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March 1, 1979

3/1/79

Mr. John F. Stolz, Chief
Light Water Reactors Branch No. 1
Division of Project Management
U. S. Nuclear Regulatory Commission
Washington, D. C. 20555

Re: Docket No. 50-275-OL
Docket No. ~~50-323-OL~~
Diablo Canyon Units 1 & 2

Dear Mr. Stolz:

The attached material will be included in a future amendment to the Hosgri Seismic Evaluation Report. It is being transmitted to the Staff at this time to permit the continuation of the review of the seismic retesting of Class IE electrical equipment.

Five copies of this submittal have been sent directly to Mr. Dennis Allison.

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

Very truly yours,

Philip A. Crane, Jr.

Enclosures
CC w/enc.: Mr. Dennis Allison
Service List

Six molded case circuit breakers were further tested separately. The test requirements were defined in the "Seismic Test Procedure for Diablo Canyon 125 VDC Switchgear Distribution Panel, Molded Case Circuit Breakers, Addendum No. 1" dated December 20, 1978. The actual electrical test connections are shown in Figure 10-17D. Shunts were added to monitor the current flow thru the one set of circuit breakers rather than relying on the voltage drop across the ammeter and the current transformer in the 20A circuit breaker loop was omitted since the ammeter used could measure the current directly. An indicating light was added to demonstrate that 125 VDC voltage potential was present at all times during the test between the live parts of the molded case circuit breakers and their mounting base.

Two composite spectra were made up to be similar to the data on response plots pages 265-280 as referenced in the procedure. Machine limitations fell somewhat short of the desired spectra. For an added measure of assurance, a sine sweep was performed from 1 - 35 Hz at 3 g's input. The sweep was performed one axis at a time in the three axes.

No chatter was recorded or observed during the test runs neither on the closed and current carrying circuit breakers nor on the circuit breakers left open. The white potential indicating light remained lit during the test series indicating that no insulation breakdown had occurred. |77

The circuit breakers were tested for their overcurrent trip ranges upon return to the Diablo Canyon Site. They operated (tripped) within their acceptance time and current range.

10.3.5.2.6 Conclusions

A 125 VDC Distribution Panelboard (SD-21) from Diablo Canyon Unit 2 was tested by a multi-axis, multi-frequency seismic simulation described in Wyle Report No. 58255, April 19, 1978, pp. 255-280. This panelboard is identical to the other five 125 VDC Distribution Panelboards installed in

5. Run five OBE and two SSE tests (reduce pressure to actuate controller prior to one OBE and one SSE)

6. Rotate equipment 90 degrees on table and repeat steps 1 through 5.

7. Test equipment to verify proper operability prior to placing in service.

10.3.8.5 Test Results

No physical damage was observed as a result of the testing. Relays ICR, 3TR and the auxiliary contact of the main contactor demonstrated chatter during one SSE. As control power was available and no undesirable actuation occurred, the chatter presents no problem.

Functional testing has verified that the equipment is capable of starting the fire pump after the seismic test.

The Fire Pump Controller was further tested as described in the "Seismic Test Procedure for Diablo Canyon Fire Pump Controller" dated December 29, 1978. During this test the controller chattered, closed and sealed itself in. The chatter and seal-in occurred during the front to back orientation SSE runs. It is believed that a minor modification in the mounting of the controller to the test machine, making it more rigid than it was during the first testing, caused the closure of the controller. However, inadvertent closure of the controller and start of the Fire Pump does not have an adverse effect on the fire protection system. No chatter of the main contacts of the controller has been recorded once it had closed or during the test run with the contactor energized and closed intentionally. The front to back orientation is the direction in which the controller is most susceptible to chatter during seismic events. In the light of the inadvertant closure of the controller during seismic testing in this orientation it was decided not to test the controller any further in its side to side orientation. It should be noted that the

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In March 1976, PGandE's Department of Engineering Research, in situ tested one of the Instrument Power AC Panelboards, PY-22, (DER Report 7333,141-76), and determined that the panelboard (as a whole) and the panelback (as a component) have no natural frequency below 33 Hz, and that the mounting plate (above the breaker assembly) has a resonance frequency of 30 Hz. This mounting plate has been modified on all panelboards with horizontal centerline supports to the back panel per the recommendations in the above report. The circuit breaker assembly has no resonance below 33 Hz. Therefore, the circuit breakers would be subjected to the unamplified accelerations of the wall on which the panelboard is mounted. The wall mounting can resist up to 18g acceleration in any direction.

For the Hosgri 7.5M event, at the Instrument AC Power Panels, the floor accelerations are: 0.92g Horizontal and 0.56g Vertical. At a wall location 5 ft. above the floor at 115' Elevation these accelerations would be 1.00g and 0.6g respectively. In April 1975, Wyle Laboratories tested single pole and two-pole FPE type NE circuit breakers which are identical to those used in the Instrument AC Power Panels (Wyle Laboratory Report No. 53744-2). ZPA of these tests were (on the average) 2.8g horizontal and 1.5g vertical, applied simultaneously. The circuit breakers were monitored electrically during the Wyle tests and did not chatter or malfunction. Circuit breakers of essentially the same design were tested to a constant 3g's at all frequencies between 0 and 35 Hz, as described in section 10.3.5, with no malfunctions. For these reasons it can be concluded that the Instrument Power AC Panelboards are qualified for a postulated 7.5M Hosgri event in accordance with IEEE-Standard-344-1975 and USNRC R.G. 1.100. 177

10.3.12 INSTRUMENT PANELS PIA, PIB, AND PIC (B.O.P.)

These instrument panels house various devices used to power balance of plant transmitters and perform the necessary signal conditioning to provide alarm functions and send linear signals to indicators on the main control board. The parameters involved are CCW flows and heat exchanger P, and RWST level. These panels replace the original instrument rack, PGIR. Most of the components in them were originally in PGIR. The panels are mounted on reinforced concrete columns at about the 132 feet elevation, 131 feet west of the center of mass at this location.

10.3.23.5 Test Results

The ventilation control logic was undamaged by the seismic testing, as verified by functional testing after completion of the seismic shaking. The typical outputs monitored maintained the proper relationship to the logic input during and after the tests. Change of state of the output relays was not demonstrated during the test runs. However relays, using reed contacts of similar design have been operated successfully during seismic test runs. For instance, relays K632AX and K632BX of the Vital Load Center Auxiliary Relay Panels, paragraph 10.3.25A have been switched many times during seismic tests. It can be reasoned that low mass reed relay contacts will change state on command even under severe seismic conditions. 177

10.3.23.6 Conclusions

The Ventilation Control Logic cabinet from Diablo Canyon Unit 2 was tested by a multi-axis, multi-frequency seismic simulation described in Wyle Report No. 58255, pp. 182-197. This Ventilation Control Logic Cabinet is identical to that installed in Diablo Canyon Unit 1.

The test results in section 10.3.23.5 demonstrate that the test criteria specified in section 10.3.23.3 are met and thus that the equipment's safety function has been demonstrated during and after seismic testing to the RRS based on the postulated 7.5M Hosgri event.

It is therefore concluded that the Diablo Canyon Units 1 and 2 Ventilation Control Logic Cabinets are qualified for the postulated 7.5M Hosgri event in accordance with IEEE Standard 344-1975 and NRC RG 1.100.

10.3.25B.4 Test Procedure and Setup

1. Remove typical Fan Cooler Controller from plant.

2. Mount controller on test table in a manner simulating field mounting. See Figure 10-25C.

3. Connect 440 volts through circuit breaker and contactor to 440V-6V transformer. The secondary was connected to a strip chart recorder.

4. Run three OBE tests with the controllers deenergized (open).

5. Run two OBE tests with controllers energized (closed).

6. Run two SSE tests with low or high speed controller energized (closed).

7. Run one SSE test with controller deenergized (open).

8. Rotate equipment 90 degrees and repeat steps 2 through 7.

9. Verify equipment operability prior to placing in service.

10.3.25B.5 Test Results

The Fan Cooler Motor Controllers meet the criteria specified in section 10.3.25A.3. No unwanted operating was detected during the test. All breakers and contractors stayed closed as required.

The Fan Cooler Controllers, one each from Units 1 and 2, were further tested as described in "Seismic Test Procedure for Diablo Canyon Fan Cooler Motor Controller", dated January 4, 1979. The two controllers were mounted to individual steel frames to simulate their actual field mounting.

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The frames with the starters were fastened back to back onto a seismic test stand mounted rigidly to the test table. This arrangement permitted the simultaneous testing of both the Unit 1 and Unit 2 controllers. The controllers were subjected to four SSE test runs in the front-to-back orientation and five SSE test runs in the side-to-side orientation. The equipment changed state on command as required during the test runs. No chatter was observed on any of the energized contactors. The timings of the 42X-2G-1 low speed contactor auxiliary relays varied slightly, less than 5%, during the test runs from the timing obtained before and after the seismic test. The minor timing variation will not adversely affect the safety function of the low speed fan cooler controller operation. Chatter was observed on the deenergized high speed contactor 42-2G-1/HIGH, both with the low speed contactor energized and deenergized. Normally spurious chatter of a motor controller contactor will not adversely affect the connected motor as the contactor itself. However, in the case of the two speed fan cooler motors, spurious chatter of the high speed contactors, while the motors are running on low speed, may cause damage to the motors. For that reason mechanical interlocks need to be installed on the fan cooler motor controllers. Such interlocks would prevent the high speed contactors from closing when the motors are operated on low speed. Chatter was detected only on the Unit 2 controller which is mechanically different from the Unit 1 controller. However, for reasons of uniform operating features, interlocks will be installed on all Unit 1 and Unit 2 fan cooler motor controllers.

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Testing of the replacement contactor, required in the test procedure, was not performed. The supplier of the equipment documented that style changes made to the replacement contactor will not affect its performance under seismic conditions.

10.3.25.6 Conclusions

As a result of the seismic testing, mechanical interlocks will be installed on all fan cooler motor controllers at the Diablo Canyon Site. The interlocks must prevent the high speed contactors from inadvertent

closure while the fan cooler motors are operating on low speed. The interlocks must be designed such that additional seismic testing of the fan cooler motor controllers will not be necessary.

The testing has demonstrated that with the exception of the high speed contactor chatter, which will be prevented by the new interlocks, the equipment will perform its safety function during and after seismic events.

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It is therefore concluded that the Diablo Canyon Units 1 and 2 Fan Cooler Motor Controllers are qualified for the postulated 7.5M Hosgri event in accordance with IEEE Standard 344-1975 and USNRC R.G. 1.100.