REGULATORY INFORMATION DISTRIBUTION SYSTEM (RIDS)

ACCESSION NBR:8201200589 DOC.DATE: 82/01/18 NOTARIZED: NO DOCKET #
FACIL:50-361 San Onofre Nuclear Station, Unit 2, Southern Californ 05000361
50-362 San Onofre Nuclear Station, Unit 3, Southern Californ 05000362
AUTH.NAME AUTHOR AFFILIATION
BASKIN,K.P. Southern California Edison Co.
RECIP.NAME RECIPIENT AFFILIATION
MIRAGLIA,F. Licensing Branch 3

SUBJECT: Discusses NRC concerns re effects of input voltage faults on plant protection sys matrix relay circuit. No effects described would prevent normal tripping action of sys under fault conditons.

DISTRIBUTION CODE: 3001S COPIES RECEIVED:LTR 1 ENCL 0 SIZE: 2
TITLE: PSAR/FSAR AMDTS and Related Correspondence

NOTES:L Chandler:all FSAR & ER amends.1 cy:J Hanchett(Region V). 05000361
D Scaletti:1 cy all envir info.
L Chandler:all FSAR & ER amends.1 cy:J Hanchett(Region V). 05000362
D Scaletti:1 cy all envir info.

	RECIPIENT ID CODE/NAME		COPIES LTTR	COPIES ENCL	RECIPIENT ID CODE/NAME		COPIES LTTR	COPIES ENCL
ACTION:	A/D LICENSNG		1	0	LIC BR #3 BC		1	0
	LIC BR #3 LA		1	0	ROOD,H.	01	1	1
INTERNAL:	ELD		1	0	IE	06	3	3
	IE/DEP/EPDB	35	1	1	IE/DEP/EPLB	36	3	3
	MPA		1	0	NRR/DE/CEB	11	1	1
	NRR/DE/EQB	13	3	3	NRR/DE/GB	28	2	2
	NRR/DE/HGEB	30	2	2	NRR/DE/MEB	18	1	1
	NRR/DE/MTEB	17	1	1	NRR/DE/QAB	21	1	1
	NRR/DE/SAB	24	1	1	NRR/DE/SEB	25	1	1
	NRR/DHFS/HFEB	40	1	1	NRR/DHFS/LQB	32	1	1
	NRR/DHFS/OLB	34	1	1	NRR/DHFS/PTRB	20	1	1
	NRR/DSI/AEB	26	1	1	NRR/DSI/ASB	27	1	1
	NRR/DSI/CPB	10	1	1	NRR/DSI/CSB	09	1	1
	NRR/DSI/ETSB	12	1	1	NRR/DSI/ICSB	16	1	1
	NRR/DSI/PSB	19	1	1	NRR/DSI/RAB	22	1	1
	NRR/DSI/RSB	23	1	1	NRR/DST/LGB	33	1	1
	REG FILE	04	1	1				
EXTERNAL:	ACRS	41	16	16	BNL(AMDTS ONLY)		1	1
	FEMA-REP DIV	39	1	1	LPDR	03	1	1
	NRC PDR	02	1	1	NSIC	05	1	1
	NTIS		1	1				

TOTAL NUMBER OF COPIES REQUIRED: LTTR 64 ENCL 0

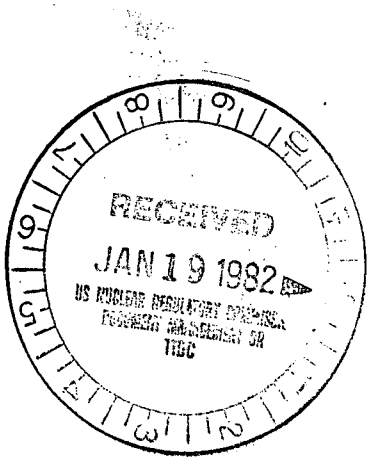
Southern California Edison Company

P. O. BOX 800
2244 WALNUT GROVE AVENUE
ROSEMEAD, CALIFORNIA 91770

K. P. BASKIN
MANAGER OF NUCLEAR ENGINEERING, SAFETY, AND LICENSING

TELEPHONE
(213) 572-1401

January 18, 1982



Director, Office of Nuclear Reactor Regulation
Attention: Mr. Frank Miraglia, Branch Chief
Licensing Branch No. 3
U. S. Nuclear Regulatory Commission
Washington, D.C. 20555

Gentlemen:

Subject: Docket Nos. 50-361 and 50-362
San Onofre Nuclear Generating Station
Units 2 and 3

During recent telephone conversations between the NRC (Mr. R. Stevens) and SCE (Mr. F. R. Nandy), the NRC expressed concerns regarding the effects of input voltage faults on the Plant Protection System — (PPS) matrix relay circuit. Specifically the concern postulated the possibility of the PPS bistable relay contacts welding shut due to a surge or high voltage fault on the input of one of the matrix power supplies with one PPS channel in a bypassed condition, thereby rendering the PPS inoperable.

SCE's response to NRC question 032.11 discussed input surge and fault testing and referenced tests previously performed on the Arkansas Nuclear One - Unit 2 (ANO-2) (Docket 50-368) PPS matrix power supplies. Briefly,the PPS matrix is powered by two Power Mate PXS-B-12V power supplies which are paralleled using auctioneering diodes. During the following input surge and fault tests, the matrix circuit was simulated using load resistors:

1. With 120 volts AC on the AC input of one power supply, 140 volts DC was applied on the AC input of the other power supply for 30 seconds.

2. With 120 volts AC on the AC input of one power supply, 508 volts AC was applied on the AC input of the other power supply for 30 seconds.

3. With 120 volts AC on the AC inputs of both power supplies, surge wave form was applied to one power supply using common-mode configuration.

4. With 120 volts AC on the AC inputs of both power supplies, surge wave form was applied to one power supply using transverse-mode configuration.

The surge waveform used during the testing was in accordance with Section 2 of IEEE 472-1974 with amplitude reduced. The adequacy of this reduced amplitude surge was previously discussed in the response to NRC Question 032.32.

3001
s
1/0

The following were observed as a result of the input surge and fault testing which was performed:

1. There were no effects observed on the test load with either surge wave forms or with the 140 volt DC fault applied to the test circuit.

2. With the 508 volt AC fault applied to the test circuit, the wave form across the test lead was observed to be a spike train superimposed on the nominal 12 volt DC level. The peak amplitude of the spike train followed an exponential envelope which rushed to a maximum value of 41 volts DC and subsequently decayed to a steady state value of 12 volts DC.

Based upon the results summarized above as documented in the referenced test report, an analysis was performed to assess the effects of applying the surge and fault voltages to the PPS matrix circuit. The analysis was performed with 41 volts DC applied continuously to the matrix circuit to conservatively model the circuit under fault conditions. This configuration is considered conservative because the voltage applied to the circuit during the fault test was periodic with short duration spikes whose average values were approximately 15 volts DC. The analysis showed that with the higher DC voltages applied to the circuit, the current values in the circuit would increase proportionately due to the resistive nature of the load. The results of the analysis are available at the Combustion Engineering Offices in Windsor, Connecticut for inspection by the NRC.

This increase in the current level is below that which is required to weld the bistable relay contacts shut. The increase in the base current to the relay driver transistors would place these transistors well into saturation but the resulting load line would be well within the safe operating area specified for these transistors and consequently, they would not be expected to fail due to excessive thermal dissipation or secondary breakdown. The increase in current through the matrix relay coil windings may open circuit the windings if the fault is sustained for a long period of time.

In conclusion, none of the above stated effects would prevent normal tripping action of the PPS under fault conditions. The possible matrix relay coil failure would trip the circuit and is not detrimental to the normal operation of the PPS.

If you have any questions or comments concerning this information, please contact me.

Very truly yours,

K P Basha