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February 25, 1994

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

Subject: Docket Nos. 50-361 and 50-362
30-Day Report
Licensee Event Report No. 93-012
San Onofre Nuclear Generating Station, Units 2 and 3

Pursuant to 10 CFR 50.73(d), this submittal provides the required 30-day written Licensee Event Report (LER) for a condition involving the Motor Control Center control circuit voltages in Units 2 and 3. Since this occurrence involves similar systems, cause, and corrective actions applicable to Units 2 and 3, a single report for Unit 2 is being submitted in accordance with NUREG-1022. 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. 93-012

cc: K. E. Perkins, Jr., Acting Regional Administrator, NRC
Region V
J. A. Sloan (USNRC Senior Resident Inspector, Units 1,2 & 3)
M. B. Fields, NRC Project Manager, San Onofre Units 2 & 3
Institute of Nuclear Power Operations (INPO)

IE22

LICENSEE EVENT REPORT (LER)

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

Title (4)

MOTOR CONTROL CENTER CONTROL CIRCUIT VOLTAGES

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)
				---		---				UNIT 3	0 5 0 0 0 3 6 2
0 1	2 6	9 4	9 4		0 1 1 2	0 0	0 2	2 5	9 4		0 5 0 0 0

OPERATING MODE (9)		THIS REPORT IS SUBMITTED PURSUANT TO THE REQUIREMENTS OF 10CFR (Check one or more of the following) (11)			
	1	___ 20.402(b)	___ 20.405(c)	___ 50.73(a)(2)(iv)	___ 73.71(b)
POWER LEVEL (10)	0 9 8	___ 20.405(a)(1)(i)	___ 50.36(c)(1)	___ 50.73(a)(2)(v)	___ 73.71(c)
		___ 20.405(a)(1)(ii)	___ 50.36(c)(2)	___ 50.73(a)(2)(vii)	___ Other (Specify in Abstract below and in text)
		___ 20.405(a)(1)(iii)	X 50.73(a)(2)(i)	___ 50.73(a)(2)(viii)(A)	
		___ 20.405(a)(1)(iv)	___ 50.73(a)(2)(ii)	___ 50.73(a)(2)(viii)(B)	
		___ 20.405(a)(1)(v)	___ 50.73(a)(2)(iii)	___ 50.73(a)(2)(x)	

LICENSEE CONTACT FOR THIS LER (12)

Name	TELEPHONE NUMBER
	AREA CODE
R. W. Krieger, Vice President, Nuclear Generation	7 1 4 3 6 8 - 6 2 5 5

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)		Expected Submission Date (15)	Month	Day	Year
___	___				
Yes (If yes, complete EXPECTED SUBMISSION DATE)	X NO		0 2	2 5	9 4

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

During a 1989 NRC Safety System Functional Inspection (SSFI) of the electrical systems at San Onofre Units 2 and 3, the NRC noted inadequacies in electrical distribution system design calculations. In response to this NRC observation, Edison committed, by letter dated April 24, 1990, to prepare new, formal electrical distribution system design calculations. Because the 120 VAC Motor Control Center (MCC) control circuit voltage calculations are dependent on the other calculations, they were the last of the electrical distribution calculations to be prepared.

In November 1993, during preparation of the MCC control circuit voltage calculations, Edison identified several circuits where the available voltage may not have been adequate to ensure automatic component actuation under worst case post-accident loading concurrent with minimum switchyard voltage conditions. On January 26, 1994, Edison conservatively concluded that, the alternate power source for the MCC control circuits for 2HV9303, the Containment Emergency Sump Train A outlet valve, and 3HV4713, the discharge control valve for Train A Auxiliary Feedwater pump may not always provide sufficient voltage to ensure automatic component actuation.

Technical Specification 3.8.1.1, "A.C. Sources," requires two physically independent circuits between the offsite network [FK] and the onsite Class 1E distribution system. Because 2HV9303 and 3HV4713 may not have operated with the alternate power source, Edison is conservatively reporting this condition in accordance with 10CFR50.73(a)(2)(i).

LER 2-93-012, "Motor Control Center (MCC) Control Circuit Voltage"

Plant: San Onofre Nuclear Generating Station, Units 2 and 3
Reactor Vendor: Combustion Engineering
Event Date: January 26, 1994
Event Time: 1237
Mode: Unit 2: Mode 1 at 98% power
Unit 3: Mode 1 at 97% power

Description of the Event:

During a 1989 NRC Safety System Functional Inspection (SSFI) of the electrical systems at San Onofre Units 2 and 3, the NRC noted inadequacies in electrical distribution system [EB] [ED] design calculations. At the time of the inspection, formal, auditable calculations for the electrical distribution system were not available. In response to this NRC observation, Edison committed, by letter dated April 24, 1990, to prepare new, formal electrical distribution system design calculations. Because the 120 VAC Motor Control Center (MCC) [ED] control circuit voltage calculations are dependent on the other calculations, they were the last of the electrical distribution calculations to be prepared.

In November 1993, during preparation of the MCC control circuit voltage calculations, Edison identified several circuits where the available voltage may not have been adequate to ensure automatic component actuation under worst case post-accident loading concurrent with minimum switchyard [FK] voltage conditions. Edison immediately upgraded the MCC control circuits of concern by replacing circuit potential transformers [XPT] with larger transformers. The larger transformers have a lower internal impedance which increases the voltage available to the individual components to greater than the minimum required voltage.

During the circuit upgrades, Edison tested the circuits to determine the minimum MCC control circuit voltages under which each component would automatically actuate. Although the margin between the minimum required voltage and the actual voltages available was less than would be designed today, they were sufficient to ensure automatic component actuation when the MCC control circuits are powered by the normal A.C. power source under worst case post-accident loading conditions concurrent with minimum switchyard voltage conditions.

During our continuing review of this issue, Edison evaluated various configurations of electric power sources for the MCC control circuits. Specifically, during power operation, the Unit 2 normal source of A.C. power is the Unit 2 reserve auxiliary transformer [XFMR]; the alternate source of A.C. power is provided by a cross-tie to the Unit 3 Class 1E distribution system [EB]. When maintenance is being performed on the Unit 3 reserve auxiliary transformer, the Unit 3 Class 1E distribution system is powered through the Unit 3 unit auxiliary transformer [EL]. In this configuration, Unit 3 is said to be "backfeeding." Due to the specific electrical lineup, the voltages provided while backfeeding are slightly lower than when power is supplied by the reserve auxiliary transformer. (Note that this description applies to both Units).

In evaluating the "backfeeding" configuration, Edison re-reviewed test data collected during the circuit upgrades and compared the minimum acceptable voltages with the calculated minimum backfeeding voltages. Based on this comparison, on January 26, 1994, Edison conservatively concluded that during backfeeding periods concurrent with a high load on the grid [FK], the alternate power source for the MCC control circuits for 2HV9303, the Containment Emergency Sump Train A outlet valve [BE] [BQ], and 3HV4713, the discharge control valve for Train A auxiliary feedwater (AFW) pump [BA] may not provide sufficient voltage to ensure automatic component actuation.

Edison reviewed historical records and confirmed that between May 14, 1990 and June 20, 1990 (and likely at other times during previous outages), Unit 3 was backfeeding with a high load on the grid. Similarly, Edison also noted that Unit 2 was backfeeding with a high load on the grid between June 9, 1993 and June 16, 1993 (and likely at other times during previous outages).

Technical Specification 3.8.1.1, "A.C. Sources," requires two physically independent circuits between the offsite network and the onsite Class 1E distribution system. Because 2HV9303 and 3HV4713 may not have operated with the alternate power source, Edison is conservatively reporting this condition in accordance with 10CFR50.73(a)(2)(i).

Cause of the Event:

The Architect/Engineer for San Onofre Units 2 and 3 used incorrect engineering judgement and made nonconservative assumptions in the original electrical distribution system design calculations. Because of the passage of time it is not possible to determine why the nonconservative assumptions were used in the original calculations.

Corrective Actions:

On November 24, 1993, Edison upgraded the MCC control circuit for 2HV9303 by replacing the circuit potential transformer with a larger transformer. On November 25, 1993, Edison upgraded the MCC control circuit for 3HV4713 by replacing the circuit potential transformer with a larger transformer.

Safety Significance:

Valve 2HV9303 is the Containment Emergency Sump Train A outlet valve to the Safety Injection System suction header, and automatically opens on initiation of a Recirculation Actuation Signal (RAS) [JE]. If the Unit 2 reserve auxiliary transformer had failed during periods when Unit 3 was backfeeding, MCC control circuits for 2HV9303 would have been realigned to the alternate power source. If this occurred concurrent with a high load on the grid, the voltage available to the control circuit of 2HV9303 may not have been sufficient to ensure valve operation, and the valve may not have automatically opened on a RAS. However, based on a best estimate probabilistic risk assessment (PRA), Edison concluded this condition for 2HV9303 contributed less than 3E-7 to the core damage probability for any year in which the condition occurred.

Valve 3HV4713 is the discharge control valve for Train A AFW, and automatically opens on initiation of an Emergency Feedwater Actuation Signal (EFAS) [JE]. If the Unit 3 reserve auxiliary transformer had failed during periods when Unit 2 was backfeeding, MCC control circuits for 3HV4713 would have been realigned to the alternate power source. If this occurred concurrent with a high load on the grid, the voltage available to the control circuit of 3HV4713 may not have been sufficient to ensure valve operation, and the valve may not have opened on an EFAS. However, based on a best estimate probabilistic risk assessment (PRA), Edison concluded this condition for 3HV4713 contributed less than 1E-9 to the core damage probability for any year in which the condition occurred.

Therefore, there was minimal safety significance for this condition.

Additional Information:

A review of previous LERs did not reveal any similar events.