

January 15, 2008

U. S. Nuclear Regulatory Commission
Attn: Document Control Desk
Washington, DC 20555-0001

Subject: **Docket Nos. 50-361 and 50-362
Response to Request for Additional Information on the Proposed
Amendment for Loss of Voltage Signal (LOVS) Relay Replacement,
Proposed Change Number (PCN) 577 (TAC Nos. MD5112 and MD5113)
San Onofre Nuclear Generating Station, Units 2 and 3**

Reference: March 30, 2007 letter from B. Katz (SCE) to Document Control Desk (NRC),
Subject: San Onofre Nuclear Generating Station Units 2 and 3, Docket Nos. 50-
361 and 50-362, Proposed Change Number (PCN)-577, LOVS Relay
Replacement

Dear Sir or Madam:

By letter dated March 30, 2007 Southern California Edison (SCE) submitted the referenced Proposed Change Number (PCN)-577, LOVS Relay Replacement. In a telephone conversation on January 7, 2008, NRC staff requested additional information regarding the submittal. The NRC staff question and the SCE response are contained in the enclosure.

This submittal contains no new regulatory commitments.

If you have any questions or require additional information, please contact Ms. Linda T. Conklin at (949) 368-9443.

Sincerely,



Enclosure

cc: E. E. Collins, Regional Administrator, NRC Region IV
N. Kalyanam, NRC Project Manager, San Onofre Units 2 and 3
C. C. Osterholtz, NRC Senior Resident Inspector, San Onofre Units 2 and 3

ENCLOSURE

NRC QUESTION

In the LAR dated March 30, 2007, the licensee stated the following on Page 1 of Enclosure 2: "The 115.5 V initial voltage (110% of the 105 V setpoint) to 57 V minimum voltage is selected based on the available manufacturer's relay curves which provided the specific time at 57 V when voltage is dropped from 115.5 V." The Technical Specification change request also states for the requested time delay "(voltage change from 115.5 V to 57.0 V)".

Staff reviewers could not confirm the above from the manufacturer's catalog for the BE1-27 relay. The curves provided for the relay provide the operating time in terms of voltage difference from the pickup setting (nominal 105.0 V) and the time dial.

SCE RESPONSE

Applicable inverse timing characteristic curves for the loss of voltage relay are shown in the manufacturer's enclosed Figure 3-2 using range 3. The horizontal scale of Figure 3-2 (range 3) shows voltage difference (0 to 48 volts) from the relay pickup setting. The manufacturer's catalog for the model BE1-27 relay describes that the inverse time curves were generated with pre-fault voltages at 10% higher than pickup for the model 27 relay curves (page 1-5, enclosed).

Figure 3-2 therefore shows that a relay with a voltage tap setting of 105 V will operate as follows:

- 1) When the system voltage drops from a pre-fault voltage of 115.5 V (110% of relay pickup voltage 105 V) to 105 V (0 V difference from the relay pickup setting), the relay will take more than 4 seconds to operate if the time dial is set at #7, or more than 10 seconds for time dial setting at #20.
- 2) When the system voltage drops from a pre-fault voltage of 115.5 V (110% of relay pickup voltage 105 V) to 57 V ($57\text{ V} = 105\text{ V} - 48\text{ V}$), the relay will operate within 0.4 seconds if time dial is set at #7 or more than 1.0 second for time dial setting at #20.

Figure 3-2 does not give relay operating times when the system voltage drops from 110% of the relay pickup setting to zero volts. The manufacturer does not provide relay operating times for this case because they do not have official test data.

Therefore, it was determined that the allowable time delay in the proposed Technical Specification (0.69 to 1.0 second, inclusive) should be measured when the voltage changes from 115.5 V (pre-fault voltage = 110% of LOV relay pickup setting) to 57 V (105 V - 48 V), which is the lowest voltage shown in the Figure 3-2.

Inverse Time	Inverse curve types are defined by the Style Chart and are represented by the curves shown in Section 3, <i>Functional Description</i> . Inverse time is adjustable from 01 to 99 in increments of 01. Incrementing the time dial varies the inverse curve along the Y axis. A setting of 00 designates instantaneous timing.
Inverse Time Accuracy	Within $\pm 5\%$ or 50 ms (whichever is greater) of the indicated time for any combination of time dial setting and pickup setting and is repeatable within $\pm 2\%$ or 50 ms (whichever is greater) for any combination of time dial and tap setting. <u>Curves were generated with prefault voltages at 10% greater than pickup for the 27 curves and 10% less than pickup for the 59 curves.</u> For prefault voltages that are greater in difference from the pickup setting, the timing accuracy is $\pm 10\%$ or 100 ms (whichever is greater).
UL Recognition	UL Recognized per Standard 508, UL File No. E97033. Note: Output contacts are not UL Recognized for voltages greater than 250 V.
Isolation	Meets IEC 255-5 and exceeds ANSI/IEEE C37.90 one minute dielectric test as follows: All Circuits to Ground: 2,828 Vdc (excludes communication ports). Communication Ports to Ground: 500 Vdc. Input Circuits to Output Circuits: 2,000 Vac or 2,828 Vdc.
Surge Withstand Capability: Oscillatory	Qualified to IEEE C37.90.1-1989 <i>Standard Surge Withstand Capability (SWC) Tests for Protective Relays and Relay Systems</i> (excluding communication ports).
Fast Transient	Qualified to IEEE C37.90.1-1989 <i>Standard Surge Withstand Capability (SWC) Tests for Protective Relays and Relay Systems</i> . (Excluding communication ports).
Electrostatic Discharge (ESD) CE Certified	Four kilovolts contact discharges and 8 kilovolts air discharges applied in accordance with Qualification EN61000-4-2.
Radio Frequency Interference	Qualified to IEEE C37.90.2-1995 <i>Standard for Withstand Capability Of Relay Systems to Radiated Electromagnetic Interference from Transceivers</i> .
Impulse Test	Qualified to IEC 255-5.
Shock	15 g in each of three mutually perpendicular axes.
Vibration	2 g in each of three mutually perpendicular axes swept over the range of 10 to 500 Hz for a total of six sweeps, 15 minutes each sweep.
Temperature: Operating Storage	-40° C (-40° F) to +70° C (+158° F) -65° C (-85° F) to +100° C (+212° F)
Weight	14 pounds maximum.
Case Size	All units supplied in an SI size case.



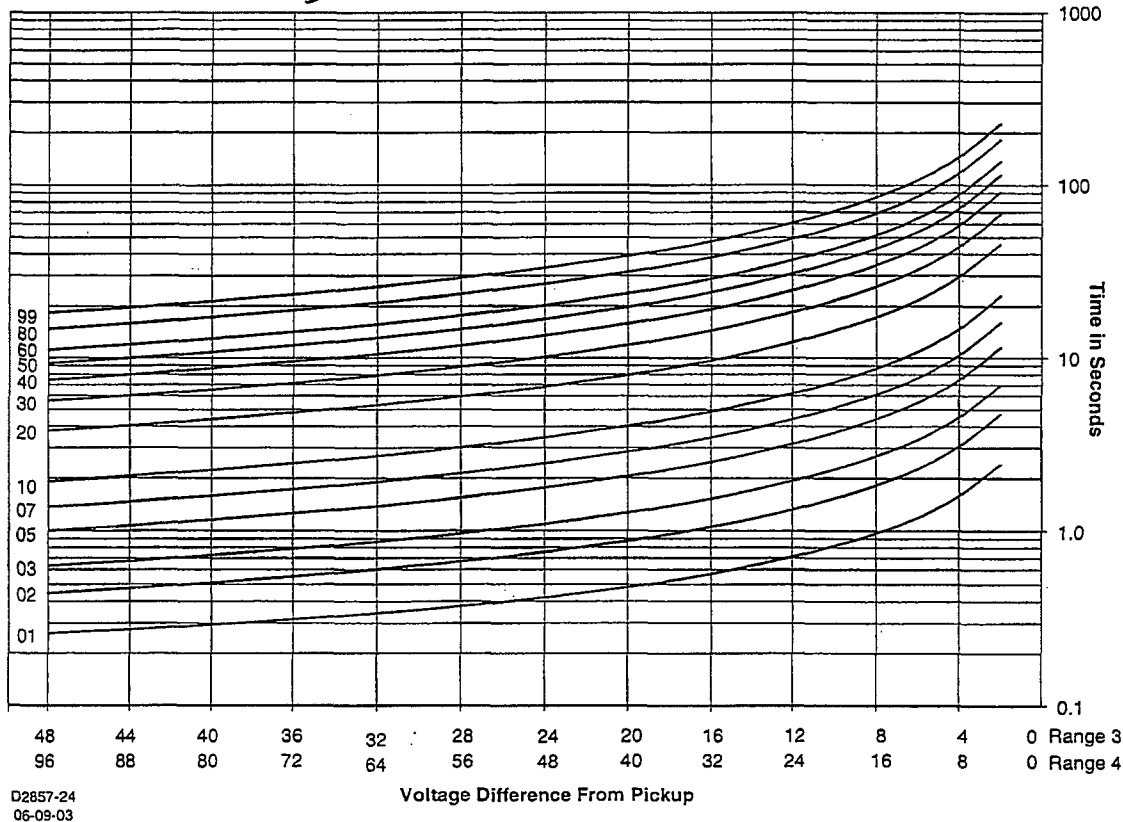
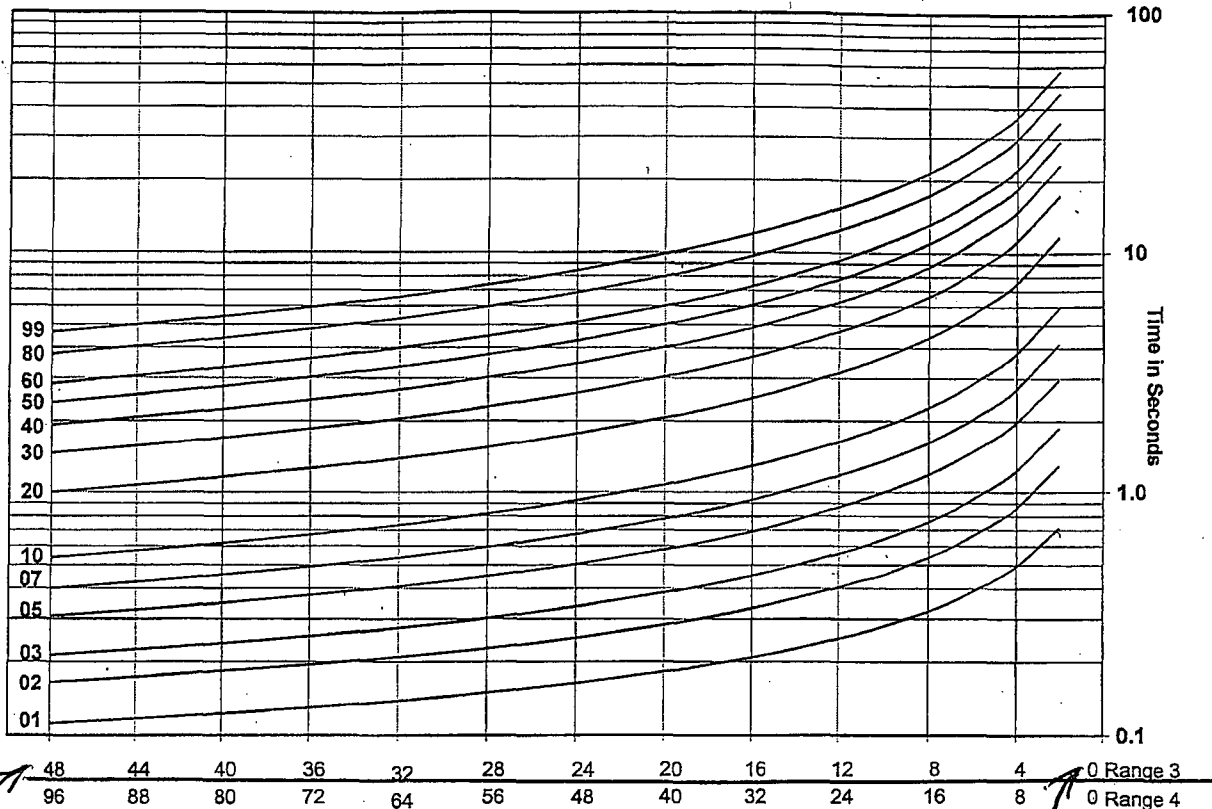


Figure 3-3. Undervoltage, Medium Inverse Timing Characteristic Curve