 PROCEDURE

5.39.29 Record the largest response time value of steps 5.39.22, 6.39.25, 5.39.26 in the "Data Collection Table."

- 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 30 and 31 on T3-1 of L129.

6.40.2 Connect the "Bistable Test" leads of L151 to terminals 30 and 31 on T3-1 of L129.

5.40.3 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 SSR14. (RAS)

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)

6.40.5 Connect the optical end of a stop cable to the LED installed in step 6.40.3 and connect the double banana plug end to the "Ll" jacks of the C-E test box.

SAN ONOFRE NUCLEAR GENERATING STATION UNITS 283

INSTRUMENT AND TEST PROCEDURE S023-11-3.3 REVISION 0 PAGE 253

### 5.0 PROCEDURE

6.40.5 Connect the optical end of a second stop cable to the LED installed in step 6.40.4 and connect the double banana plug end to the "L2" jacks of the C-E test box.

Date / Technician

6.40.7 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

5.40.8 On the channel 'C' bistable control panel, rotate the bistable selector switch to position number 20.

6.40.9 Rotate the meter input selector switch to the "TRIP SP" position.

5.40.10 Record the value indicated on the bistable control panel digital indicator.

6.40.11 Rotate the meter input selector switch to the "INPUT" position.

Date Technician

6.40.12 In the "Bistable Test" section of L151, place the toggle switch in the "OPEN" position. The LED should extinguish.

Date / Technician

UNITS 283

SAN ONDERE NUCLEAR GENERATING STATION INSTRUMENT AND TEST PROCEDURE \$023-11-3.3 PAGE 253 REVISION O

#### 6.0 PROCEDURE

Adjust the "HIGH COARSE" and the "HIGH FIVE" 5.40.13 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 5.40.14 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 5.40.10.

6.40.15 Record the adjusted voltage.

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Volts		1
Value/Units	Date	Technician

- Energize the C-E test box and ensure the following 5.40.17 switches are in the correct positions.
  - .1 "L1" and "L2" stop lamps toggle switches are in the "ON" position.

Technician Date

.2 "L3", "L4", "L5" and "L6" stop lamps toggle switches are in the "OFF" position.

.3 "START LAMPS" toggle switch is in the "1/i" position.

SAN ONOFRE NUCLEAR GENERATING STATION INSTRUMENT AND TEST PROCEDURE S023-11-3.3 UNITS 2%3 REVISION 0 PAGE 270

5.0 PROCEDURE

5.40.17.4 Start "TIMER MODES" switch is in the step up position.

.5 Stop "TIMER MODES" switch is in the step up position.

6.40.18 Adjust the input simulator box potentiometer in channel 'A' corresponding to bistable number 20 until the bistable is tripped.

Date Technician

5.40.19 Ensure the toggle switch in the "Bistable Test" section of L151 is in the "OPEN" position.

5.40.20 Ensure the C-E test box timer is reset.

Date Technician

5.40.21 After the test equipment has stabilized, place the "Bistable Test" section toggle switch on L151 in the "CLOSE" position. The timer should start.



5.40.22 Record the response time.

Value/Units Date Technician

6.40.23 Adjust the input simulator box potentioneter 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 ONDERE HUCLEAR GENERATING STATION INSTRUMENT AND TEST PROCEDURE SO23-II-3.3 UNITS 243 REVISION 0 PAGE 271

#### 5.0 PROCEDURE

6.40.24 Reset bistable number 20 in channel 'B'.



5.40.25 Repeat steps 5.40.18 through 5.40.24 substituting channel 'B' in place of channel 'A'.

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chnician	Techni	Date	Value/Units
e	T	Date	Value/Units

5.40.25 Repeat steps 5.40.19 through 5.40.24 substituting channel 'D' in place of channel 'A'.

Value/Units	Date	Technician

5.40.27 Disconnect the "Bistable Test" leads and replace the input simulator leads on the terminals they were removed from in step 5.40.1

5.40.28 Reset all bistables.

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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".

Date Technician

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- 6.41 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 233

INSTRUMENT AND TEST PROCEDURE S023-II-3.3 REVISION 0 PAGE 272

#### 6.0 PROCEDURE

6.41.1 Remove the input simulator box leads from terminals 36 and 37 on TB-1 of L129.

Date Technician

5.41.2 Connect the "Bistable Test" leads of L151 to terminals 35 and 37 on TB-1 of L129.

5.41.3 In bay 6 of cabinet A (L034), 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)

6.41.4 In bay 5 of cabinet B (LO35), connect an LED jumper cable in series with a six volt DC pover supply across ter inals 37 and 39 on terminal strip TB55. This mon tors contacts on the solid state relay SSR18. (EFAS-1)

6.41.5 Connect the optical end of a stop cable to the LED installed in step 5.37.3 and connect the double banana plug end to the "Ll" jacks of the C-E test box.

5.41.6 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.

SAN ONOFRE NUCLEAR GENERATING STATION INSTRUMENT AND TEST PROCEDURE \$023-11-3.3 UNITS 243

### 6.0 PROCEDURE

1.1.10

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5.41.7 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.

On channel 'C' bistable control panel, rotate the 5.41.8 bistable selector switch to position number 21.

6.41.9 Rotate the meter input selector switch to the "TRIP So" position.

Record the value indicated on the bistable control panel 5.41.10 digital indicator.

6.41.11 Rotate the meter input selector switch to the "INPUT" position.

In the "Bistable Test" section of L151, place the toggle 5.41.12 suitch in the "OPEN" position. The LED should extinguish.

5.41.13 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.

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SAN ONOFRE NUCLEAR GENERATING STATION INSTRUMENT AND TEST PROCEDURE S023-II-3.3 UNITS 2&3 REVISION O PAGE 274

### 5.0 PROCEDURE

5.41.14 In the "Bistable Test" section of L151, place the toggle switch in the "CLOSED" position. The LED should energize.

Date Technician

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 5.41.10.

Date Technician

6.41.16 Record the adjusted voltage.

Volts		1	
Value/Units	Date	Technician	

- 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.

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

SAN DHOFRE NUCLEAR GENERATING STATION UNITS 243

5.41.18

5.41.19

INSTRUMENT AND TEST PROCEDURE S023-11-3.3 REVISION O PAGE 275

#### 5.0 PROCEDURE

6.41.17.5 Stop "TIMER MODES" switch is in the step up position.

5.41.21 After the test equipment has stabilized, place the "Bistable Test" section toggle switch on L151 in the "CLOSE" position. The timer should start.

5.41.22 Record the response time.

- 6.41.23 Adjust the input simulator box potentiometer in channel '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'.

SAN ONOFRE NUCLEAR GENERATING STATION INSTRUMENT AND TEST PROCEDURE SO23-11-3 -UNITS 2&3 REVISION 0 PAGE 275

5.0 PROCEDURE

6.41.25 Repeat steps 5.41.18 through 5.41.24 substituting channel 'B' in place of channel 'A'.

	Value/Units	Date	Technician
5.41.25	Repeat steps 6.41.19 thro channel 'D' in place of c	ugh 5.41.24 hannel 'A'.	substituting

Value/Units Date /

5.41.27 Disconnect the "Bistable Test" leads and replace the input simulator leads on the terminals they were removed from in step 5.41.1



6.41.28 Reset all bistables.

Date echnician

5.41.29 Record the largest response time value of steps 6.41.22, 5.41.25, 5.41.26 in the "Data Collection Table".



- 5.42 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 33 and 34 on T3-1 of L129.

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Date echnician

SAN ONOFRE NUCLEAR GENERATING STATION

INSTRUMENT AND TEST PROCEDURE S023-11-3.3 REVISION 0 PAGE 277

# 5.0 PROCEDURE

5.42.2 Connect the "Bistable Test" leads of L151 to terminals 33 and 34 on TB-1 of L129.

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 SSR1A. (EFAS-2)

6.42.4 In bay 5 of cabinet B (LO35), 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 SSR13. (EFAS-2)

5.42.5 Connect the optical end of a stop cable to the LED installed in step 5.42.3 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.

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SAN ONOFRE NUCLEAR GENERATING STATION INSTRUMENT AND TEST PROCEDURE S023-II-3.3 UNITS 233 REVISION 0 PAGE 279

### 5.0 PROCEDURE

6.42.9 On channel 'C' bistable control panel, rotate the bistable selector switch to position number 22.

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Date	Tec	hnician	-

5.42.9 Rotate the meter input selector switch to the "TRIP SP" position.

5.42.10 Record the value indicated on the bistable control panel digital indicator.

5.42.11 Rotate the mater input selector switch to the "INPUT" position.

6.42.12 In the "Bistable Test" section of L151, place the toggle switch in the "OPEN" position. The LED should extinguish.

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 <u>+</u> .1 VDC.

5.42.14 In the "Bistable Test" section of L151, place the toggle switch in the "CLOSED" position. The LED should energize.

SAN ONOFRE NUCLEAR GENERATING STATION INSTRUMENT AND TEST PROCEDURE SO23-11-3.3 UNITS 243

REVISION 0 ' PASE 279

# 5.0 PROCEDURE

Adjust the "LOW COARSE" and "LOW FINE" potentiometers in 5.42.15 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 6.42.10.

5.42.15 Record the adjusted voltage.

- Energize the C-E test box and ensure the following 5.42.17 switches are in the correct positions.
  - .1 "L1" and "L2" stop lamps toggle switches are in the "OH" position.



.? "L3", "L4", "L5" and "L6" stop lamps toggle switches are in the "OFF" position.

> Technician Date

.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.

Technician Date

SAN ONOFRE NUCLEAR GENERATING STATION INSTRUMENT AND TEST PROCEDURE S023-11-3.3 UNITS 283 REVISION 0 PAGE 230

# 6.0 PROCEDURE

6.42.18 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.

5.42.20 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.



- 5.12.23 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 5.1.1.
- 5.42.24 Reset bistable number 2? in channel 'A'.

Date Technician

6.42.25 Repeat steps 6.42.18 through 6.42.24 substituting channel 'B' in place of channel 'A'.



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# INSTRUMENT AND TEST PROCEDURE SO23-II-3.3 REVISION 0 PAGE 281

# 5.0 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 6.42.1

Date Technician

6.42.28 Reset all bistables.

5.42.29 Record the largest response time value of steps 6.42.22, 5.42.25, 5.42.25 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.

echnician Date

SAN ONOFRE NUCLEAR GENERATING STATION INSTRUMENT AN UNITS 253 REVISION O

INSTRUMENT AND TEST PROCEDURE S023-11-3.3. REVISION 0 PAGE-292

#### 5.0 PROCEDURE

5.43.2 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

5.43.5 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

- 5.43.8 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 SS LEVEL and LOW RWT LEVEL trips.
- 6.43.9 Verify no bistable Pretrip, Trip, or 3ypass lights are energized on any of the four channels.

Technician Date

SAN ONOFRE NUCLEAR GENERATING STATION UNITS 283

INSTRUMENT AND TEST PROCEDURE SO23-11-3.3 REVISION 0 PAGE 233

# 6.0 PROCEDURE

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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 6.1.4.

Date Technician

6.43.12 Inform the watch engineer that the test has been completed.

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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7.0	RECORD	RECORDS				
	7.4	Record the date test completed				
		Technician(s)				
		Foreman				
		Approved by Date				
		Remarks				
8.0	ATTAC	HMENTS				
	8.1	Data Collection Tables (11 pages)				
	8.2	Drawings and Diagrams (7 pages)				
	8.3	Pressure Transient Information (Appendix C) (1 pages)				
	8.4	Rotary Select Switch Positions (Appendix D) (3 pages)				
	8.5	ESFAS Actuation Relays Electrical Lineup (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)				

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B. KATZ Station Technical Manager

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INSTR. AND TEST PROCEDURE S023-II-3.3 REVISION 1 PAGE 1 OF 11 ATTACHMENT 8.1 CDM ENCODE NO. NC119-TRP

# 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 Proce		
6 5 12	PT-1023-1 Low SC-2 Proce		
6 6 12	T-1112-1 Low SG-2 Fress		
6 7 12	LT-1122-1 Low 50-1 Level		
0.7.12	LI-1123-1 LOW 5G-2 Level		
0.8.12	PI-U351-1 High Cont. Press		
6.9.12	PI-0352-1 High High Cont. Press		
6.10.12	LT-0305-1 Low RWT Level		
6.11.12	PDT-0978-1 Low SG-1 Flow		
6.12.12	PDT-0979-1 Low SG-2 Flow		
6.14.16	TE-0112-1		
6.15.16	TE-9178-1		
6.16.16	TE-0122-1		
6.17.16	TE-9179-1		
6.18.4	RTSG Uncorrected		
6 19 35	High Linear Power to PTSG		
6 20 13	High Lon Pistable to PTSC		
6 20 20	High Log Distable to Kisa		
6 22 2 20	Tanan Log Preamp		
6.22.2.20	Low Temperature TTTTTTT		
0.22.2.40	Low temperature ITIZZLA		
0.22.2.00	High Temperature 11112HA		
6.22.2.80	High Temperature TT122HA		
6.22.3.21	Pzr Pressure		
6.22.4.28	Ex core Power		
6.22.5.23	ST 113A W1 RCP Speed		
6.22.5.46	ST 123 W2 RCP Speed		
6.22.5.58	ST 133 W3 RCP Speed		
6.22.6.19	ST 143 W4 RCP Speed		
6.23.29	High Pzr Press to RTSG		
6.24.29	Low Pzr Press to RTSG		
6 25 28	Low Pzr Press to STAS		
6 25 42	Low Dan Dross to CCAS		
6 26 20	Low F21 Fress to CCAS		
6 27 20	Low SG-1 Level to RISG		
6 20 20	LOW SG-1 Level to EFAS-1		
0.28.29	Low SG-2 Level to RISG		
6.29.29	Low SG-2 Level to EFAS-2		
6.30.29	Low SG-1 Press to RTSG		
6.31.29	Low SG-1 Press to MSIS		
6.32.29	Low SG-2 Press to RTSG		
6.33.29	Low SG-2 Press to MSIS		
6.34.29	High Cont. Press to RTSG		
6.35.28	High Cont. Press to CIAS		
6.35.41	High Cont. Press to CCAS		
6.35.55	High Cont. Press to SIAS		

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SAN ONOFRE NUCLEAR GENERATING STATION INSTRUMENT AND TEST PROCEDURE SO23-11-3.3 UNITS 2 AND 3

PAGE 2 OF 11 **REVISION 1** 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		
IRAIN A

- 1. Pressurizer Pressure-Low
  - a. SIAS

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- (1). Safety Injection
- a

а.	High Pressure Safe	ety Injection				
	Field Comp. *P017 *P018 *HV-9324 *HV-9327 *HV-9330 *HV-9333	Rec. Time	Test No.	Relay Time	Test No.	Total Time
b.	Low Pressure Safet *P015 *HV-9325 *HV-9328	ty Injection				
Con	ntainment isolation erg. Diesel Start De	elay of 10 sec	+ Instr. and L	ngic Response Only		
Con	ntainment Spray (pur	nps)				
*P- *HV	-012 /-6501					
Cor	itainment Emergency	Cooling				
8. 8.	Field Comp. CCW. Pumps *P-024 *P-025	Rec. Time	Test No.	Relay lime	Test No.	Total Time
b.	C.C.W. Valves HV-6212 HV-6218 HV-6366 HV-6367 HV-6370 HV-6371					
c.	Emergency Cooling	Fans				
	A-071					

A-()74

- E-399 -.
- E-401
- 3. Containment Pressure High
  - a. SIAS (see Pressurizer Pressure Low)
  - b. CIAS
    - (1.) Containment Isolation (See Items)
- 4. Containment Pressure High High
  - a. CSAS
  - (1) Containment Spray
  - . HV-9367

INSTRUMENT AND TEST PROCEDURE S023-11-3.3 REVISION 1 ALLACHMENT

Total Time

Test No.

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Relay Time Test No. MSIS (1) Main Steam Isolation (MSIV) HV-8204 HV-8205 (2) Main FeedWater Isolation HV-4048 HV-4052 Rec. Time Field Comp. .

2

Refueling Water Storage Tank .0 RAS
RAS
(1) Containment Sump Valves Open
HV-9303
HV-9305
(2) ECCS Miniflow Valves Shut
HV-9306 

HV-9307 .

4.16 KV. Emergency Bus Undervoltage
a. LOV (Loss of voltage and degraded voltage) 1.

Steam Generator #1 Level-Low .....

Test No. Relay Time Test No. Rec. Time Aux, F.W. AC Train EFAS HV-4713 HV-4731 Field Comp.

Total Time

Aux. F.W. DC Train EFAS P-141 HV-4730 HV-1716 HV-1716 HV-8201 HV-8201 HV-4054

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SAN	I ONOFRE NUCLEAR GENERATING STATION TS 2 AND 3	INSTRUMENT AND TEST PROCEDURE S023-11-3.3 REVISION 1 PAGE 5 OF 11 ATTACHMENT
	TRAIN B	
1.	Pressurizer Pressure-Low	
	a. SIAS (1). Safety Injection a. High Pressure Safety Injection	
	Field Comp. Rec. Time Test No. Relay Time * P019	Test No. Total Time
	<ul> <li>HV-9323</li> <li>HV-9326</li> <li>HV-9329</li> <li>HV-9333</li> </ul>	
	b. Low Pressure SAfety Injection	
	<ul> <li>P016</li> <li>HV-9322</li> <li>HV-9331</li> </ul>	
3.	Containment Isolation Emerg. Diesel Start Delay of 10 Sec + Instr. and Logic Response	Only
4.	Containment Spray (Pumps)	
	* P-013 * HV-6500	
5.	Containment Emergency Cooling	
	a. Field Comp. Rec. Time Test No. Relay Time a. CCW. Pumps *P-026	Test No. Total Time
	b. C.C.W. Valves HV-6213 HV-6219 HV-6368 HV-6369 HV-6372 HV-6373	
	c. Emergency Cooling Fans	
	A-072 A-073 * E-400 * E-402	
3.	Containment Pressure High	
	<ul> <li>a. SIAS (see Pressurizer Pressure Low)</li> <li>b. CIAS <ul> <li>(1.) Containment Isolation (See Items)</li> </ul> </li> </ul>	
4.	Containment Pressure High High	
	a. CSAS (1) Containment Spray * HV-9368	

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SAN ONOFRE NUCLEAR GENERATING STATION UNITS 2 AND 3		INSTRUMENT AND REVISION 1 ATTACHMENT	TEST PROCEDURE	S023-11-3.3
5. Steam Generator Pressure Low				
Field Comp. Rec. Time Test No.	No. Retay time	Test No.	Total Time	
<ul> <li>MSIS</li> <li>(1) Main Steam Isolation (MSIV)</li> <li>HV-8204</li> <li>HV-8205</li> </ul>				
<pre>(2) Main Feedwater Isolation HV-4048 HV-4052</pre>				
6. Refueling Water Storage Tank				
<ul> <li>8. RAS</li> <li>(1) Containment Sump Valves Open</li> <li>+ HV-9302</li> <li>+ HV-9304</li> <li>+ HV-9347</li> <li>+ HV-9348</li> </ul>				
<ol> <li>4.16 kV. Emergency Bus Undervoltage</li> <li>a. LOV (Loss of voltage and degraded voltage</li> </ol>	oitage)			
8. Steam Generator #2 Level-Low				
Field Comp. Rec. Time Test No.	No. Relay Time	Test No.	Total Time	
Aux. F.W. AC Train EFAS P-145 HV-4715 HV-4716 HV-4716 HV-4712 HV-4712 HV-4712				
Aux. F.W. DC Train EFAS HV-8200 HV-4053 P-500				

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INSIRUMENT AND TEST PROCEDURE S023-11-3.3 REVISION 1 ATTACHMENT 8.1

# RESPONSE TIME TABLE

			Reactor Tri	bs		
function	Sensor	Trip Unit to RISG	RISG [Corrected]	lotal Response lime	Tech. Spec. Accept. Grit.	Verified Initial/Date
Linear Power High		< .40 sec*				
Log Pur High		45 sec*				
PZR Press High		≤ .90 sec				
PZR Press Low		< ,90 sec				
Cntmt. Press High		< .90 sec				
SG-1 Press Low		5.90 sec				
SG-2 Press Low		< .90 sec				
SG-1 LVL LOW		5,90 sec				
SG-2 LVL LOW		≤ .90 sec				
SG-1 LOW FIOW		≤ .90 sec				
SG-2 LOW FIOW		≤ .90 sec				

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# 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. RID 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 RID 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 S023-11-3.3 REVISION 1 PAGE 8 OF 11 ATTACHMENT 8.1

RESPONSE TIME TABLE (Continued)

Reactor Trips

Function	CPC Signal Processing	RISG (Corrected)	lotal <u>Response lime</u>	lech, 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				.53 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###	
				and the second se	

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		acceptance criteria	Verified
		value/units	5.4 sec	initial/date
2.	Hot Leg Temp. sensors	value units	5.4 sec	initial/date

#### FOOTNOTES:

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\*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. RID 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 interal required for the transmitter to achieve 63.2% of its total change when subjected to a step change in pressure transmitter pressure.

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INSTRUMENT AND TEST PROCEDURE S023-11-3.3 REVISION 1 PAGE 9 OF 11 ATTACHMENT 8.1

#### RESPONSE TIME TABLE

ESFAS

Function	Sensor	Trip Unit to ESFAS	field Components	lotal Response lime	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 and	23
PZR Press Low Cntmt. Spray Pumps					≤ 25.6 sec*	
PZR Press Low CCW Pumps					≤ 31.2 sec*	
PZR Press Low CCW Valves					≤ 21.2 sec Note 4 ≤ 23.2 sec Note 4	a D
PZR Press Low Emer. Clg. Fans					≤ 21.2 sec*	
Cntmt. Press High HPSI					≤ 41.0 sec*	
Cntmt. Press High LPSI					≤ 41.0 sec*	
Cnimt. Press High Cnimt. Spray Pumps					≤ 25.4 sec*	
Cotmt. Press High					≤ 31.0 sec*	

#### FOOTNOTES:

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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. a. CCW non-critical loop isolation valves HV-6212, HV-6213, HV-6218 and HV-6219. Close
  - b. Containment Emergency Cooler CCW Isolation Valves HV-6366, HV-6367, HV-6368, HV-6369, HV-6370, HV-6371, HV-6372 and HV-6373 Open.
- 5. Response time includes instrumentation, logic, and isolation damper closure times only.

SAN ONOFRE NUCLEAR GENERATING STATION

INSTRUMENT AND TEST PROCEDURE S023-11-3.3 REVISION 1 PAGE 10 OF 11 ATTACHMENT 8.1

#### RESPONSE TIME TABLE

#### ESFAS

#### (Continued)

Function	Sensor	Trip Unit to ESFAS	Field Components	Total Response Time	Tech, Spec. Accept, Crit.	Verified Initial/Date
Cntmt Press High CCW Valves					$\leq 21.0 \text{ sec}$ Note 4a $\leq 23.0 \text{ sec}$ Note 4b	
Cntmt. Press High Emer. Clg. Fans					≤ 21.0 sec*	
Cntmt. Press High Cntmt. Isol.					$\leq$ 10.9 sec* Note 2	
Cntmt. Press High- High Cntmt. Spray					≤ 21.0 sec*	
SG-1 Press Low MSIV					≤ 20.9 sec	
SG-1 Press Low MFW Isol.					≤ 10.9 sec	
SG-2 Press Low					≤ 20.9 sec	

FOOTNOTES:

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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. a. CCW non-critical loop isolation valves HV-6212, HV-6213, HV-6218 and HV-6219 Close.
 b. Containment Emergency Cooler CCW Isolation Valves HV-6366, HV-6367, HV-6368, HV-6369, HV-6370, HV-6371, HV-6372 and HV-6373 Open.

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

INSTRUMENT AND TEST PROCEDURE S023-11-3.3 REVISION 1 PAGE 11 OF 11 ATTACHMENT 8.1

#### RESPONSE TIME TABLE

#### ESFAS

#### (Continued)

Function	Sensor	Trip Unit to ESFAS	Field Components	Total Response Time	lech. Spec. Accept, Crit.	Verified Initial/Date
SG-2 Press Low MFW Isol.					≤ 10.9 sec*	
Low RWT LVL Cntmt. Sump VLVs Open					≤ 50.7 sec*	
Low RWT LVL ECCS Miniflow VLVs Shut					≤ 40.7 sec*	
SG-1 LVL LOW Aux. FW AC Trains					≤ 50.9 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. a. CCW non-critical loop isolation valves HV-6212, HV-6213, HV-6218 and HV-6219 Close.

b. Containment Emergency Cooler CCW Isolation Valves HV-6366, HV-6367, HV-6368, HV-6369, HV-6370, HV-6371, HV-6372 and HV-6373 Open.

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

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INSTRUMENT AND TEST PROCEDURE SO23-II-3.3 REVISION 1 Page 1 of 7 ATTACHMENT 8.2 CDMC ENCODE NO. NC119-TRP

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APPENDIX A FIGURE A-1 HYDRAULIC SIGNAL GENERATOR REAR VIEW 1

INSTRUMENT AND TEST PROCEDURE S023-II-3.3 REVISION 1 PAGE 2 of 7 ATTACHMENT 8.2

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#### TIME RESPONSE TEST SET CONTROLS

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#### IDENTIFICATION

#### FUNCTION

- 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

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



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INSTRUMENT AND TEST PROCEDURE 5023-11-3.3 REVISION 1 ATTACHMENT 8.2	COULAGE SUPPLY Rea TANISMITTER REAS. SMITTER RESS. SMITTER RESS. SMITTER RESS. SMITTER RESS. SMITTER RESS. SMITTER RESS. SMITTER RESS. SMITTER REAL READOR RESS. SMITTER REAL READOR RESS. SMITTER REAL READOR REAL READOR REAL READOR REAS. SMITTER READOR REAS. SMITTER READOR READOR REAS. SMITTER READOR RE	
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INSTRUMENT AND TEST PROCEDURE S023-II-3.3 REVISION 1 Page 6 of 7 ATTACHMENT 8.2



Figure A-6

INSTRUMENT AND TEST PROCEDURE SO23-II-3.3 REVISION 1 Page 7 of 7 ATTACHMENT 8.2

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Where A is the first terminal given for the relay to be tested in .

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and B is the second terminal given for the relay to be tested.

Example: K301 in 2L034 A = TE31-165 B = TE31-166

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INSTRUMENT AND TEST PROCEDURE S023-11-3.3 REVISION 1 ATTACHMENT 8.3 PAGE 1 of 1

#### APPENDIX C

#### TABLE 1

#### PRESSURE TRANSIENT INFORMATION

INSTRUMENT	SENSOR	UNIIS	DIAPHRAGM RANCE	P 1 INITIAL	P SP SETPOINT	P 2 FINAL	DESIRED RAMP RATE	ACTUAL RAMP RATE
Hi Pzr Press	2PT-0101	psia		1750	1850	2450	93.5/sec	
Lo Pzr Press	2PT-0102	psia		2100	1800	Atm	-300/sec	
Lo SG Press	2PT-1013 2PT-1023	psia		850	730	Atm	-140/sec	
Lo SG Level	2LT-1113 2LT-1128	% range		100	90	0	-7.6/sec	
HI SG Level		No te	st required					
Hi Containment Press	2PT-0351	psig		-1	3	18	7/sec	
Hi HI Containment Press	2PT-0352	psig		7	8	18	5/sec	
Lo RWST Level	2LT-0305	% range		100	90	0	-7/sec	
Hi Steam Generator Differential Pressure	2PDT-0978 2PDT-0979	psid		67.5	45.0	0.0	-45.0/sec	

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INSTRUMENT AND TEST PROCEDURE SO23-II-3.3 REVISION 1 Page 1 of 3 ATTACHMENT 8.4

# APPENDIX D

#### ROTARY SELECT SWITCH POSITIONS

Rotary Select Switches & Positions			Relay	
52	\$3	S4	\$5	Under Test
1				К301
2				K308
3				K101
4				K108
5				K401
6				K302
7				К409
8				K403
9				K109
10				K110
11				K410
12				K408
13				K102
14				K103
15				К311
16				K412
17-56	17			K201
17-56	18			K208
17-56	19			K202
17-56	20			K209

UNITS 2&3

SAN ONOFRE NUCLEAR GENERATING STATION INSTRUMENT AND TEST PROCEDURE S023-11-3.3 Page 2 of 3 REVISION 1 ATTACHMENT 8.4

# APPENDIX D

# ROTARY SELECT SWITCH POSITIONS

# (Continued)

Rotary Select Switches & Positions			Relay	
\$2	\$3	<b>S</b> 4	\$5	Under Test
17-56	21			К203
17-56	22			K210
17-56	23			K205
17-56	24			K212
17-56	25			K206
17-56	26			K204
17-56	27			K213
17-56	28			К309
17-56	29			К104
17-56	30			K312
17-56	31			K405
17-56	32-56	32		K105
17-56	32-56	33		К305
17-56	32-56	34		K404
17-56	32-56	35		К411
17-56	32-56	36		K313
17-56	32-56	37		K406
17-56	32-56	38		K106
17-56	32-56	39		K113

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INSTRUMENT AND TEST PROCEDURE S023-II-3.3 REVISION 1 Page 3 of 3 ATTACHMENT 8.4

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# APPENDIX D

# ROTARY SELECT SWITCH POSITIONS

# (Continued)

R	otary Select	Switches & P	ositions	Relay
S2	\$3	S4	\$5	Under Test
17-56	32-56	40		K211
17-56	32-56	41		K402
17-56	32-56	42		K303
17-56	32-56	43		К112
17-56	32-56	44		K310
17-56	32-56	45-56	45	K306
17-56	32-56	45-56	46	К413
17-56	32-56	45-56	47	К107
17-56	32-56	45-56	48	K304
17-56	32-56	45-56	49	К111
17-56	32-56	45-56	50	K114

UNITS 2&3

SAN ONOFRE NUCLEAR GENERATING STATION INSTRUMENT AND TEST PROCEDURE S023-11-3.3 Page 1 of 4 **REVISION 1** ATTACHMENT 8.5

#### APPENDIX E

#### ESFAS ACTUATION RELAYS ELECTRICAL LINEUP

BREAKER	PANELS INVOLVED	CLOSED Verified By: Initial/Date	OPEN Verified By: Initial/Date
Y0109	2Y01 to 2L034 CH.A	1	/
Y0109	2Y01 to 2L034 CH.A	1	/
40209	2402 to 2L034 CH.B	1	1
Y0210	2Y02 to 2L034 CH.B	1	1
Y0309	2Y03 to 2L035 CH.C	/	1
Y0310	2Y03 to 2L035 CH.C	1	1
Y0409	2Y04 to 2L035 CH.D	1	1
Y0410	2Y04 to 2L035 CH.D	1	/
CB59	2L034 Bay 5	1	/
CB69	2L034 Bay 6	1	/
CB79	2L034 Bay 7	/	1
CB89	2L034 Bay 8	/	/
CB59	2L035 Bay 5	/	/
CB69	2L035 Bay 6	/	/

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INSTRUMENT AND TEST PROCEDURE \$023-II-3.3 REVISION 1 Page 2 of 4 ATTACHMENT 8.5

# APPENDIX E

# ESFAS ACTUATION RELAYS ELECTRICAL LINEUP

# (Continued)

BREAKER	PANELS INVOLVED	CLOSED Verified By: Initial/Date	OPEN Verified By: Initial/Date
CB79	2L035 Bay 7	,	1
CB89	2L035 Bay 8	1	1
CB61	2L034 Bay 6		
		/	1
CB62	2L034 Bay 6		
		1	1
CB63	2L034 Bay 6	1	1
CB64	2L034 Bay 6	/	1
CB65	2L034 Bay 6	1	1
CB66	2L034 Bay 6	1	/
CB67	2L034 Bay 6	1	/
CB68	2L034 Bay 6	/	,
CB61	2L035 Bay 6	/	/
CB62	2L035 Bay 6		
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SAN ONOFRE NUCLEAR GENERATING STATION INSTRUMENT AND TEST PROCEDURE S023-II-3.3 UNITS 2&3

Page 3 of 4 **REVISION 1** ATTACHMENT 8.5

#### APPENDIX E

# ESFAS ACTUATION RELAYS ELECTRICAL LINEUP

# (Continued)

BREAKER	PANELS INVOLVED	CLOSED Verified By: Initial/Date	OPEN Verified By: Initial/Date
CB63	2L035 Bay 6		
		1	/
CB64	2L035 Bay 6	1	1
CB65	2L035 Bay 6	1	1
CB66	2L035 Bay 6	1	/
CB67	2L035 Bay 6	/	1
CB68	2L035 Bay 6		
<u></u>		/	/
CB71	2L034 Bay 7		
		/	//
CB72	2L034 Bay 7	/	/
CB73	2L034 Bay 7	1	1
CB74	2L034 Bay 7	,	1
CB75	2L034 Bay 7	/	1
<b>C</b> B76	2L034 Bay 7	1	1

INSTRUMENT AND TEST PROCEDURE S023-II-3.3 REVISION 1 Page 4 of 4 ATTACHMENT 8.5

#### APPENDIX E

# ESFAS ACTUATION RELAYS ELECTRICAL LINEUP

# (Continued)

BREAKER	PANELS INVOLVED	CLOSED Verified By: Initial/Date	OPEN Verified By: Initial/Date
CB77	2L034 Bay 7		
		/	1
CB78	2L035 Bay 7		
		/	1
CB71	2L035 Bay 7	/	/
CB72	2L035 Bay 7	1	/
CB73	2L035 Bay 7	/	/
CB74	2L035 Bay 7	1	/
CB75	2L035 Bay 7	1	/
CB76	2L035 Bay 7	/	1
CB77	2L035 Bay 7	1	
CB78	2L035 Bay 7		
		/	1

UNITS 2&3

SAN ONOFRE NUCLEAR GENERATING STATION INSTRUMENT AND TEST PROCEDURE S023-II-3.3 Page 1 of 3 **REVISION 1** ATTACHMENT 8.6

# APPENDIX F

# ESFAS ACTUATION RELAYS

Relay	Contact	Relay	Contact
K301	TB31-165&166	K210	TB26-657&658
K308	TB35-565&566	K205	TB23-392&393
K101	TB12-259&260	K212	TB27-789&790
K108	TB15-580&581	К206	TB24-457&458
K401	TB41-177&178	K204	TB22-257&258
K302	TB31-189&190	К213	TB28-862&863
K409	TB45-589&590	К309	TB35-586-587
K403	TB42-274&275	К104	TB13-365&366
K109	TB15-567&568	К312	TB38-867&868
K110	TB16-691&692	K405	TB44-480&481
K410	TB22-249&250	K105	TB13-389&390
K408	TB45-571&572	K305	TB33-389&390
K102	TB11-165&166	K404	TB43-377&378
K103	TB12-265&266	K411	TB47-765&766
K311	TB37-762&763	K313	TB38-877&878
K412	TB47-795&796	K406	TB44-467&468
K201	TB21-150&151	K106	TB14-485&486
K208	TB25-565&566	K113	TB18-885&886
K202	TB21-177&178	K211	TB27-750&751
K209	TB25-589&590	K402	TB44-461&462
K203	TB22-245&246	K303	TB32-277&278

SAN ONOFRE NUCLEAR GENERATING STATION INSTRUMENT AND TEST PROCEDURE SO23-II-3.3 UNITS 2&3 REVISION 1 Page 2 of 3 ATTACHMENT 8.6

As in the first

### APPENDIX F

# ESFAS ACTUATION RELAYS

# (Continued)

Relay	Contact	Relay	Contact
K112	TB17-780&781	K201	TB21-153&154
K310	TB36-674&574	K208	TB25-565&566
K306	TB34-477&478	K202	TB21-180&181
K413	TB48-877&878	К209	TB25-589&590
K107	TB14-491&492	K203	TB22-262&263
K304	TB33-365&366	К210	TB26-655&656
К111	TB15-565&566	K205	TB23-351&352
K114	TB18-891&892	К212	TB27-786&787
K301	TB21-147&148	K206	TB24-451&452
K308	TB35-565&566	K204	TB22-255&256
K101	TB22-255&256	K213	TB28-862&863
K108	TB15-580&581	К309	TB35-586&587
K401	TB41-177&178	K104	TB13-365&366
K302	TB31-186&187	K312	TB38-867&868
K409	TB45-589&590	K405	TB44-480&481
K403	TB42-274&275	K105	TB13-389&390
К109	TB15-567&568	K305	TB33-389&390
К110	TB16-691&692	K404	TB43-377&378
K410	TB45-674&675	K411	TB47-765&766
<b>K</b> 408	TB45-565&566	K313	TB38-877&878
K102	TB11-165&166	К406	TB44-467&468
K103	TB12-265&266	К106	TB14-485&486

INSTRUMENT AND TEST PROCEDURE SO23-II-3.3 REVISION 1 Page 3 of 2 ATTACHMENT 8.6

#### APPENDIX F

#### ESFAS ACTUATION RELAYS

# (Continued)

Contact	Relay	Contact
TB37-762&763	К113	TB18-887&888
TB47-795&796	K211	TB27-753&754

K402 TB44-463&464

Relay

K311

K412

- K303 TB32-274&275
- K112 TB17-786&787
- K310 TB36-683%684
- K306 TB34-477&478
- K413 GB48-877&878
- K107 TB14-491&492
- K304 TB33-365&366
- K111 TB15-565&566
- K114 TB18-891&892

INSTRUMENT AND TEST PROCEDURE SO23-II-3.3 REVISION 1 Page 1 of 1 ATTACHMENT 8.7

Stand and a start of the

# APPENDIX G

# ESFAS INTERPOSING RELAYS

	C	ontrol			C	ontrol	
Relay	Func- tion	Panel Bay	Contacts	Relay	Func- tion	Panel Bay	Contacts
K623	MSIS	6	TB67-42&41	K623	MSIS	6	TB67-42&41
K723	MSIS	7	TB77-5&6	K723	MSIS	7	TB77-5&6
K624	EFAS-1	6	TB67-27&26	K624	EFAS-1	6	TB67-15&14
K724	EFAS-1	7	TB77-32&33	K724	EFAS-1	7	TB77-32&33
K625	EFAS-2	6	TB66-14&15	K625	EFAS-2	6	TB66-14&15
K725	EFAS-2	7	TB76-21&25	K725	EFAS-2	7	TB76-27&28

1956b

INSTRUMENT AND TEST PROCEDURE S023-II-3.3 REVISION 1 PAGE 1 OF 9 ATTACHMENT 8.8 CDM ENCODE NO. NC119-TRP

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APPENDIX H

CPC/CEAC

RESPONSE TIME TEST SOFTWARE

USER'S MANUAL

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INSTRUMENT AND TEST PROCEDURE S023-II-3.3 REVISION 1 PAGE 2 OF 9 ATTACHMENT 8.8

APPENDIX H

#### 1.0 INTRODUCTION

The CPC System Response Time Test (RTT) software is an interactive, multiprogrammed system designed to set up and run test cases to be used to verify that CPC system hardware time response has not degraded to an unacceptable level. The RTT software is organized such that the RTT is run in two parts. Part 1 is called the Interactive I/O System Test and it exercises all of the CPC and CEAU input and output hardware. Part 2 is called the Processor Timing Test and it exercises the CPC and CEAC processors with software which is typical of CPC and CEAC application programs.

Two floppy disks are required to load the RTT software. Disk 1 is to be used to load the Interactive I/O System Test into each of the six processors. Disk 2 is to be used to load the Processor Timing Test. The procedure for loading the RTT software is identical to that which is used for normal system loads. The "CPC TEST" and CEAC TEST" indicator lamps on the Operators Module will always be lit while the special test software is in memory. In addition the CPC trip outputs will be set in the tripped fail-safe condition. Trips will be reset by software in a CPC only when a Teletype is connected during the Interactive I/O System Test.

INSTRUMENT AND TEST PROCEDURE S023-II-3.3 REVISION 1 PAGE 3 OF 9 ATTACHMENT 8.8

#### 2.0 TEST PREREQUISITES

The RTT Software utilizes the Precision Interval Clock (PIC) for scheduling programs and for timing the processor. Therefore, the accuracy of the PIC should be verified before loading the RTT software. The following procedure can be used to verify the PIC interrupt frequency for each processor.

- Step 1: Load the online software and display the LOWTOD Point ID on the operator's module.
- Step 2: Press the "INI" button on the hexadecimal display panel of the processor to be checked. This results in a system auto-restart which resets LOWTOD to zero. Synchronize the pressing of the "INI" button with the seconds hand of a watch.
- Step 3: Press the "FN" button on the hexadecimal display panel.
- Step 4: Press the "LOC" button on the hexadecimal display panel in sync with the ending of a 5 minute interval on the watch. This halts the processor which in turn stops the LOWTOD from accumulating.
- Step 5: Read LOWTOD from the operator's module. Normally over this interval, a system that is running properly would display 6000 + 40 in LOWTOD.

In addition, it is recommended that the standard Interdata Universal Clock Module Test be run to verify the remaining PIC functions.

INSTRUMENT AND TEST PROCEDURE S023-II-3.3 REVISION 1 PAGE 4 OF 9 ATTACHMENT 8.8

# 3.0 RTT PART I - INTERACTIVE I/O SYSTEM TEST

The Interactive I/O System Test Software monitors one or more user specified inputs and initiates a DNBR or LPD trip when a selected input reaches a user specified setpoint. The specified inputs will be sampled at the following rates:

Pump Speeds	50 msec		
Temperatures	100 msec		
Pressure	100 msec		
Excore Detectors	10C msec		
Penalty Factors	100 msec		
CEA Positions (CPC)	1000 msec		
CEA Positions (CEAC)	100 msec		

In addition, the CPCs will read the CEAC-CPC data link once every 100 msec.

All inputs are preset to the steady state values (constants) contained in Table A1 (i.e., NOP inputs). The test engineer will be able to select one or more inputs to be accessed via the CPC/CEAC MACS (i.e., live inputs). The current value of all inputs are available via the Operator's Module Point ID Table. Table A2 contains the valid CPC Point ID list and Table A3 contains the valid CEAC Point ID list for the Interactive I/O System Test.

#### 3.1 COMMAND STRUCTURE

This section describes the syntax, parameters, usage, and restrictions of the RTT SOFTWARE COMMANDS. User commands may only be entered when a test is not in progress. When the RTT software is waiting for a command, the test engineer will be prompted with either an asterisk (\*) or a question mark (?). All commands entered by the user must be followed by a carriage return. If the RTT software responds with an "\*", this will indicate that the command was accepted and the requested action was performed. If the RTT software responds with a "?", this will indicate that the command was rejected.

RTT commands are all of the form:

OP PARAM-LIST

where: a) OP is the operation code mnemonic.

b) PARAM-LIST are the various entries such as the input to be made live, the setpoint, the direction of approach, and the type of trip desire. All parameters must be separated by commas, and there must be no embedded blanks.

INSTRUMENT AND TEST PROCEDURE S023-II-3.3 REVISION 1 PAGE 5.0F 9 ATTACHMENT 8.8

#### 3.1.1 Examine Command

The Examine Command is used to obtain the status of a particular system input. When this command is encountered, the RTT software will output the status of the specified input to the Teletype. This information will include whether the input in question is currently being accessed via the CPC/CEAC MACS or if a constant value is being used. If the input is currently selected as live, then the associated parameter list will be output. The format of the Examine Command is:

EX x

Where: x is the input the user wishes to examine. Valid entries for x are contained in Table G1.

The following condition results in a syntax error and causes the command to be rejected:

a) If the specified input parameter is not in Table G1.

An example of the Examine Command is as follows:

\*EX TH1

TH1,600, IN, LPD

In this case, the test engineer requested a printout of TH1. As shown, the TH1 setpoint is set at 600 Degrees Fahrenheit; a trip will be output when the setpoint is approached from a value less than 600 degrees; and when the setpoint is reached the RTT software will initiate an LPD trip.

#### 3.1.2 Live Command

The Live Command is used to specify an input to be accessed via the CPC/CEAC MACS. When the RTT software encounters this command, it will enable that input to be read at the sampling rate stated above. The format of the Live Command is:

LI x,s,d,t

where: a) x is the input which is to be made live (see Table 1).

b) s is the setpoint which when reached will cause the trip to occur. The setpoint range for each input can be found in Table 1. Setpoints must be entered as integers without decimal points.

INSTRUMENT AND TEST PROCEDURE S023-II-3.3 REVISION 1 PAGE 6 OF 9 ATTACHMENT 8.8

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#### 3.1.2 Live Command (Continued)

- c) d is the direction from which the setpoint will be approached which will in turn trip the channel. The only two acceptable entries for this parameter are IN or DE. IN is used if the input should be increasing to initiate a trip. DE is used if the input should be decreasing to initiate a trip. If the setpoint is reached, in the opposite of the specified direction, a trip will not occur. It is important to remember that in the case of the reactor coolant pumps, if the pump speed is decreasing, the setpoint will be approached from the increasing direction. This is because the setpoint is entered in counts which are inversely proportional to RPM. If a pump speed input is set for IN then a trip will be output during increasing RPMs. Conversely, a DE entry will cause a trip output for decreasing RPMs. The relationship between RPMs and counts is:
  - w = h

where: W = pump speed in RPMs h = a constant equal to 3 x 10<sup>6</sup> x = counts

- d) t is the type of trip that will occur when the setpoint is reached for the specified input. Valid entries for this parameter are:
  - 1) LPD for Local Power Density Trip
  - DNB for Departure from Nucleate Boiler Point Ratio Trip
  - ALL in which case both LPD and DNBR trips will be set

The following conditions result in a syntax error and cause the command to be rejected.

- a) If the x parameter is not in Table G1
- b) If the setpoint is out of range for that input (see Table G1)
- c) If the d parameter is not IN or DE
- d) If the t parameter is not LPD, DNB, or ALL

INSTRUMENT AND TEST PROCEDURE S023-II-3.3 REVISION 1 PAGE 7 OF 9 ATTACHMENT 8.8

The following is an example of the Live Command:

With this command, the test engineer made Reactor Coolant Pump 1 a live input. The trip setpoint was set at 2815 counts. The type of trip requested was a DNBR trip. Therefore, if the Pump 1 input count increases (i.e., RPMs decreasing) to a value of 2815 counts, a DN3R trip will be output.

#### 3.1.3 NOP Command

The purpose of the NOP command is to allow the test engineer to revert a live input back to a steady state (constant) input. The format of the NOP command is:

NOP x

where: a) x is the input the test engineer wishes to be reverted to a steady state. Valid entries for x are contained in Table 1.

The following condition results is a syntax error and causes the command to be rejected:

a) If the specified input parameter is not in Table G1.

The following is an example of the NOP command.

\*EX TH1

TH1,600, IN, LPD

\*NOP TH1

TH1 619.6

The test engineer first examined TH1, then issued a NOP command on that input. The RTT software responded by outputting the steady state value for that input.

#### 3.1.4 Status Command

The Status Command may be used to obtain a complete list of which inputs have been selected live, what the setpoint is, the direction of approach for initiating a trip, and the type of trip desired for each selected input. It is recommended that this command be entered before starting each test case in order to obtain a hard copy of the test conditions. The format of the Status command is:

ł.

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ST

The following is an example of the Status Command:

\*ST

TH1,600, IN, LPD W1,2020, DE, DNB

As shown, the test engineer requested the test status. The RTT software responded by printing the inputs which had been selected live, the setpoint values, the direction of approach, and the desired trip.

3.1.5 Go Command

The Go Command when issued will cause the test to start executing. When this command is read, the RTT software will respond with the following message:

RTT IN PROGRESS

The format of the Go Command is:

GO

3.2 TEST TERMINATION

In order to terminate an RTT in progress, it is necessary to press the white (spare) pushbutton on the Operator's Module. The RTT software will respond with "RESTART OR LOAD ? (R/L)". The responses to this question are:

- a) R, when this entry is made, all trips will be reset and the RTT software will prompt the test engineer for new commands.
- b) L, this entry will allow the test engineer to load the processor memory via the system warm start loader.
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### 4.0 RTT PART 2 - PROCESSOR TIMING TEST

. The Processor Timing test schedules execution of tasks which contain sets of instructions that are typical of CPC and CEAC application programs. The CPC test will schedule four tasks as follows:

				Cyclin	ng Rate
TASK	1	(typical	FLOW algorithm)	50	msec
TASK	2	(typical	UPDATE algorithm)	100	msec
TASK	3	(typical	POWER algorithm)	1	sec
TASK	4	(typical	STATIC algorithm)	2	sec

The CEAC test will schedule one task as follows:

Cycling Rate

100 msec

TASK 1 (typical Penalty Factor algorithm)

This test requires no user interaction and does not perform any I/O functions. All process inputs required by the test are set up as constants in appropriate memory locations. This test begins execution automatically after loading and will take approximately 10 minutes to complete. Upon completion, a test report will be output to the teletype. This report contains the expected maximum execution times and the actual maximum execution times for each task during the 10 minute interval. The actual times must be equal to or less than the expected times. This system also prints out the number of timing errors detected. A timing error occurs when the actual execution time for a task is greater than the expected execution time. If any errors are detected, the processor clock must be reset according to the procedures contained in the Interdata maintenance manuals. The Processor Timing Test should then be rerun. Examples of the test output are provided in Figures G1 and G2.

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	VALID USER E	IABLE H1 NIRIES FOR × and S PARAMATER	S PARAMETE	RS	APPLICABLE
PARAMETER	DEFINITION	RANGE	VALUE	UNITS	CALCULATOR
THURSDE I CH					
111	Reactor Coolant Pump 1 Speed	32767-2500	2531	Counts	CPC
W1	Reactor Coolant Pump 2 Speed	32767-2500	2531	Counts	CPC
W2	Posetor Contant Pump 3 Speed	32767-2500	2531	Counts	CPC
W 3	Peactor Coolant Pump & Speed	32767-2500	2531	Counts	CPC
WG	Loop 1 Cold Log Lomoralure	465-615	553.5	e 4	CPC
ICI	Loop 7 Cold Log Lomperature	465-615	551.5	oF	CPC
102	Loop 2 Cold Log Temperature	525-675	614.6	°F	CPC
101	Loop 1 Cold Log Temperature	525-675	614 6	or	CPC
TH2	Loop 2 Cold Leg temperature	1500-2500	2250	psia	CPC
PR	Pressurizer Pressure	0-200	05.3	2 Power	CPC
01	upper Excore Neutron Flux Detector	0=200	125 85	2 Power	CPC
50	Middle Excore Neutron Flux Detector	0 = 200	00 18	2 Power	CPC
03	Lower Excore Neutron This Detector	0-150	150	Inches Withdrawn	CPC
SG01	CEA Subgroup I resition	0-150	150	Inches Withdrawn	CPC
\$G02	CLA Subgroup 2 Position	0-150	150	Inches Withdrawn	CPC
SG03	CEA Subgroup 3 Position	0-150	150	Inches Withdrawn	CPC
SG04	CEA Subgroup 4 Position	0-150	150	Inches Withdrawn	CPC
SG05	CEA Subgroup 5 Position	0-150	150	Loches Withdrawn	CPC
\$G06	CEA Subgroup 6 Position	0-150	150	Inches Withdrawn	CPC
\$G07	CLA Subgroup 7 Position	0-150	150	Inches Withdrawn	CPC
SG08	CEA Subgroup 8 Position	11-150	150	Inches Withdrawn	CPC
SG09	CEA Subgroup 9 Position	0-150	150	Lochas Withdrawn	CPC
SG10	CEA Subgroup 10 Position	0-150	150	Inches Withdrawn	CPC
SG11	CEA Subgroup 11 Position	0-150	150	Inches Withdrawn	CPC
SG12	CEA Subgroup 12 Position	0-150	150	Inches Withdrawn	CPC
SG13	CEA Subgroup 13 Position	0-150	150	Inches Withdrawn	CPC
SG14	CEA Subgroup 14 Position	0-150	150	inches withdrawn	CPC
SG15	CEA Subgroup 15 Position	0-150	150	inches withdrawn	CPC.

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	VALID USER ENTRIES FOR x and s PARAMETERS					
		S PARAMATER		UNITE	CALCULATO	
X PARAMETER	DEFINITION	RANGE	VALUE	UNITS	CALCOLATOR	
5016	CEA Suboroup 16 Position	0-150	150	Inches Withdrawn	CPC	
5010	CEA Subgroup 17 Position	0-150	150	Inches Withdrawn	CPC	
5017	CEA Suboroup 18 Position	0-150	150	Inches Withdrawn	CPC	
5010	CEA Subgroup 19 Position	0-150	150	Inches Withdrawn	CPC	
5019	CEA Subornup 20 Position	0-150	150	Inches Withdrawn	CPC	
5620	CLA Subaroup 21 Position	0-150	150	Inches Withdrawn	CPC	
5021	CLA Subgroup 22 Position	0-150	150	Inches Withdrawn	CPC	
5022	CEA Subgroup 23 Position	0-150	150	Inches Withdrawn	CPC	
5023	Penalty Factor from CFAC 1	128-32767	128	(None)	CPC	
Pro	Penalty Factor from CEAC 2	11,-32767	128	(None)	CPC	
CEAO1	CLA # 1 Position	0-150	150	Inches Withdrawn	CEAC	
CEAOT	CEA # 2 Position	0-150	150	Inches Withdrawn	CEAC	
CEAO2	CLA # 3 Position	0-150	150	Inches Withdrawn	CEAC	
CEAUS	CEA # b Position	0-150	150	Inches Withdrawn	CEAC	
CEAUS	CLA # 5 Position	0-150	150	inches Withdrawn	CEAC	
CEAUS	CEA # 6 Position	0-150	150	Inches Withdrawn	CEAC	
CEAUO	CLA # 7 Position	0-150	150	Inches Withdrawn	CEAC	
CEAUT	CEA # 8 Position	0-150	150	Inches Withdrawn	CEAC	
CEADO	CLA # O Position	0-150	150	Inches Withdrawn	CEAC	
CEAUS	CEA # 10 Position	0-150	150	Inches Withdrawn	CEAC	
CEATO	CEA # 11 Position	0-150	150	Inches Withdrawn	CEAC	
CEATT	CEA # 12 Position	0-150	150	Inches Withdrawn	CEAC	
CEATZ	CEA # 12 Position	0-150	150	Inches Withdrawn	CEAC	
CEATS	CLA # 15 Position	0-150	150	Inches Withdrawn	CEAC	
CEA14	CEA # 14 Position	0-150	150	Inches Withdrawn	CEAC	
CEATS	CEA # 15 Position	0-150	150	Inches Withdrawn	CEAC	
CEA16	CEA # 17 Desition	0-150	150	Inches Withdrawn	CEAC	
CEA17	CEA # 17 Position	0-150	150	Inches Withdrawn	CEAC	
CEA18	CEA # 18 POSICION	0-190	1 10	indited in provident		

#### TABLE H1 ALLID USER ENTRIES FOR $\times$ and s PARAMETERS

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#### INSTRUMENT AND TEST PROCEDURE S023-11-3.3 REVISION 1 PAGE 3 of 5 ATTACHMENT 8.9

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	VALI	TABLE III D USER ENTRIES FOR x and s PARAMATER	S PARAMET	ERS	APPLICABL
× PARAMETER	DEFINITION	RANGE	VALUE	UNITS	CALCULATO
A CONTRACTOR OF A CONTRACTOR OFTA CONT					
4					
CFA13	CFA # 19 Position	0-150	150	Inches Withdrawn	CEAC
CEA20	CFA # 20 Position	0-150	150	Inches Withdrawn	CEAC
CEA21	CEA # 21 Position	0-150	150	Inches Withdrawn	CEAC
CFA22	CFA # 22 Position	0-150	150	Inches Withdrawn	CEAC
CFA23	CLA # 23 Position	0-150	150	Inches Withdrawn	CEAC
CEA2h	CLA # 24 Pusition	0-150	150	Inches Withdrawn	CEAC
CEA25	CFA # 25 Position	0-150	150	Inches Withdrawn	CEAC
CLA26	CEA # 26 Position	0-150	150	Inches Withdrawn	CEAC
CEA27	CLA # 28 Position	0-150	150	Inches Withdrawn	CEAC
CEA28	CFA # 28 Position	0-150	150	Inches Withdrawn	CEAC
CEA20	CFA # 29 Position	0-150	150	Inches Withdrawn	CEAC
CEA30	CFA # 30 Position	0-150	150	Inches Withdrawn	CLAC
CEA31	CEA # 31 Position	0-150	150	Inches Withdrawn	CEAC
CEA12	CEA # 32 Position	0-150	150	Inches Withdrawn	CEAC
CEA33	CEA # 33 Position	0-150	150	Inches Withdrawn	CEAC
CEASD	CFA # 34 Position	0-150	1' 1)	Inches Withdrawn	CEAC
CEA15	CEA # 35 Position	0-150	150	Inches Withdrawn	CEAC
CEA36	CEA # 36 Position	0-150	150	Inches Withdrawn	CEAC
CEA30	CEA # sl Position	0-150	150	Inches Withdrawn	CEAC
CEAT	CEA # 38 Position	0-150	150	Inches Withdrawn	CEAC
CEAJO	CLA # 30 Position	0-150	150	inches Withdrawn	CEAC
CEADO	CEA # h0 Position	0-150	150	Inches Withdrawn	CEAC
CEANI	CEA # h1 Position	0~150	150	Inches Withdrawn	CEAC
CEADO	CEA # 12 Position	0-150	150	Inches Withdrawn	CEAC
CEANZ	CEA # h3 Position	0-150	150	Inches Withdrawn	CEAC
CEA43	CEA # hh Position	0-150	150	Inches Withdrawn	CEAC
CEAGG	CEA # b5 Position	0-150	150	Inches Withdrawn	CEAC
CEA42	ULA # 49 PUSICION	0.170		and the second s	

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	VALID USER ENTRIES FOR × and \$ PARAMETERS					
PARAMETER	DEFINITION	S PARAMATER RANGE	VALUE	UNITS	CALCULATOR	
FANANCIEN						
영영 전 이 가지 않는 것이 같아.						
	CTA # h6 Position	0-150	150	Inches Withdrawn	CEAC	
CEA46	CEA # 40 POSILION	0-150	150	Inches Withdrawn	CEAC	
CEA47	CFA # 47 POSILION	0=150	150	Inches Withdrawn	CEAC	
CEAU8	CEA # da Position	0-150	150	Inches Withdrawn	CEAC	
CEA49	CFA # 49 Position	0=150	150	Inches Withdrawn	CEAC	
CEA50	CEA # 50 POSILION	0=150	150	Inches Withdrawn	CEAC	
CEAS1	CEA # 51 Position	0-150	150	Inches Withdrawn	CEAC	
CEA52	CEA # 32 POSILION	0=150	150	Inches Withdrawn	CEAC	
CEA53	CEA # 53 Position	0=150	150	Loches Withdrawn	CEAC	
CEA54	CEA # 54 Position	0=150	150	Inches Withdrawn	CEAC	
CEA55	CEA # 55 Position	0-150	150	Inches Withdrawn	CEAC	
CEA56	CEA # 56 Position	0-150	150	Inches Withdrawn	CEAC	
CEA57	CEA # 57 Position	0-150	150	Inches Withdrawn	CEAC	
CEA58	CLA # 58 Position	0-150	150	Inches Withdrawn	CEAC	
CEA59	CEA # 59 Position	0-150	150	Lochoe Withdrawn	CEAC	
CEA60	CEA # 60 Position	0-150	150	Luchas Withdrawn	CEAC	
CEA61	CEA # 61 Position	0-150	150	Inches Withdrawn	CEAC	
CEA62	CEA # 62 Position	0-150	150	Inches Withdrawn	CEAC	
CEA63	CEA # 63 Position	0-150	150	Inches Withdrawn	CEAC	
CEA64	CEA # 64 Position	0-150	150	Inches Withdrawn	CEAC	
CFA65	CEA # 65 Position	0-150	150	Inches withdrawn	CEAC	
CEA66	CEA # 66 Position	0-150	150	inches withdrawn	CEAC	
CEA67	CEA # 67 Position	0-150	150	Inches Withdrawn	CEAC	
CEAGR	CEA # 68 Position	0-150	150	Inches Withdrawn	CEAC	
CEAGO	CEA # 69 Position	0-150	150	Inches Withdrawn	CEAC	
CEA70	CFA # 70 Position	0-150	150	Inches Withdrawn	CLAC	
CLA70	CEA # 71 Position	0-150	150	Inches Withdrawn	CEAC	
CEA72	CEA # 72 Position	0-150	150	Inches Withdrawn	CEAC	

TABLE H1

INSTRUMENT	AND	TEST	PROCEDURE SO23-11-3.3
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		TABLE H1			
	VALID U	SER ENTRIES FOR x and	S PARAMET	ERS	
		S PARAMATER			APPLICABLE
× PARAMETER	DEFINITION	RANGE	VALUE	UNITS	CALCULATOR
CFA73	CEA # 73 Position	0-150	150	Inches Withdrawn	CEAC
CFA74	CFA # 74 Position	0-150	150	Inches Withdrawn	CEAC
CEA75	CFA # /5 Position	0-150	150	Inches Withdrawn	CEAC
CEA76	CEA # 76 Position	0-150	150	Inches Withdrawn	CEAC
CEA77	CEA # 77 Position	0-150	150	Inches Withdrawn	CEAC
CEA78	CEA # 78 Position	0-150	150	Inches Withdrawn	CEAC
CEA79	CEA # 79 Position	0-150	150	Inches Withdrawn	CEAC
CEA80	CEA # 80 Position	0-150	150	Inches Withdrawn	CEAC
CEA81	CEA # 81 Position	0-150	150	Inches Withdrawn	CEAC
CEA82	CEA # 82 Position	0-150	150	Inches Withdrawn	CEAC
CEA83	CEA # 83 Position	0-150	150	Inches Withdrawn	CEAC
CEA84	CEA # 84 Position	0-150	150	Inches Withdrawn	CEAC
CEA85	CEA # 85 Position	0-150	150	Inches Withdrawn	CEAC
CEA86	CEA # 86 Position	0-150	150	Inches Withdrawn	CEAC
CEA87	CEA # 87 Position	0-150	150	Inches Withdrawn	CEAC
CEA88	CEA # 88 Position	0-150	150	Inches Withdrawn	CEAC
CEA89	CEA # 89 Position	0-150	150	Inches Withdrawn	CEAC
CEA90	CEA # 90 Position	0-150	150	Inches Withdrawn	CEAC
CEA91	CEA # 91 Position	0-150	150	Inches Withdrawn	CEAC

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### FIGURE H1

### RTT Part 2 CPC Sample Run

CPC RESPONSE TIME TEST PART 2 ENABLE MEMORY PROTECT TOTAL RUN- TIME= 600.0 SECONDS

TASK	NUM EX	MINEX	AV GEX	MAXEX	%CPU
Ø	0	0.0	0.0	0.0	0.0
1	6000	.1	.2	.2	.2
2	6000	8.2	8.3	8.3	8.3
3	3000	14.8	14.9	14.9	7.4
4	2000	.1	.1	.2	. 0
5	600	.9	1.0	1.0	. 1
6	300	26.9	27.0	27.1	1.3
7	150	158.3	158.4	158.6	4.0
8	Q	0.0	0.0	0.0	0.0
9	0	0.0	0.0	0.0	0.0
10	0	0.0	0.0	0.0	0.0
11	Ø	0.0	0.0	0.0	0.0
12	0	0.0	0.0	0.0	0.0
13	0	0.0	0.0	0.0	0.0
14	Ø	0.0	0.0	0.0	0.0
15	0	0.0	0.0	0.0	0.0

EXECUTION TIMES IN MILLLSECONDS END RUN.

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### FIGURE H2

### RTT Part 2 CEAC Sample Run

CEAC RESPONSE TIME TEST PART 2 ENABLE MEMORY PROTECT TOTAL RUN- TIME= 6000.0 SECONDS

TASK	NUM EX	MINEX	AV GEX	MAXEX	%CPU
0	e	0.0	0.0	0.0	0.0
1	11999	. 1	.1	. 2	. 2
2	5999	22.3	22.3	35.8	22.3
3	0	0.0	0.0	0.0	0.0
4	3999	.1	.1	.2	. 1
5	1199	.9	.9	1.0	.2
6	0	0.0	0.0	0.0	0.0
7	0	0.0	0.0	0.0	0.0
8	6	.1	.2	.2	. 0
9	299	14.5	16.5	515.3	.8
10	0	0.0	0.0	0.0	0.0
11	Ø	0.0	0.0	0.0	0.0
12	0	0.0	0.0	0.0	0.0
13	ø	0.0	0.0	0.0	0.0
14	0	0.0	0.0	0.0	0.0
15	0	0.0	0.0	0.0	73.2

EXECUTION TIMES IN MILLLSECONDS END RUN.

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#### INSTRUMENT AND TEST PROCEDURE S023-11-3.3 REVISION 1 PAGE 1 OF 3 ATTACHMENT 8.11

#### TABLE H2

Number	Definition	Units
1	Pump Speed pulse count from reactor coolant pump 1	Counts
2	Pump Speed pulse count from reactor coolant pump 2	Counts
3	Pump Speed pulse count from reactor coolant pump 3	Counts
4	Pump Speed pulse count from reactor coolant pump 4	Counts
5	Raw loop 1 cold leg temperature signal	۰F
6	Raw loop 2 cold leg temperature signal	۰F
7	Rew loop 1 hot leg temperature signal	۰F
8	Raw loop 2 hot leg temperature signal	۰F
9	Raw pressurizer pressure signal	psia
10	Raw upper excore neutron flux detector response	% Power
11	Raw middle excore neutron flux detector response	% Power
12	Raw lower excore neutron flux detector response	% Power
13	Packed penalty factor wood from CEAC 1	None
14	Packed penalty factor word from CEAC 2	None
15	Raw CEA subgroup 1 position signal	Inches Withdrawn
16	Raw CEA subgroup 2 position signal	Inches Withdrawn
17	Raw CEA subgroup 3 position signal	Inches Withdrawn

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#### INSTRUMENT AND TEST PROCEDURE S023-11-3.3 REVISION 1 PAGE 2 OF 3 ATTACHMENT 8.11

#### TABLE H2

#### CPC POINT ID ASSIGNMENTS FOR RTT PART 1

Point ID		
Number	Definition	

18	Raw CEA subgroup 4 position signal
19	Raw CFA subgroup 5 position signal
20	Raw CEA subgroup 6 position signal
21	Raw CEA subgroup 7 position signal
22	Raw CEA subgroup 8 position signal
23	Raw CEA subgroup 9 position signal
24	Raw CEA subgroup 10 position signal
25	Raw CEA subgroup 11 position signal
26	Raw CEA subgroup 12 position signal
27	Raw CEA subgroup 13 position signal
28	Raw CEA subgroup 14 position signal
29	Raw CEA subgroup 15 position signal
30	Raw CEA subgroup 16 position signal
31	Raw CEA subgroup 17 position signal
32	Raw CEA subgroup 18 position signal
33	Raw CEA subgroup 19 position signal

Inches Withdrawn Inches Withdrawn Inches Withdrawn

Units

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Inches Withdrawn Inches Withdrawn

Inches Withdrawn Inches Withdrawn

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TABLE 112

CPC POINT ID ASSIGNMENTS FOR RIT PART 1

Definition

Raw CEA subgroup 20 position signal Raw CEA subgroup 21 position signal Raw CEA subgroup 22 position signal Raw CEA subgroup 23 position signal Time of Day Point ID Number 34 35 35 36 36 36 36

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Units

Inches Withdrawn Inches Withdrawn Inches Withdrawn Inches Withdrawn

Hours

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#### TABLE H3

Point ID Number	Definition	Units
1	Raw CEA #1 Position Signal	Inches Withdrawn
2	Raw CEA #2 Position Signal	Inches Withdrawn
3	Raw CEA #3 Position Signal	Inches Withdrawn
4	Raw CEA #14 Position Signal	Inches Withdrawn
5	Raw CEA #5 Position Signal	Inches Withdrawn
6	Raw CEA #6 Position Signal	Inches Withdrawn
7	Raw CEA #7 Position Signal	Inches Withdrawn
8	Raw CEA #8 Position Signal	Inches Withdrawn
9	Raw CEA #9 Position Signal	Inches Withdrawn
10	Raw CEA #10 Position Signal	Inches Withdrawn
11	Raw CEA #11 Position Signal	Inches Withdrawn
12	Raw CEA #12 Position Signal	Inches Withdrawn
13	Raw CEA #13 Position Signal	Inches Withdrawn
14	Raw CEA #14 Position Signal	Inches Withdrawn

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INSTRUMENT AND TEST PROCEDURE S023-11-3.3 REVISION 1 PAGE 2 OF 8 ATTACHMENT 8.12

#### TABLE H3

Point ID Number	Definition	Units
15	Raw CEA #15 Position Signal	Inches Withdrawn
16	Raw CEA #16 Position Signal	Inches Withdrawn
17	Raw CEA #17 Position Signal	Inches Withdrawn
18	Raw CEA #18 Position Signal	Inches Withdrawn
19	Raw CEA #19 Position Signal	Inches Withdrawn
20	Raw CEA #20 Position Signal	Inches Withdrawn
21	Raw CEA #21 Position Signal	Inches Withdrawn
22	Raw CEA #22 Position Signal	Inches Withdrawn
23	Raw CEA #23 Position Signal	Inches Withdrawn
24	Raw CEA #24 Position Signal	Inches Withdrawn
25	Raw CEA #25 Position Signal	Inches Withdrawn
26	Raw CEA #26 Position Signal	Inches Withdrawn

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INSTRUMENT AND TEST PROCEDURE S023-11-3.3 REVISION 1 PAGE 3 OF 8 ATTACHMENT 8.12 1.0

#### TABLE H3

Point ID Number	Definition	Units
27	Raw CEA #27 Position Signal	Inches Withdrawn
28	Raw CEA #28 Position Signal	Inches Withdrawn
29	Raw CEA #29 Position Signal	Inches Withdrawn
30	Raw CEA #30 Position Signal	Inches Withdrawn
31	Raw CEA #31 Position Signal	Inches Withdrawn
32	Raw CEA #32 Position Signal	Inches Withdrawn
33	Raw CEA #33 Position Signal	Inches Withdrawn
34	Raw CEA #34 Position Signal	Inches Withdrawn
35	Raw CEA #35 Position Signal	Inches Withdrawn
36	Raw CEA #36 Position Signal	Inches Withdrawn
37	Raw CEA #37 Position Signal	Inches Withdrawn

INSTRUMENT AND TEST PROCEDURE S023-11-3.3 REVISION 1 PAGE 4 OF 8 ATTACHMENT 8.12

#### TABLE H3

Point ID Number	Definition	Units
38	. Raw CEA #38 Position Signal	Inches Withdrawn
39	Raw CEA #39 Position Signal	Inches Withdrawn
40	Raw CEA #40 Position Signal	Inches Withdrawn
41	Raw CEA #41 Position Signal	Inches Withdrawn
42	Raw CEA #42 Position Signal	Inches Withdrawn
43	Raw CEA #43 Position Signal	Inches Withdrawn
44	Raw CEA #44 Position Signal	Inches Withdrawn
45	Raw CEA #45 Position Signal	Inches Withdrawn
46	Raw CEA #46 Position Signal	Inches Withdrawn
47	Raw CEA #47 Position Signal	Inches Withdrawn
48	Raw CEA #48 Position Signal	Inches Withdrawn
49	Raw CEA #49 Position Signal	Inches Withdrawn

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Point ID Number

#### INSTRUMENT AND TEST PROCEDURE S023-11-3.3 REVISION 1 PAGE 5 OF 8 ATTACHMENT 8.12

Inches Withdrawn

#### TABLE H3

### CPC POINT ID ASSIGNMENTS FOR RTT PART 1

Definition	Units
Raw CEA #50 Position Signal	Inches Withdrawn
Raw CEA #51 Position Signal	Inches Withdrawn
Raw CEA #52 Position Signal	Inches Withdrawn
Raw CEA #53 Position Signal	Inches Withdrawn
Raw CEA #54 Position Signal	Inches Withdrawn
Raw CEA #55 Position Signal	Inches Withdrawn
Raw CEA #56 Position Signal	Inches Withdrawn
Raw CEA #57 Position Signal	Inches Withdrawn
Raw CEA #58 Position Signal	Inches Withdrawn
Raw CEA #59 Position Signal	Inches Withdrawn
Raw CEA #60 Position Signal	Inches Withdrawn

Raw CEA #61 Position Signal

#### INSTRUMENT AND TEST PROCEDURE S023-11-3.3 REVISION 1 PAGE 6 OF 8 ATTACHMENT 8.12

#### TABLE H3

Point ID Number	Definition	Units
62	Raw CEA #62 Position Signal	Inches Withdrawn
63	Raw CEA #63 Position Signal	Inches Withdrawn
64	Raw CEA #64 Position Signal	Inches Withdrawn
65	Raw CEA #65 Position Signal	Inches Withdrawn
66	Raw CEA #66 Position Signal	Inches Withdrawn
67	Raw CEA #67 Position Signal	Inches Withdrawn
68	Raw CEA #68 Position Signal	Inches Withdrawn
69	Raw CEA #69 Position Signal	Inches Withdrawn
70	Raw CEA #70 Position Signa!	Inches Withdrawn
71	Raw CEA #71 Position Signal	Inches Withdrawn
72	Raw CEA #72 Position Signal	Inches Withdrawn
73	Raw CEA #73 Position Signal	Inches Withdrawn

Point ID

Number

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77

78

81

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INSTRUMENT AND TEST PROCEDURE S023-11-3.3 REVISION 1 PAGE 7 OF 8 ATTACHMENT 8.12

#### TABLE H3

#### CPC POINT ID ASSIGNMENTS FOR RTT PART 1

#### Definition

#### Units

Raw CEA #74 Position Signal Raw CEA #75 Position Signal Raw CEA #76 Position Signal Raw CEA #77 Position Signal Raw CEA #77 Position Signal Raw CEA #79 Position Signal Raw CEA #80 Position Signal Raw CEA #81 Position Signal Raw CEA #82 Position Signal Raw CEA #83 Position Signal Raw CEA #84 Position Signal Raw CEA #84 Position Signal Inches Withdrawn Inches Withdrawn

INSTRUMENT AND TEST PROCEDURE S023-11-3.3 REVISION 1 PAGE 8 OF 8 ATTACHMENT 8.12

#### TABLE H3

CPC POINT ID ASSIGNMENTS FOR RIT PART 1

Point ID Number	Definition	Units
86	Raw CEA #86 Position Signal	Inches Withdrawn
87	Raw CEA #87 Position Signal	Inches Withdrawn
88	Raw CEA #88 Position Signal	Inches Withdrawn
89	Raw CEA #89 Position Signal	Inches Withdrawn
90	Raw CEA #90 Position Signal	Inches Withdrawn
91	Raw CEA #91 Position Signal	Inches Withdrawn
92	Raw CFA #92 Position Signal	Inches Withdrawn
93	Raw CEA #93 Position Signal	Inches Withdrawn

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March 13, 1983

### MR. A. E. CHAFFEE

SUBJECT: NRC Requested Documents

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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 porforming 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.

11. A "Document History Summary" which identifies the chronological history of all revisions and TCNs for each of the procedures identified above.

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### W. C. MOODY

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cc: H. B. Ray J. M. Price CDM