



**UNITED STATES
NUCLEAR REGULATORY COMMISSION
REGION IV
611 RYAN PLAZA DRIVE, SUITE 400
ARLINGTON, TEXAS 76011-4005**

August 7, 2003

MEMORANDUM TO: Neil O'Keefe, Senior Reactor Engineer, Division Reactor Safety

FROM: Arthur T. Howell III, Director, Division of Reactor Projects **/RA/ by
Gail Good**

SUBJECT: CHARTER FOR THE SPECIAL INSPECTION TEAM AT THE DIABLO
CANYON POWER PLANT (DCPP)

In response to our initial evaluation of high failure rates of Unit 1 and 2 safety-related and backup battery chargers, during the period March 2002 through May 2003, a Special Inspection Team is being chartered. You are hereby designated as the Special Inspection Team leader.

A. Background

There are a total of three primary and two backup battery chargers for each unit. During a 15-month period, there were three battery charger failures on Unit 1 (two primary and a backup) and three failures (all primary) on Unit 2. DCPP has two safety trains spread over three 4160 V vital safety buses (F, G, and H). The safety-related 4160 V busses power the battery chargers through 4160/480 V step-down transformers that serve the smaller loads. The vital battery chargers are fed from the 480 V load distribution centers. These vital battery chargers supply 130 Vdc and 400 amperes to keep each of the three (F, G, and H) vital batteries charged and provide the normal power supply to the vital dc loads.

DCPP design has two installed backup battery chargers (nonsafety). Thus, a primary battery charger can be removed from service, but the batteries remain operable as long as the backup charger is in service. This lineup is permitted by TS 3.8.4 (dc sources) for 14 days.

The Unit 2 design is as follows (Unit 1 is similar):

- Bus F: Primary dedicated charger is Battery Charger 2-1
- Bus G: Primary dedicated charger is Battery Charger 2-2
- Bus H: Primary dedicated charger is Battery Charger 2-3-2
- Backup charger for Battery Charger 2-1 (F) is Battery Charger 2-2-1
- Backup charger for Battery Charger 2-2 (G) is also Battery Charger 2-2-1
- Backup charger for Battery Charger 2-3-2 (H) is Battery Charger 2-3-1

Surveillance Test Procedure STP M-12B, "Battery Charger Performance Test," verifies a charger's capability to deliver greater than 130 Vdc at 400 amperes for at least 4 hours.

STP M-12A, "Vital Station Battery Modified Performance Test," verifies that the station vital batteries can power the dc loads for 2.5 hours at 400 amperes when disconnected from the battery chargers.

B. Basis

On March 22, 2002, Primary Battery Charger 1-3-2 failed while in normal service. The licensee determined that the failure was due to an electrolytic capacitor failure. Subsequently, Primary Battery Charger 1-2 failed while recharging Battery 1-2, following completion of STP M-12A on May 7, and the following day Battery Charger 1-2-1 also failed while recharging Battery 1-2. The licensee determined that the battery charger failures were age-related failures of the electrolytic capacitors. The battery chargers were then placed in 10 CFR 50.65 a(1) of the maintenance rule. The maintenance rule panel determined that a common cause failure of Unit 1 battery chargers had occurred and that a prudent action would be to inspect/replace the electrolytic capacitors in the remaining battery chargers.

On February 19, 2003, during Refueling Outage 2RF11, Battery Charger 2-2 failed while recharging vital Battery 2-2 following completion of STP M-12A. Three days later Battery Charger 2-3-2 failed while recharging vital Battery 2-3 following completion of STP M-12A. On March 23 the Plant Safety Review Committee approved Unit 2 for restart and plant heatup to Mode 3 (Hot Standby). The following day Unit 2 entered Mode 2 and the outage ended with synchronization of the main generator to the grid. On May 22, 2003, the licensee attributed the Unit 2 battery charger failures to aged capacitors. On May 27 Battery Charger 2-1 failed a modified STP M-12B (1-hour load test). The licensee determined that the electrolytic capacitors failed.

The NRC staff considered both deterministic and safety significance criteria, established in NRC Management Directive 8.3, "NRC Incident Investigation Program," to determine whether a special inspection would be performed. In evaluating the battery charger failures for a special inspection, the NRC staff determined that three deterministic criteria were met. Specifically, the battery charger failures involved possible adverse generic implications, the failures were repetitive (common cause), and concerns were identified regarding the licensee's operational performance and the timeliness of corrective actions. In regard to the last item, the NRC staff noted that the licensee had delayed testing on Battery Charger 2-1 until after the completion of Refueling Outage (2R11).

In regard to safety significance, an NRC senior reactor analyst performed a safety assessment. The senior reactor analyst assessed an incremental conditional core damage probability on the order of $6E-6$ using the NRC's Standard Plant Analysis Risk (SPAR) model, Diablo Canyon, Revision 3QA, for the common cause failure of the three primary and two backup battery chargers. The senior reactor analyst and the licensee discussed the recovery action that should be considered in the safety

assessment. The senior reactor analyst determined that operator recovery actions would not be credited in the NRC's initial safety assessment based in part on the preliminary results from a simulator run where the licensee found that the loss of battery chargers was not readily recognized by the operators. The senior reactor analyst had telephone discussions with the licensee regarding their preliminary risk assessment and their assumptions used in modeling the battery charger failures. The analyst found that the licensee's and the NRC's initial safety assessments were generally within 1 order of magnitude of each other.

The NRC staff found that three of the special inspection deterministic criteria were met and that the safety significance was within the range of a special inspection and no additional inspection. Therefore, considering the deterministic criteria and the initial NRC safety assessment, Region IV has determined that a Special Inspection Team is appropriate and the team is being dispatched to gain a better understanding of the failures associated with the battery chargers and the licensee's common mode failure analysis as it relates to the root cause(s). The team will also determine the extent of the impact of the battery charger failures and the overall safety significance, and it will verify the licensee's actions leading up to and including the identification and resolution of the condition.

C. Scope

The team is expected to perform data gathering and fact-finding in order to address the following items:

1. Develop a complete sequence of events related to the subject battery chargers in the dc system and licensee actions taken in response to the failures.
2. Evaluate pertinent industry operating experience and potential precursors to the condition, including the effectiveness of any action taken in response to the operating experience.
3. Evaluate the adequacy of the licensee response to the battery charger failures (timeliness of evaluation, notifications, appropriate use of all relevant data, procedure usage, etc.).
4. Determine what evaluations were performed to assess operability of the battery chargers.
5. Review the licensee's root cause evaluation determination for independence, completeness, and accuracy, including the risk analysis of the event.
6. Review the licensee's justification for the established service life of the electrolytic capacitors in the battery chargers and other components.
7. Sample the licensee's preventive maintenance and aging management programs to independently assess the extent of condition in regard to other components.

8. Review the licensee's restart process from planned and forced outages to assess deferred work activities. Sample the status of work deferred from the last Units 1 and 2 forced and refueling outage activities. Determine whether operability reviews were needed.
9. Review and assess the licensee's corrective actions and ensure that they have adequately evaluated and addressed the extent of condition. Include recommendations from the licensee's Maintenance Rule Panel.
10. Verify adequacy of postmaintenance testing activities for the battery chargers.
11. Evaluate and determine the common-cause failure aspects.
12. Review the condition for generic implications.

C. Guidance

Inspection Procedure 93812, "Special Inspection," dated July 7, 2003, provides additional guidance to be used by the Special Inspection Team.

This memorandum designates you as the Special Inspection Team leader. Your duties will be as described in Inspection Procedure 93812. The team composition will consist of yourself and Mr. Terry Jackson, Resident Inspector, DCP. During performance of the Special Inspection, the designated team member is separated from normal duties and reports directly to you. The team is to emphasize fact-finding in its review of the circumstances surrounding the event, and it is not the responsibility of the team to examine the regulatory process. Safety concerns identified that are not directly related to the event should be reported to the Region IV office for appropriate action.

The Team will report to the site, conduct an entrance, and begin inspection on August 11, 2003. Tentatively, the inspection should be completed by the close of business on August 15, 2003. A formal exit will be scheduled following completion of the on-site inspection. A report documenting the results of the inspection will be issued within 30 days of the completion of the inspection. While the team is onsite, you will provide daily status briefings to Region IV management.

This Charter may be modified should the team develop significant new information that warrants review. Should you have any questions concerning this Charter, contact William B. Jones at (817) 860-8147.

cc via E-mail:

T. Gwynn
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S. Dembeck, NRR
G. Shukla, NRR

ADAMS: ☒ Yes ☐ No Initials: __gmg__
☒ Publicly Available ☐ Non-Publicly Available ☐ Sensitive ☒ Non-Sensitive

S:\DRP\DRPDIR\CHARTER\DC August 2003.wpd

RIV:C:DRP/E	AD:DRS	For concurrence	ARA	D:DRP
WBJones;df	ATGody	ATHowell III	TPGwynn	ATHowell III
/RA/	/RA/	GMGood for	/RA/	GMGood for
8/4/03	8/4/03	8/7/03	8/7/03	8/7/03

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