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EISENHUT,D.G. Division of Licensing

SUBJECT: Forwards addl info re near-term completion of Item 4.3, "Reactor Trip Sys Reliability" of Generic Ltr 83-28 & addresses 13 items listed in final SER on shunt trip design.

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NOTES:J Hanchett 1cy PDR Documents. 05000275
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	NRR/DHFS/HFEB		1	1	NRR/DHFS/LQB		1	1
	NRR/DHFS/PSRB		1	1	NRR/DL DIR		1	1
	NRR/DL/ORAB		1	1	NRR/DL/SSPB		1	1
	NRR/DSI/ASB		1	1	NRR/DSI/ICSB		2	2
	NRR/DSI/PSB		1	1	NRR/DSI/RSB		1	1
	REG FILE	04	1	1	RGN5		1	1
EXTERNAL:	ACRS		6	6	LPDR	03	2	2
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AUTH.NAME   AUTHOR AFFILIATION
SHIFFER,J.D.   Pacific Gas & Electric Co.
RECIP.NAME   RECIPIENT AFFILIATION
KNIGHTON,G.   Division of Licensing

SUBJECT: Forwards addl info re near-term completion of Item 4.5, "Reactor Trip Sys Reliability" of Generic Ltr 83-28 & addresses 13 items listed in final SER on Salem trip question.

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	NRR/[illegible]	1	1	NRR/[illegible]	1	1
	NRR/[illegible]	1	1	NRR/[illegible]	1	1
	NRR/[illegible]	1	1	NRR/[illegible]	1	1
	NRR/[illegible]	1	1	NRR/[illegible]	2	2
	NRR/[illegible]	1	1	NRR/[illegible]	1	1
	REG FILE 04	1	1	RGN5	1	1
EXTERNAL:	[illegible]	0	0	LPDR 03	2	2
	NRC PDR 02	1	1	NSIC 05	1	1
	TIS	1	1			
NOTES:		1	1			

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J. O. SCHUYLER
VICE PRESIDENT
NUCLEAR POWER GENERATION

December 20, 1983

Mr. Darrell G. Eisenhut, Director
Division of Licensing
Office of Nuclear Reactor Regulation
U. S. Nuclear Regulatory Commission
Washington, D.C. 20555

Re: Docket No. 50-275, OL-DPR-76
Docket No. 50-323
Diablo Canyon Units 1 and 2
GL No. 83-28 - Generic Implications of ATWS Events
Item 4.3 "Reactor Trip System Reliability"

Dear Mr. Eisenhut:

PGandE's letter dated November 7, 1983 provided the status of current conformance and the schedule for improvements planned for Diablo Canyon Units 1 and 2 to assure compliance with Generic Letter 83-28. That letter indicated that PGandE would provide additional information relating to the near term completion of item 4.3. This letter provides that information and addresses the thirteen items listed in the NRC's final SER dated August 10, 1983 concerning the Westinghouse Owners Group's generic shunt trip design.

In accordance with the requirements of Generic Letter 83-28, NRC approval is required prior to implementation. PGandE's current implementation schedule, pending NRC approval, is April 15, 1984.

Kindly acknowledge receipt of this material on the enclosed copy of this letter and return it in the enclosed addressed envelope.

Sincerely,

J. O. Schuyler

A055
1/1

Enclosure

cc: J. B. Martin
Service List

SHUNT TRIP MODIFICATION

1. Request for Drawings

"Provide the electrical schematic/elementary diagrams for the reactor trip and bypass breakers showing the undervoltage and shunt coil actuation circuits as well as the breaker control (e.g., closing) circuits, and circuits providing breaker status information/alarms to the control room."

PGandE Response

Attached are electrical drawings for the reactor trip and bypass breakers showing the undervoltage and shunt coil actuation circuits as well as the breaker control (e.g., closing) circuits, and circuits providing breaker status information/alarms to the control room.

2. Request for Class 1E Power with Indication and Overvoltage Capability

"Identify the power sources for the shunt trip coils. Verify that they are Class 1E and that all components providing power to the shunt trip circuitry are Class 1E and that any faults within non-Class 1E circuitry will not degrade the shunt trip function. Describe the annunciation/indication provided in the control room upon loss of power to the shunt trip circuits. Also describe the overvoltage protection and/or alarms provided to prevent or alert the operator(s) to an overvoltage condition that could affect both the UV coil and the parallel shunt trip actuation relay."

PGandE Response

A. Power Sources

The power supplies and all components providing power to the shunt trip circuitry are Class 1E. No change has been made to the power supply portion of the circuitry. Drawing No. SK437610 Rev. 9B shows the power supply for the shunt trip coil of 52/RTA is from Battery 11 thru CKT 129D. The power supply for 52/RTB is from Battery 12 via CKT 229D. Since the Class 1E circuitry provided to the shunt trip is separated from non-Class 1E circuitry, a fault within non-Class 1E circuitry will not degrade the shunt trip function.

B. Indication

Indications on the Main Control Board for breaker operation are the red and green position lights. The green light indicates that the breaker is open and power is available to the closing circuit of the breaker. The red light indicates that the breaker is closed, and power is available to the shunt trip device. The red lamp is connected in series with the shunt coil and an "a" auxiliary contact. This provides detectability of power failure

to the shunt trip coil. A red indicating light (non-Class 1E) failure will not impact the shunt trip coil function. For example, if the breaker is closed, the green light is off and the red light is on. If the red light goes out with the green light remaining off, either a power loss to the shunt trip coil or a discontinuity in the shunt trip coil or a burned out bulb would be indicated. Verification of bulb operability is readily determined by replacing the bulbs.

C. Overvoltage Conditions

The added shunt trip circuitry is powered from the reactor protection logic voltage supply. Components in the added shunt trip circuitry have been selected based on their ability to perform their intended function up to a voltage as high as 115% of nominal voltage. The reactor protection logic voltage is regulated with overvoltage protection set at 115% of normal voltage characteristic of the SSPS.

The shunt trip coils in the reactor trip breakers are powered from 125 VDC via the station batteries. Normally the shunt trip coils are in a de-energized condition. When the trip breakers are closed, the red lamp current (approx. 50 m.a.) flows through the trip coil to monitor the circuit continuity. This current is not large enough to actuate the trip coil armature. The reactor trip signal applies a nominal voltage of 125 VDC to each shunt trip coil in the redundant trains. As the breaker trips, its auxiliary switch opens to de-energize the shunt trip coil. Since the 125 VDC voltage is supplied from the battery system, it may temporarily rise to the battery equalizing voltage (not exceeding 115% of the nominal voltage). The reactor trip breaker shunt trip coil can operate at this overvoltage condition without deleterious effects since it is energized for a very small interval.

3. Request for Information on Added Relays

"Verify that the relays added for the automatic shunt trip functions are within the capacity of their associated power supplies and that the relay contacts are adequately sized to accomplish the shunt trip function. If the added relays are other than the Potter & Brumfield MDR series relays (P/N 2383A38 or P/N 955655) recommended by Westinghouse, provide a description of the relays and their design specifications."

PGandE Response

The added relays specified by Westinghouse are the Potter and Brumfield MDR series relays (P/N 2383A38 [125 VDC] or P/N 955655 [48 VDC]). Due to the excessive time required to obtain relays through Westinghouse, MDR5134 relays were ordered directly from Potter-Brumfield. These relays are the same as Westinghouse P/N 955655 (48 VDC). Westinghouse has verified that the relay contacts are adequately sized for the shunt trip function and are within the capacity of their associated power supplies.

4. Request for Test Procedure Proposed by WOG

"That whether the test procedure/sequence used to independently verify operability of the undervoltage and shunt trip devices in response to an automatic reactor trip signal is identical to the test procedure proposed by the WOG. Identify any differences between the WOG test procedure and the test procedure to be used and provide the rationale/justification for these differences."

PGandE Response

PGandE plans to implement a test procedure that is functionally similar to the WOG proposed procedure. The test procedure will be in effect prior to completion of the installation of the shunt trip modification in Diablo Canyon Unit 1.

5. Request for Class 1E Shunt Trip Function

Verify that the circuitry used to implement the automatic shunt trip function is Class 1E (safety related), and the procurement, installation, operation, testing, and maintenance of this circuitry will be in accordance with the quality assurance criteria set forth in Appendix B to 10CFR Part 50.

PGandE Response

The circuitry used to implement the automatic shunt trip function is Class 1E (safety related), and the procurement, installation, operation, testing, and maintenance of this circuitry will be in accordance with the quality assurance criteria set forth in Appendix B to 10CFR Part 50.

6. Request for Seismic Qualification

"Verify that the shunt trip attachments and associated circuitry are/will be seismically qualified (i.e., be demonstrated to be operable during and after a seismic event) in accordance with the provisions of Regulatory Guide 1.100, Revision 1 which endorses IEEE Standard 344, and that all non-safety related circuitry/components in physical proximity to or associated with the automatic shunt trip function will not degrade this function during or after a seismic event."

PGandE Response

The Westinghouse Owners Group is performing seismic qualification tests to demonstrate operability of the shunt trip in accordance with the provisions of Regulatory Guide 1.100 Rev. 1. These tests will be performed on a generic system encompassing the Diablo Canyon features.

7. Request for Environmental Qualification

"Verify that the components used to accomplish the automatic shunt trip function are designed for the environment where they are located."

PGandE Response

The components used to accomplish the automatic shunt trip function are designed for the environment where they are located.

8. Request for Separation

"Describe the physical separation provided between the circuits used to manually initiate the shunt trip attachments of the redundant reactor trip breakers. If physical separation is not maintained between these circuits, demonstrate that faults within these circuits can not degrade both redundant trains."

PGandE Response

Physical separation is maintained between redundant trains in the main control board, reactor trip switchgear and reactor protection logic for the shunt trip circuitry. All interconnected circuits are also separated. All current modifications are within the reactor trip switchgear. Separation includes:

1. Dual section manual Reactor Trip and Safety Injection switches with metal barriers and RTV silicon compound between redundant train switch decks.

2. Shunt trip attachments interposing relays and their associated terminal blocks are mounted in separated metal enclosures.

3. Reactor Protection Logic outputs for energizing the shunt trip interposing relays are housed in existing separate metal enclosures.

4. Wiring in panels is separated per PGandE Standard drawing.

5. Field cabling from the Main Control Board and Reactor Protection logic to redundant Train A and Train B Reactor Trip switchgear are routed in separate raceway systems.

9. Request for Test Procedure of Control Board Manual Switches

"Verify that the operability of the control room manual reactor trip switch contacts and wiring will be adequately tested prior to startup after each refueling outage. Verify that the test procedure used will not involve installing jumpers, lifting leads, or pulling fuses, and identify any deviations from the WOG procedure. Permanently installed test connection (i.e., to allow connection of a voltmeter) are acceptable."

PGandE Response

Surveillance test procedure STP I-16C Rev. 1 is in effect to address this request(*). This procedure is attached. This test is consistent with the WOG procedure. One jumper is utilized in step 1.b.1 of the procedure (page 6) to bypass inputs to the UV trip coils. This jumper is relocated in step 2.c.1 (page 8) and removed in Step 9.j (Page 28). The installation and removal are recorded on the summary sheet page 2 for steps 1.b.1. and 9.j.

10. Request for Bypass Breaker Testing

"Verify that each bypass breaker will be tested to demonstrate its operability prior to placing it into service for reactor trip breaker testing."

PGandE Response

FSAR page 7.2-31 describes the procedure for testing the trip breakers. The bypass breaker is closed and tripped to verify its operation. After its operability is verified it can be reclosed, and testing can begin on the reactor trip breakers of the same train.

11. Request the Reactor Trip Breaker Operability Indication Test Procedure

"Verify that the test procedure used to determine reactor trip breaker operability will also demonstrate proper operation of the associated control room indication/annunciation."

PGandE Response

No modifications are being made to any indication for the reactor trip switchgear. No new procedures need to be written to verify proper operation of the associated control room indication/annunciation. As described in Item 2 above, it is standard practice in the application of Reactor Trip switchgear in Westinghouse plants to indicate in the Main Control Room that the breaker is closed (by a red light) and that the breaker is open (by a green light). For the schematic refer to the generic package submitted to the NRC by letter dated June 14, 1983 by the WOG.

(*) Please note that the procedure submitted to the Staff in this submittal is unsigned and marked FOR INFORMATION ONLY. A signed current copy of the procedure is available to NRC inspectors at the Plant site. PGandE expects to make modifications to procedures where required for plant safety, or for other appropriate reasons. We do not plant to submit these modifications formally to the NRC.

12. Request for Response Time Testing

"Verify that the response time of the automatic shunt trip feature will be tested periodically and shown to be less than or equal to that assumed in the FSAR analyses or that specified in the technical specifications."

PGandE Response

Verification of time response testing is plant specific. Should plant specific life cycle testing show that breaker trip response time degrades with operation, periodic on-line response time testing will be considered by WOG.

13. Request for Technical Specification Change

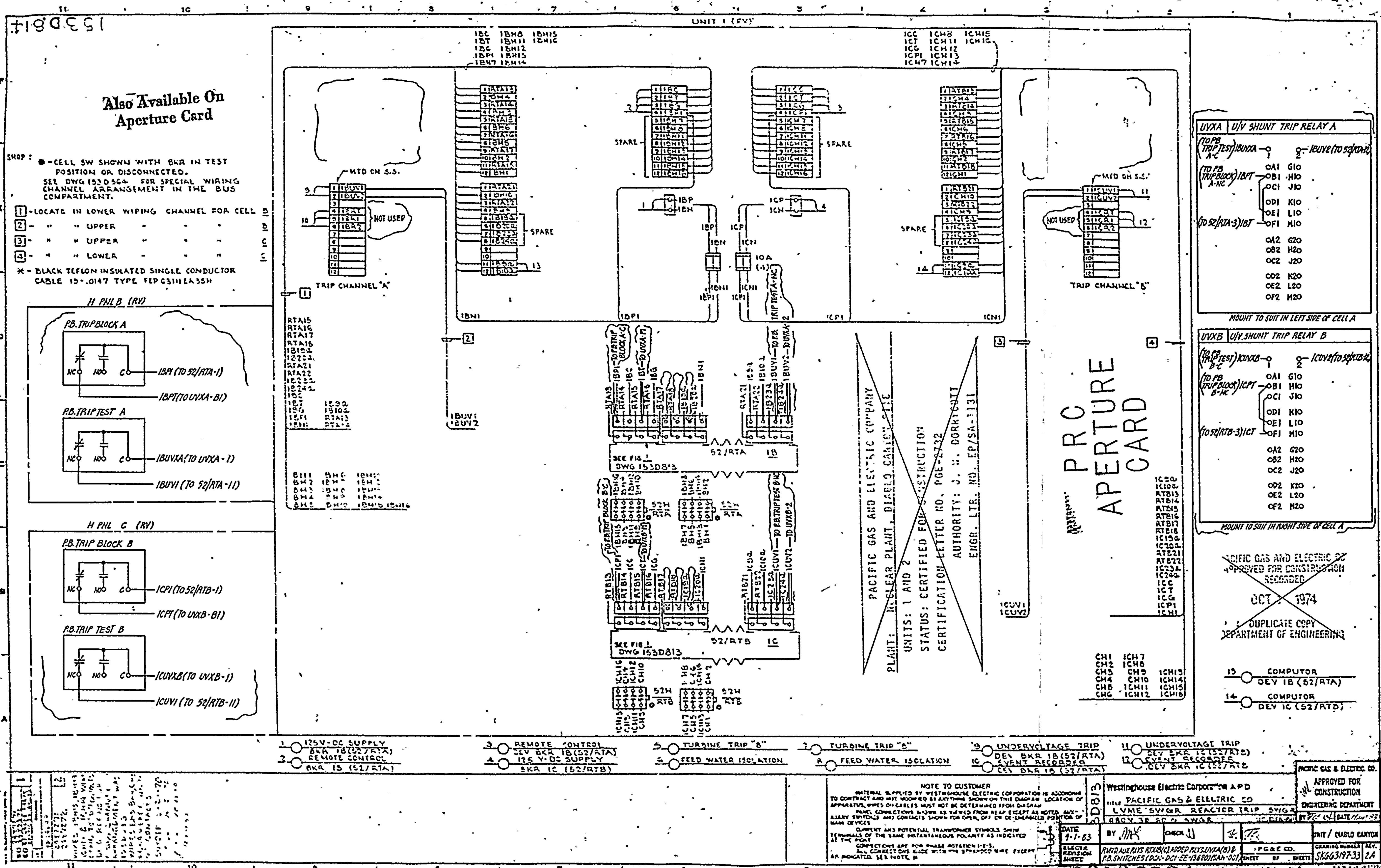
"Propose Technical Specification changes to require periodic testing of the undervoltage and shunt trip functions and the manual reactor trip switch contacts and wiring."

PGandE Response

A Technical Specificatioon change request will be submitted to modify Technical Specification Table 4.3-1, Item 21, incorporating the required testing of the reactor trip function.

Attachments:

1. Drawing No. SK 437610 Rev. 9B
2. Drawing No. SK 66319733 Rev. 2A
3. Surveillance Test Procedure STP I-16C



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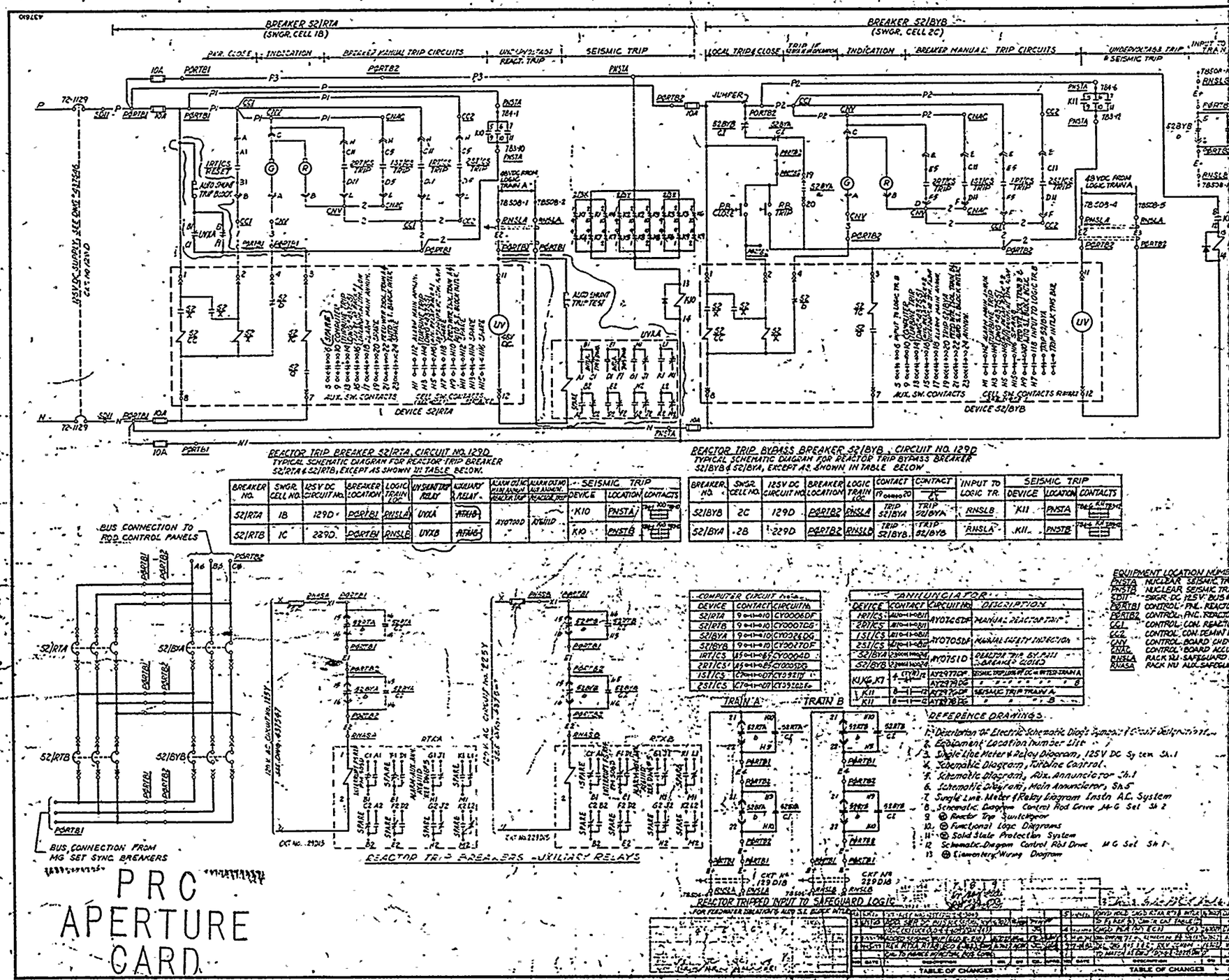


BREAKER NO.	SWGR. CELL NO.	125V DC CIRCUIT NO.	BREAKER LOCATION	LOGIC TRAIN	UV SHUNT TRIP RELAY	AUXILIARY RELAY	ALARM CT/C REACTOR TRIP	ALARM DI/O MAN. BYPASS	ALARM DI/O REACT. TRIP	SEISMIC TRIP DEVICE	SEISMIC TRIP LOCATION	SEISMIC TRIP CONTACTS
52/1RTA	1B	1290	PORT B1	RNSLA	UVXA	ATXIB	AY07D0D	XY1110		K10	PNSTA	784-2 K10
52/1RTB	1C	2290	PORT B1	RNSLB	UVXB	ATXIC				K10	PNSTB	784-5 K10

BREAKER NO.	SWGR. CELL NO.	125V DC CIRCUIT NO.	BREAKER LOCATION	LOGIC TRAIN	CONTACT 52/1BYA	CONTACT 52/1BYB	INPUT TO LOGIC TR.	SEISMIC TRIP DEVICE	SEISMIC TRIP LOCATION	SEISMIC TRIP CONTACTS
52/1BYB	2C	1290	PORT B2	RNSLB	TRIP 52/1BYA	TRIP 52/1BYA	RNSLB	K11	PNSTA	784-6 K11
52/1BYA	2B	2290	PORT B2	RNSLB	TRIP 52/1BYB	TRIP 52/1BYB	RNSLA	K11	PNSTB	784-3 K11

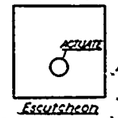
COMPUTER CIRCUIT No.		
DEVICE	CONTACT	CIRCUIT No.
52/1RTA	9 o—1—o10	CY0006DF
52/1RTB	9 o—1—o10	CY0007DG
52/1BYA	9 o—1—o10	CY0026DG
52/1BYB	9 o—1—o10	CY0027DF
1RT/CS	85 o—1—o5	CY0004D
2RT/CS	85 o—1—o5	CY0005DG
1ST/CS	CY o—1—o7	CY0328DF
2ST/CS	CY o—1—o7	CY0329DG

ANNUNCIATOR			
DEVICE	CONTACT	CIRCUIT No.	DESCRIPTION
1RT/CS	ALM o—1—o811	AY07C6DF	MANUAL REACTOR TRIP
2RT/CS	ALM o—1—o811		
1ST/CS	ALM o—1—o811	AY07D5DF	MANUAL SAFETY INJECTION
2ST/CS	ALM o—1—o811		
52/1BYA	2300 o—1—o24	AY07E1D	REACTOR TRIP BY-PASS BREAKER CLOSED
52/1BYB	2300 o—1—o24		
K1/K6, K7	CT o—1—o12	AY2677DF	SEISMIC TRIP LOGIC AT DG-W INTER TRAIN A
K11	8 o—1—o14	AY2678DF	SEISMIC TRIP TRAIN A
K11	8 o—1—o14	AY2678DG	SEISMIC TRIP TRAIN B

DESCRIPTION							
DEVICE NO.	FUNCTION	RATING	MFR	TYPE	CAT.	DWG. NO.	REMARKS
52/1RTA	Reactor Trip Breaker "A"		W.E.Co			(11)	
52/1RTB	Reactor Trip Breaker "B"					(11)	
52/1BYA	Reactor Bypass Breaker "A"					(11)	
52/1BYB	Reactor Bypass Breaker "B"					(11)	
K1A,B,K6,K7	UV AUXILIARY RELAY	48V DC	(G)	66	1805-L12C		SPARE
K2A,B, CT1B	Reactor Trip Brk. Aux. Relay	120 V AC	(G)	MDR	MDR 134-1		
K1,K6,K7	SEISMIC "A" AXIS RELAYS	125 VDC		—	—		NORMALLY ENERGIZED, DEENERGIZE TO TRIP
K2,K8,K8	" "B" "	"	"	"	"	"	
K3,K9,K9	" "E" "	"	"	"	"	"	
K10,K11	SEISMIC TRIP RELAYS						NORMALLY DEENERGIZED
UVXA, UVXB	UV SHUNT TRIP RELAY	48V DC	(G) (SPARE)	MDR	MDR5134		
—	AUX SHUNT TRIP TEST		(SPARE) (SERIES)		X-154		
—	AUX SHUNT TRIP BLOCK		(SPARE) (SERIES)		7-867		

NOTES

1. Cell Switch Contacts Shown With Breaker In Operating Position.
2. G12-G1 And H11-H1 Are Jumpered In Module. Contacts From 1RT/CS And 2RT/CS Are Connected In Series And Fed Into Train B Logic Input.
3. H6-H7 And G6-G7 Are Jumpered In Module. Contacts From 1RT/CS And 2RT/CS Are Connected In Series And Fed Into Train A Logic Input.



Escutcheon

CONTACTS	POSITION RESET	POSITION ACTUATE	REMARKS
A11 o—1—o B11		X	ALM/ANNUNCIATOR
A12 o—1—o B12	X		SPARE
A1 o—1—o B1		X	LOGIC TRAIN A
A5 o—1—o B5		X	LOGIC TRAIN B
A6 o—1—o B6	X		SPARE
A7 o—1—o B7		X	TRIP 52/1BYA
C11 o—1—o D11		X	TRIP 52/1BYB
C12 o—1—o D12	X		SPARE
C1 o—1—o D1		X	TRIP 52/1RTB
C5 o—1—o D5		X	TRIP 52/1RTA
C6 o—1—o D6	X		SPARE
C7 o—1—o D7		X	COMPUTER

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SPRING RET. FR TO NEUTRAL
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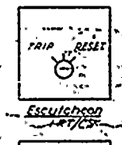
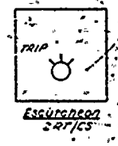


Escutcheon 1RT/CS



Escutcheon 2RT/CS

CONTACTS	POSITION RESET	POSITION ACTUATE	REMARKS
A11 o—1—o B11		X	ALM/ANNUNCIATOR
A12 o—1—o B12	X		SPARE
A1 o—1—o B1		X	LOGIC TRAIN A
A5 o—1—o B5		X	LOGIC TRAIN B
A6 o—1—o B6	X		SPARE
A7 o—1—o B7		X	TRIP 52/1BYA
C11 o—1—o D11		X	TRIP 52/1BYB
C12 o—1—o D12	X		SPARE
C1 o—1—o D1		X	TRIP 52/1RTB
C5 o—1—o D5		X	TRIP 52/1RTA
C6 o—1—o D6	X		SPARE
C7 o—1—o D7		X	COMPUTER
E11 o—1—o F11		X	
E12 o—1—o F12	X		
E1 o—1—o F1		X	
E5 o—1—o F5		X	
E6 o—1—o F6	X		
E7 o—1—o F7		X	
G11 o—1—o H11		X	
G12 o—1—o H12	X		
G1 o—1—o H1		X	
G5 o—1—o H5		X	
G6 o—1—o H6	X		
G7 o—1—o H7		X	

CONTROL SWITCH REACTOR TRIP 1RT/CS, 2RT/CS

USED AT LOCATION CR "CNY"
SPRING RET. FR TO NEUTRAL
W.E. CORP. TYPE W-2 2 POSITION STYLE No. 10053GA2

EQUIPMENT LOCATION NUMBERS

PNSTA	NUCLEAR SEISMIC TRIP CABINET A
PNSTB	NUCLEAR SEISMIC TRIP CABINET B
EDTF	SWGR. DC 125V BUS 1 & 1F
PORT B1	CONTROL: PNL. REACTOR TRIP BREAKERS
PORT B2	CONTROL: PNL. REACTOR TRIP BYPASS BKRS.
CC1	CONTROL: CON. REACTOR CONTROL
CC2	CONTROL: CON. DEMIN'S MAKE-UP WATER
CNV	CONTROL BOARD CHEM. VOLUME CONTROL SYS.
CNAC	CONTROL BOARD ACCUMULATOR SERVICE
RNSLA	RACK NU - SAFEGUARD LOGIC A
RNASA	RACK NU - ALT. SAFEGUARD CAB. A

REFERENCE DRAWINGS

1. Discription Of Electric Schematic Diag's Symbols & Circuit Designation
2. Equipment Location Number List
3. Single Line Meter & Relay Diagram, 125V DC System Sh. 1
4. Schematic Diagram, Turbine Control
5. Schematic Diagram, Aux. Annunciator Sh. 1
6. Schematic Diagram, Main Annunciator, Sh. 5
7. Single Line Meter & Relay Diagram Instr. A.C. System
8. Schematic Diagram Control Rod Drive M-G Set Sh. 2
9. Reactor Trip Switchgear
10. Functional Logic Diagrams
11. Solid State Protection System
12. Schematic Diagram Control Rod Drive M-G Set Sh. 1
13. Elementary Wiring Diagram

Dwg. No. 950032
Dwg. No. 101060
Dwg. No. 437546
Dwg. No. 437551
Dwg. No. 437730
Dwg. No. 501125
Dwg No. 437547, 445291
Dwg No. 437634
Rec No. 663197
Rec No. 663195
Rec No. 663231
Dwg No. 437673
Rec. No. 663193

PG&E SYS. PHASE SEQUENCE A-B-C

PACIFIC GAS & ELECTRIC CO.
APPROVED FOR CONSTRUCTION
ENGINEERING DEPARTMENT

SCHEMATIC DIAGRAM
REACTOR TRIP & BYPASS BKRS

DATE 9-1-85 BY [illegible] CHECK [illegible]

UNIT DIABLO CANYON

SHEET 8P SHEETS SK437610 REV 9B

PWR/AUX RLYS ATTACH/ADDED RELAYS (EVA) ON P.B. ENVIRONMENTION DCE 66-0047(CAM-0017)

PRC APERTURE CARD

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