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 AUTH. NAME AUTHOR AFFILIATION
 MORGAN, H. E. Southern California Edison Co.
 RECIP. NAME RECIPIENT AFFILIATION

SUBJECT: LER 89-005-00: on 890502, Tech Spec action requirement exceeded due to core operating limit SSBC.

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Southern California Edison Company

SAN ONOFRE NUCLEAR GENERATING STATION

P. O. BOX 128

SAN CLEMENTE, CALIFORNIA 92672

H. E. MORGAN
STATION MANAGER

TELEPHONE
(714) 368-6241

June 1, 1989

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

Subject: Docket No. 50-362
30-Day Report
Licensee Event Report No. 89-005
San Onofre Nuclear Generating Station, Unit 3

Pursuant to 10 CFR 50.73(d), this submittal provides the required 30-day written Licensee Event Report (LER) for an occurrence involving the Core Operating Limit Supervisory System. This occurrence had no effect on the health and safety of either plant personnel or the public.

If you require any additional information, please so advise.

Sincerely,

Enclosure: LER No. 89-005

cc: F. R. Huey (USNRC Senior Resident Inspector, Units 1, 2 and 3)

J. B. Martin (Regional Administrator, USNRC Region V)

Institute of Nuclear Power Operations (INPO)

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LICENSEE EVENT REPORT (LER)

Facility Name (1)						Docket Number (2)				Page (3)		
SAN ONOFRE NUCLEAR GENERATING STATION, UNIT 3						0 5 0 0 0 2 0 0				1 of 0 6		
Title (4)												

TECHNICAL SPECIFICATION ACTION REQUIREMENT EXCEEDED DUE TO CORE OPERATING LIMIT SUPERVISORY SYSTEM BACKUP COMPUTER FAILURE

EVENT DATE (5)			LER NUMBER (6)				REPORT DATE (7)			OTHER FACILITIES INVOLVED (8)																									
Month	Day	Year	Year	Sequential Number	Revision Number	Month	Day	Year	Facility Names	Docket Number(s)																									
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OPERATING MODE (9)		THIS REPORT IS SUBMITTED PURSUANT TO THE REQUIREMENTS OF 10CFR (Check one or more of the following) (11)																																	
POWER LEVEL (10)		<table border="0"> <tr> <td><input type="checkbox"/> 20.402(b)</td> <td><input type="checkbox"/> 20.405(c)</td> <td><input type="checkbox"/> 50.73(a)(2)(iv)</td> <td><input type="checkbox"/> 73.71(b)</td> </tr> <tr> <td><input type="checkbox"/> 20.405(a)(1)(i)</td> <td><input type="checkbox"/> 50.36(c)(1)</td> <td><input type="checkbox"/> 50.73(a)(2)(v)</td> <td><input type="checkbox"/> 73.71(c)</td> </tr> <tr> <td><input type="checkbox"/> 20.405(a)(1)(ii)</td> <td><input type="checkbox"/> 50.36(c)(2)</td> <td><input type="checkbox"/> 50.73(a)(2)(vii)</td> <td><input type="checkbox"/> Other (Specify in Abstract below and in text)</td> </tr> <tr> <td><input type="checkbox"/> 20.405(a)(1)(iii)</td> <td><input checked="" type="checkbox"/> 50.73(a)(2)(i)</td> <td><input type="checkbox"/> 50.73(a)(2)(viii)(A)</td> <td></td> </tr> <tr> <td><input type="checkbox"/> 20.405(a)(1)(iv)</td> <td><input type="checkbox"/> 50.73(a)(2)(ii)</td> <td><input type="checkbox"/> 50.73(a)(2)(viii)(B)</td> <td></td> </tr> <tr> <td><input type="checkbox"/> 20.405(a)(1)(v)</td> <td><input type="checkbox"/> 50.73(a)(2)(iii)</td> <td><input type="checkbox"/> 50.73(a)(2)(x)</td> <td></td> </tr> </table>										<input type="checkbox"/> 20.402(b)	<input type="checkbox"/> 20.405(c)	<input type="checkbox"/> 50.73(a)(2)(iv)	<input type="checkbox"/> 73.71(b)	<input type="checkbox"/> 20.405(a)(1)(i)	<input type="checkbox"/> 50.36(c)(1)	<input type="checkbox"/> 50.73(a)(2)(v)	<input type="checkbox"/> 73.71(c)	<input type="checkbox"/> 20.405(a)(1)(ii)	<input type="checkbox"/> 50.36(c)(2)	<input type="checkbox"/> 50.73(a)(2)(vii)	<input type="checkbox"/> Other (Specify in Abstract below and in text)	<input type="checkbox"/> 20.405(a)(1)(iii)	<input checked="" type="checkbox"/> 50.73(a)(2)(i)	<input type="checkbox"/> 50.73(a)(2)(viii)(A)		<input type="checkbox"/> 20.405(a)(1)(iv)	<input type="checkbox"/> 50.73(a)(2)(ii)	<input type="checkbox"/> 50.73(a)(2)(viii)(B)		<input type="checkbox"/> 20.405(a)(1)(v)	<input type="checkbox"/> 50.73(a)(2)(iii)	<input type="checkbox"/> 50.73(a)(2)(x)	
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LICENSEE CONTACT FOR THIS LER (12)

Name	TELEPHONE NUMBER
H. E. Morgan, Station Manager	AREA CODE: 7 1 4 3 6 8 - 6 2 4 1

COMPLETE ONE LINE FOR EACH COMPONENT FAILURE DESCRIBED IN THIS REPORT (13)

CAUSE	SYSTEM	COMPONENT	MANUFAC-TURER	REPORTABLE TO NPRDS	CAUSE	SYSTEM	COMPONENT	MANUFAC-TURER	REPORTABLE TO NPRDS

SUPPLEMENTAL REPORT EXPECTED (14)

<input type="checkbox"/> Yes (If yes, complete EXPECTED SUBMISSION DATE)	<input checked="" type="checkbox"/> NO	Expected Submission Date (15)	Month	Day	Year

ABSTRACT (Limit to 1400 spaces, i.e., approximately fifteen single-space typewritten lines) (16)

At 1220 on May 2, 1989, while maintaining operation at 100% power, with Core Operating Limit Supervisory System (COLSS) having been removed from service for quarterly preventive maintenance, it was discovered that COLSS Backup Computer System (CBCS) had failed at 1115. The control room indications provided by CBCS were not updating, and had remained at the values which existed at 1115. In addition, no alarms had been received to alert the operators of this condition.

With both COLSS and CBCS inoperable, the plant was operating with a Departure from Nucleate Boiling Ratio (DNBR) below that allowed by the more restrictive Core Protection Calculator (CPC) calculated DNBR limitations of Technical Specification (TS) 3.2.4. Therefore, the requirement of TS 3.2.4 to initiate action within 15 minutes to return DNBR to within limits within 1 hour was exceeded since this condition existed for approximately 65 minutes prior to discovery.

At 1230, CBCS was returned to service, thereby permitting the application of the less restrictive COLSS DNBR limits.

Investigation determined that CBCS had failed as the result of a memory error due to an indeterminate cause. The computer failure was not detected due to the absence of a CBCS failure alarm. Design changes have been implemented for both Units 2 and 3 to provide a control room alarm upon CBCS failure.

LICENSEE EVENT REPORT (LER) TEXT CONTINUATION

SAN ONOFRE NUCLEAR GENERATION STATION UNIT 3	DOCKET NUMBER 05000362	LER NUMBER 89-005-00	PAGE 2 OF 6
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Plant: San Onofre Nuclear Generating Station
Unit: Three
Reactor Vendor: Combustion Engineering
Event Date: 05-02-89
Time: 1220

A. CONDITIONS AT TIME OF THE EVENT:

Mode: 1, Power Operation

B. BACKGROUND INFORMATION:

1. The Core Operating Limit Supervisory System (COLSS) [ID] is a computer system which is utilized by control room operators (utility, licensed) to maintain reactor power, Departure from Nucleate Boiling Ratio (DNBR), and other plant parameters within limits. COLSS receives inputs from various plant sensors including core inlet and outlet temperature, incore nuclear instrumentation [IG] signals, reactor coolant pump (RCP) [P] speeds, RCP differential pressures, and reactor coolant system [AB] pressure. COLSS uses these inputs to perform a more accurate calculation of DNBR margin than the Core Protection Calculators (CPCs) [JC], which provide the reactor protection function for low DNBR. As a result, some of the input error that is assumed in the calculations performed by the CPCs can be diminished, allowing the plant to be operated with a DNBR that is less restrictive (i.e., at a lower value) than would be allowed if only the CPCs were available (i.e., if COLSS were out of service). COLSS does not initiate any safety-related function during anticipated operational occurrences or accidents and thus is not safety related.
2. Technical Specification (TS) 3.2.4 establishes the minimum DNBR limits during power operation; more restrictive CPC calculated DNBR limits are imposed when COLSS is out of service. With COLSS out of service, action must be initiated within 15 minutes to satisfy these more restrictive limits within 1 hour or be in Hot Standby within the next 6 hours. DNBR can be restored to within limits by a reduction in power.
3. The availability of COLSS parameters is required for full power operation. In 1985, a COLSS backup computer system (CBCS) [ID] was installed to increase the availability of these parameters, thereby allowing full power operation when COLSS is out of service.

LICENSEE EVENT REPORT (LER) TEXT CONTINUATION

SAN ONOFRE NUCLEAR GENERATION STATION
UNIT 3

DOCKET NUMBER
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C. DESCRIPTION OF THE EVENT:

1. Event:

At 1220 on May 2, 1989, while maintaining operation at 100% power, with COLSS having been removed from service for quarterly preventive maintenance, it was discovered that CBCS had failed at 1115. The control room indications provided by CBCS were not updating, and had remained at the values which existed at 1115. In addition, no alarms had been received to alert the operators of this condition.

With both COLSS and CBCS inoperable, the plant was operating with a DNBR below that allowed by the more restrictive CPC calculated DNBR limitations of TS 3.2.4. Therefore, the requirement of TS 3.2.4 to initiate action within 15 minutes to return DNBR to within limits within 1 hour was exceeded since this condition existed for approximately 65 minutes prior to discovery.

At 1230, CBCS was returned to service, thereby permitting the application of the less restrictive COLSS DNBR limits.

2. Inoperable Structures, Systems or Components that Contributed to the Event:

COLSS was removed from service for quarterly preventive maintenance. While COLSS was out of service, operators were relying on CBCS indications in the control room to maintain the plant above the CPC calculated DNBR limits.

3. Sequence of Events:

<u>TIME</u>	<u>ACTION</u>
0855	COLSS removed from service for quarterly preventive maintenance. CBCS providing control room indication.
1115	CBCS failed. Control room indications provided by CBCS ceased updating.
1220	Computer operator discovered that CBCS had failed. Informed control room, and initiated action to return CBCS to service.
1230	CBCS returned to service.

4. Method of Discovery:

During a periodic review of computer status, the computer operator (utility, non-licensed) discovered that CBCS had failed.

LICENSEE EVENT REPORT (LER) TEXT CONTINUATION

SAN ONOFRE NUCLEAR GENERATION STATION UNIT 3	DOCKET NUMBER 05000362	LER NUMBER 89-005-00	PAGE 4 OF 6
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5. Personnel Actions and Analysis of Actions:

The computer technician properly responded to this event by immediately taking action to return CBCS to service. Since CBCS was returned to service 10 minutes after the failure was identified, a power reduction was not initiated.

6. Safety System Responses:

Not applicable.

D. CAUSE OF THE EVENT:

1. Immediate Cause:

The CBCS failed without being observed.

2. Intermediate Cause:

The cause of CBCS failure was determined to be a computer memory error. When the computer's internal self-checking program finds this type of error, processing is automatically halted.

The cause of the failure could not be determined. The power supplies were determined to be satisfactory. Diagnostic testing of the hardware determined that the computer was operating correctly. After the main computer circuit boards were removed and resealed, hardware diagnostics were re-run; no problems were identified.

Since the corrective actions discussed below are expected to prevent recurrence of this event, no further investigation into the cause is planned.

3. Root Cause:

CBCS was installed to increase the availability of parameters normally provided by COLSS, thereby allowing full power operation when COLSS is out of service. Although the original design of CBCS included a provision for control room alarms if any of the parameters exceeds its limit, it did not include alarm provisions for the type of CBCS processing failure described above. As a result, the CBCS failure was not detected.

LICENSEE EVENT REPORT (LER) TEXT CONTINUATION

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4. Contributing Cause:

Prior to this event, it had been recognized that CBCS could fail without a resultant alarm to alert control room operators. As a result, initial design work had been initiated to provide a CBCS failure alarm in the control room. The absence of an alarm in the control room for this type of CBCS failure was not recognized as a condition requiring increased operator surveillance of CBCS status until this event occurred for the following reasons: 1) this type of failure is relatively infrequent, and 2) reliance upon CBCS for compliance with TS 3.2.4 is also relatively infrequent.

In addition, an administrative program for the identification of problems of this type was not effectively utilized. The Site Problem Report (SPR) process, which is a program for formally identifying problems or plant betterment items involving systems or equipment that do not fall within the Quality Assurance program (i.e., equipment that is not safety-related), was not utilized. Had an SPR for this item been generated, it would have been brought to the formal attention of supervisory personnel, and identification of the need for interim compensatory action may have been recognized and implemented. In this case, however, since cognizant personnel recognized the deficiency and initiated corrective action (i.e., a design change), it was not apparent that an SPR was, in fact, necessary. As described below in Corrective Action, enhancement to this process is being considered to better capture this type of observation.

E. CORRECTIVE ACTIONS:

1. Corrective Actions Taken:

Design changes have been implemented for both Units 2 and 3 to provide a control room alarm upon CBCS failure. Until these design changes were implemented, the computer operators had been directed to monitor CBCS every 10 minutes whenever it was being relied upon to provide information normally provided by COLSS.

2. Planned Corrective Actions:

The SPR procedure will be reviewed and revised as necessary to better assure formal documentation of deficiencies such as those described in this report. Particular emphasis will be placed on improving the recognition of situations for which interim corrective actions may be appropriate.

LICENSEE EVENT REPORT (LER) TEXT CONTINUATION

SAN ONOFRE NUCLEAR GENERATION STATION
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F. SAFETY SIGNIFICANCE OF THE EVENT:

There is no safety significance to this event since COLSS parameters remained constant and within the less restrictive, COLSS in-service limits during the time CBCS was halted.

G. ADDITIONAL INFORMATION:

1. Component Failure Information:

Not applicable

2. Previous LERs for Similar Events:

None

3. Results of NPRDS Search:

Not applicable