



*Southern California Edison Company*

SAN ONOFRE NUCLEAR GENERATING STATION

P. O. BOX 128

SAN CLEMENTE, CALIFORNIA 92674-0128

R. W. KRIEGER  
STATION MANAGER

TELEPHONE  
(714) 368-6255

March 29, 1993

U. S. Nuclear Regulatory Commission  
Document Control Desk  
Washington, D.C. 20555

Subject: Docket No. 50-361  
30-Day Report  
Licensee Event Report No. 93-002  
San Onofre Nuclear Generating Station, Unit 2

Pursuant to 10 CFR 50.73(d), this submittal provides the required 30-day written Licensee Event Report (LER) for a condition involving the Unit 2 125 VDC battery chargers. Neither the health nor the safety of plant personnel or the public was affected by this condition.

If you require any additional information, please so advise.

Sincerely,

Enclosure: LER No. 93-002

cc: J. B. Martin (Regional Administrator, USNRC Region V)  
C. W. Caldwell (USNRC Senior Resident Inspector, Units 1, 2 and 3)  
M. B. Fields, NRC Project Manager, San Onofre Units 2 & 3  
Institute of Nuclear Power Operations (INPO)

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## LICENSEE EVENT REPORT (LER)

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On February 25, 1993, with Unit 2 in Mode 1 at 100% power, following replacement of all the reactor balance circuit boards of Unit 2 125 VDC battery charger 2B001 it was discovered, during review of replacement part documents, that an August 14, 1989 10 CFR Part 21 report, "C&D Battery Chargers," might be applicable to the replacement parts and might affect the TS Surveillance 4.8.2.1.c.4 minimum required charger current. Three chargers, (2B001, 2B002, and 3B004) were identified to be potentially affected by the Part 21 report.

On February 25, 1993, at approximately 7:40 pm, charger 2B001 was tested and did not meet the TS Surveillance 4.8.2.1.c.4 required current limit. Since chargers 2B001 and 2B002 each might be affected, and charger 2B002 had not been tested, both were declared inoperable. (Charger 3B004, which had three circuit boards replaced, was also declared inoperable pending testing.) As 13.3.8.2 does not provide an action statement for the condition where more than one battery charger is inoperable, TS 3.0.3 was invoked. A temporary waiver of compliance was sought and verbally approved at 8:30 pm on February 25, 1993. The temporary waiver of compliance was exited at 9:43 pm on February 25, 1993, when battery charger 2B001 was restored to operable status.

The cause of this event has been attributed to an incorrect 10 CFR Part 21 evaluation.

The affected chargers were adjusted to above the Technical Specification required amperage of 300 amperes and all warehouse in-stock reactor balance circuit boards were quarantined. Planned corrective actions include: 1) post installation testing will be required when reactor balance circuit boards are installed, 2) revision of the original 10 CFR Part 21 evaluation, and 3) procedures will be enhanced appropriately based on the revised 10 CFR Part 21 review.

LICENSEE EVENT REPORT (LER) TEXT CONTINUATION

SAN ONOFRE NUCLEAR GENERATION STATION UNIT 2	DOCKET NUMBER 05000361	LER NUMBER 93-002-00	PAGE 2 of 5
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Plant: San Onofre Nuclear Generating Station  
Unit: Two  
Reactor Vendor: Combustion Engineering  
Event Date: 02-25-93

A. CONDITIONS AT TIME OF THE EVENT:

Mode 1, Power Operation

B. BACKGROUND INFORMATION:

1. Technical Specification (TS) Requirements:

TS 3.8.2, defines the operability requirements for the four Unit 2 125 VDC battery banks and their associated full capacity chargers. TS 3.8.2 requires, in part, "...with one of the required full capacity chargers inoperable, demonstrate the OPERABILITY of its associated battery bank by performing Surveillance Requirement 4.8.2.1.a.1 within one hour, and at least once per eight hours thereafter."

TS Surveillance Requirement 4.8.2.1.c.4 requires that, at least once per refueling interval, the battery charger be able to supply at least 300 amperes at 125 VDC for twelve hours in order to be considered operable.

TS 3.0.3 requires, in part, that when a limiting condition for operation is not met, except pursuant to associated ACTION requirements, a unit shutdown shall be initiated within one hour.

2. Class 1E 125 VDC System:

Units 2 and 3 each have four 125 VDC battery banks [BTRY] and four full capacity battery chargers [BYC] (numbered 2B001, 2B002, 2B003, 2B004 for Unit 2 and 3B001, 3B002, 3B003, 3B004 for Unit 3), one charger for each battery bank. Each charger includes six reactor balance circuit boards, one preload resistor, and one current limiting circuit board with an adjustable resistor for adjusting the charger current limit.

Each charger operates in parallel with a 125 VDC battery bank and maintains a float (slight) charge on a battery bank. In the event that power is lost to the charger, a battery bank maintains power to a 125 VDC distribution bus. Each distribution bus supplies power to a 125 VDC engineered safety features equipment distribution panel, a vital bus power supply inverter [INVT] and either an auxiliary relay [RLY] panel or a shutdown cooling suction isolation valve inverter.

The capacity of the battery charger is based on the largest combined demand of all the steady state loads and the charging current required to restore the battery from the design minimum charge state to 95% charge state within twelve hours. The batteries for channels A and B are sized for ninety minutes of operation without support of a battery charger. The batteries for channels C and D are sized for eight hours of operation without support of battery chargers.

C. DESCRIPTION OF THE EVENT:

1. Event:

On February 25, 1993, with Unit 2 in Mode 1 at 100% power, following replacement of all the reactor balance circuit boards of Unit 2 125 VDC battery charger 2B001, it was discovered, during review of replacement part documents, that an August 14, 1989 10 CFR Part 21 report, "C&D Battery

LICENSEE EVENT REPORT (LER) TEXT CONTINUATION

SAN ONOFRE NUCLEAR GENERATION STATION UNIT 2	DOCKET NUMBER 05000361	LER NUMBER 93-002-00	PAGE 3 of 5
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Chargers," might be applicable to the replacement parts and might affect the TS Surveillance 4.8.2.1.c.4 minimum required charger current. Three chargers, two at Unit 2 (2B001 and 2B002) and one at Unit 3 (3B004), were identified to be potentially affected by the Part 21 report.

Unit 2 chargers 2B001 and 2B002 had their six reactor balance circuit boards replaced on February 19, 1993 and December 15, 1992, respectively. On February 25, 1993, at approximately 7:40 pm, charger 2B001 was tested and did not meet the TS Surveillance 4.8.2.1.c.4 required current limit. Since chargers 2B001 and 2B002 each were potentially affected, and since charger 2B002 had not been tested, both were declared inoperable. (Charger 3B004 was also declared inoperable pending testing.) As TS 3.8.2 does not provide an action statement for the condition where more than one battery charger is inoperable, TS 3.0.3 was invoked. A temporary waiver of compliance was sought and verbally approved at 8:30 pm on February 25, 1993 to prevent an unnecessary plant shutdown for this condition. The temporary waiver of compliance was exited at 9:43 pm on February 25, 1993, when battery charger 2B001 was restored to operable status.

Unit 3 charger 3B004, which had three circuit boards replaced on October 29, 1992, tested satisfactory on February 26, 1993.

2. Inoperable Structures, Systems or Components that Contributed to the Event:  
None.

3. Sequence of Events:

DATE	TIME	ACTION
2/25/93	1940	Unit 2 125 VDC battery chargers 2B001 and 2B002 determined to be inoperable and TS 3.0.3 invoked. (Unit 3 charger 3B004 was also declared inoperable pending testing.)
	2030	Temporary waiver of compliance granted for a period of four hours.
	2143	TS 3.0.3 exited with restoration of Unit 2 125 VDC battery charger 2B001.

4. Method of Discovery:

The inoperability of Unit 2 125 VDC chargers 2B001 and 2B002 was discovered during a review of documents following replacement of the reactor balance circuit boards on battery charger 2B001.

5. Personnel Actions and Analysis of Actions:

Not applicable.

6. Safety System Responses:

Not applicable.

D. CAUSE OF THE EVENT:

Immediate Cause:

A 10 CFR Part 21 report, "C&D Battery Chargers," was issued by C&I Power Systems on August 14, 1989. The report addressed the potential inability of the Charter Power Systems model ARR battery chargers to meet the required current output of 105 to 115% of the charger rating, known as the current limit setting, when

LICENSEE EVENT REPORT (LER) TEXT CONTINUATION

SAN ONOFRE NUCLEAR GENERATION STATION	DOCKET NUMBER	LER NUMBER	PAGE
UNIT 2	05000361	93-002-00	4 of 5

replacement reactor balance circuit boards were installed in some equipment manufactured prior to 1982. Specifically, the problem is a reduced charger output current to approximately 80 to 90% of full charger rating.

The 10 CFR Part 21 report also noted that the affected replacement circuit boards are accompanied by an instruction tag which informs the user that the charger must be adjusted upon installation of the replacement component. If the problem exists it will be detected upon adjustment or during periodic testing of the charger full load function. With regard to corrective action, the report states that permanent corrective action involves replacement of the charger 600 ohm fixed preload resistor with a 500 ohm adjustable preload resistor.

SCE's evaluation of the 10 CFR Part 21 report was completed on September 27, 1989. The evaluation included a review of: 1) where the affected chargers were installed at SONGS, 2) testing history of the affected chargers, 3) an inspection of the preload resistors in the affected chargers, and 4) telephone discussions with the charger vendor. The evaluation found that, as revealed by refueling surveillance tests, the 1E battery chargers installed at SONGS had operated per design, with no charger output current degradation. The charger preload resistor inspection revealed that 500 ohm fixed resistors were installed in the affected chargers. Based on verbal assurances from the charger vendor, who was informed that our chargers had 500 ohm preload resistors, the chargers were deemed unaffected by the 10 CFR Part 21 report, and no corrective action was taken.

Since the SCE evaluation report did not require adjustment of the charger current limit following circuit board replacement, the immediate cause of this event has been attributed to an incorrect 10 CFR Part 21 evaluation.

Root Cause:

The root cause of this event was failure by the engineer (Utility, Non-Licensed) who evaluated the 10 CFR Part 21 report to meet management expectations, in that he relied on informal, undocumented, telephone conversations with the charger vendor to determine whether our chargers were affected rather than fully addressing issues identified in the Part 21 report.

E. CORRECTIVE ACTIONS:

1. Corrective Actions Taken:

- a. The affected chargers were adjusted to above the Technical Specification required amperage of 300 amperes.
- b. All warehouse in-stock reactor balance circuit boards have been quarantined.

2. Planned Corrective Actions:

- a. A Post Installation Test to reset the current limit every time a replacement circuit board is installed will be required prior to use of the quarantined circuit boards.
- b. The original 10 CFR Part 21 evaluation for the 125 VDC charger reactor balance circuit boards will be revised. Additional corrective actions and procedure enhancements identified by this review will be implemented as appropriate.

F. SAFETY SIGNIFICANCE OF THE EVENT:

The TS surveillance 4.8.2.1.c.4 requirement for the battery chargers is to demonstrate, on a refueling outage interval, the ability to provide 300 amperes at 125 VDC for at least 12 hours. A review of the design basis calculation has shown

LICENSEE EVENT REPORT (LER) TEXT CONTINUATION

SAN ONOFRE NUCLEAR GENERATION STATION	DOCKET NUMBER	LER NUMBER	PAGE
UNIT 2	05000361	93-002-00	5 of 5

that a charger amperage of only 200 amperes is required in order for the chargers to meet their intended safety function. The testing performed on February 25, 1993 found the charging capacity with the configuration as it existed well in excess of 200 amperes. Therefore, there was no safety significance associated with this event.

G. ADDITIONAL INFORMATION:

1. Component Failure Information:  
Not applicable.
2. Previous LERs for Similar Events:  
None.