REGULATORY INFORMATION DISTRIBUTION SYSTEM (RIDS)

ACCESSION NBR: 8710060562 DOC. DATE: 87/09/30 NOTARIZED: NO DOCKET #
FACIL: 50-361 San Onofre Nuclear Station, Unit 2, Southern Californ 05000361
AUTH. NAME AUTHOR AFFILIATION
MORGAN, H. E. Southern California Edison Co.
RECIP. NAME RECIPIENT AFFILIATION

SUBJECT: LER 87-014-00: on 870831, determined that motor in motor-operator overheated & failed. Caused by failure to adhere to established administrative controls. Investigation into root cause & corrective actions continuing. W/870930 ltr.

DISTRIBUTION CODE: IE22D COPIES RECEIVED: LTR 1 ENCL 1 SIZE: 5
TITLE: 50.73 Licensee Event Report (LER), Incident Rpt, etc.

NOTES: ELD Chandler 1cy. 05000361

	RECIPIENT ID CODE/NAME	COPIES LTTR	COPIES ENCL	RECIPIENT ID CODE/NAME	COPIES LTTR	COPIES ENCL
	PD5 LA	1	1	PD5 PD	1	1
	ROOD, H	1	1			
INTERNAL:	ACRS MICHELSON	1	1	ACRS MOELLER	2	2
	AEOD/DOA	1	1	AEOD/DSP/NAS	1	1
	AEOD/DSP/ROAB	2	2	AEOD/DSP/TPAB	1	1
	DEDRO	1	1	NRR/DEST/ADS	1	0
	NRR/DEST/CEB	1	1	NRR/DEST/ELB	1	1
	NRR/DEST/ICSB	1	1	NRR/DEST/MEB	1	1
	NRR/DEST/MTB	1	1	NRR/DEST/PSB	1	1
	NRR/DEST/RSB	1	1	NRR/DEST/SGB	1	1
	NRR/DLPQ/HFB	1	1	NRR/DLPQ/QAB	1	1
	NRR/DOEA/EAB	1	1	NRR/DREP/RAB	1	1
	NRR/DREP/RPB	2	2	NRR/DRIS/SIB	1	1
	NRR/PMAS/ILRB	1	1	REG FILE 02	1	1
	RES DEPY GI	1	1	RES TELFORD, J	1	1
	RES/DE/EIB	1	1	RGN5 FILE 01	1	1
EXTERNAL:	EG&G GROH, M	5	5	H ST LOBBY WARD	1	1
	LPDR	1	1	NRC PDR	1	1
	NSIC HARRIS, J	1	1	NSIC MAYS, G	1	1
NOTES:		1	1			

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NRC Form 366
(9/83)

U.S. NUCLEAR REGULATORY COMMISSION
APPROVED OMB NO. 3150-0104
EXPIRES: 8/31/85

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)
SHUTDOWN COOLING ISOLATION VALVE PACKING GLAND LEAKAGE

EVENT DATE (5)			LER NUMBER (6)			REPORT DATE (7)			OTHER FACILITIES INVOLVED (8)	
MONTH	DAY	YEAR	YEAR	SEQ. NUMBER	REV. NUMBER	MONTH	DAY	YEAR	FACILITY NAMES	DOCKET NUMBER(S)
										0 5 0 0 0
0 8	3 1	8 7	8 7	— 0 1 4	— 0 0	0 9	3 0	8 7		0 5 0 0 0

OPERATING MODE (9)	5	THIS REPORT IS SUBMITTED PURSUANT TO THE REQUIREMENTS OF 10 CFR §: (Check one or more of the following) (11)			
POWER LEVEL (10)	0 0 0	20.402(b)	20.405(c)	50.73(a)(2)(iv)	73.71(b)
		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, NRC Form 366A)
		20.405(a)(1)(iii)	50.73(a)(2)(i)	50.73(a)(2)(viii)(A)	
		20.405(a)(1)(iv)	X 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
H. E. MORGAN, STATION MANAGER	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	MANUFACTURER	REPORTABLE TO NPRDS		CAUSE	SYSTEM	COMPONENT	MANUFACTURER	REPORTABLE TO NPRDS	
E	B P	I S V	W 2 5 5	YES							
X	B P	M O	L 2 0 0	YES							

SUPPLEMENTAL REPORT EXPECTED (14)		EXPECTED SUBMISSION DATE (15)	MONTH	DAY	YEAR
X YES (If yes, complete EXPECTED SUBMISSION DATE)	NO		1 0	3 0	8 7

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

On August 31, 1987, at approximately 1900, with Unit 2 in Mode 5 and the Reactor Coolant System (RCS) at approximately 350 psia and 127 degrees F, failure of carbon steel packing gland follower studs during manual operation of motor operated Shutdown Cooling System (SDCS) suction isolation valve 2HV-9378 resulted in leakage estimated at 100 gpm through the packing gland. Operation of the SDCS continued via a redundant flow path. RCS inventory was maintained by isolating letdown flow and using charging pumps as depressurization and venting of the RCS proceeded.

Containment closure was promptly restored and there was no effluent release from containment above regulatory limits.

At 1100 on September 1, a temporary repair was completed which reduced the leak rate to approximately 1/4 gpm, effectively terminating the event.

The cause of stud failure has been attributed to wastage due to boric acid corrosion where the studs pass through the gland follower and ineffective implementation of established administrative controls that resulted in the use of an extension on the motor operator handwheel.

SCE's investigation into the root cause and the corrective action to prevent recurrence is continuing. The results of that investigation will be provided, in detail, in a supplement to this LER.

The health and safety of plant personnel and the public were not affected by this event.

Reactor Vendor: Combustion Engineering
Event Date: 08-31-87
Event Time: 1900

A. PLANT CONDITIONS AT THE TIME OF THE EVENT

Mode:	Cold Shutdown (Mode 5), Shutdown Cooling System in operation.
RCS Temperature:	127 degrees F.
RCS Pressure:	350 psia, bubble in Pressurizer.
RCS Operation:	One RCP running and RCS undergoing cleanup prior to depressurization for refueling.
Containment:	Equipment and personnel hatches open to support refueling preparations.

B. BACKGROUND INFORMATION

The Reactor Coolant System (RCS) (EIIS System Code AB) is connected to the suction of the Shutdown Cooling System (SDCS) (EIIS System Code BP) pumps via parallel flow paths which contain redundant, motor-operated isolation valves (EIIS Component Code ISV). After the RCS is cooled down to approximately 285 degrees F using the steam generators (EIIS Component Code SG), the SDCS is placed into operation by opening the motor-operated isolation valves. Both of the parallel flow paths are opened in order to provide redundant access for the RCS to the Low Temperature Overpressure Protection (LTOP) relief valve (EIIS Component Code RV) and to provide redundant shutdown cooling flow paths.

C. DESCRIPTION OF THE EVENT

At 1235 on August 30, 1987, the redundant isolation valves in one of the two parallel flow paths were opened from the Control Room. However, one of the isolation valves in the other parallel flow path (2HV-9378) could not be opened remotely. At 1655, the SDCS was placed in service using the single flow path and cooldown was continued.

At 1730 on August 30, RCS temperature decreased below 235 degrees F and Technical Specification Limiting Condition for Operation (LCO) 3.4.8.3.1 was entered. Action Statement (b) of this LCO requires that the second flow path be in service within 7 days or the RCS must be cooled below 200 degrees F, depressurized and vented. Mode 5 was entered at 1940.

A Maintenance Order (MO) was prepared and issued at 1430 on August 30 to investigate and, if possible, correct the conditions which prevented opening of 2HV-9378. This MO provided that, if any nonconforming condition was identified, a Nonconformance Report (NCR) would be initiated.

At 0245 on August 31, it was determined that the motor (EIIS Component Code MO) in the motor-operator had overheated and was failed. Manual operation of the operator handwheel moved the valve to the indicated 5% open position where it could not be further opened. Inspection indicated that boric acid crystals and corrosion were present in the area of the packing gland and valve stem.

As provided by the MO work plan, an NCR was prepared by the cognizant engineer who was overseeing the efforts to determine the cause of the failure of the valve to open. The NCR identified that the motor in the motor-operator had failed and that inspection had identified extensive corrosion in the area of the valve gland follower and valve stem.

Further efforts to operate the manual handwheel confirmed that the valve could not be opened initially beyond 5%. The external corrosion and boric acid buildup was removed from the area of the packing gland and the stem was then lubricated. Following this lubrication, the valve could be further opened using the manual handwheel.

Following approval from the Control Room, the valve was further opened manually to about the 10% open position where the handwheel again became difficult to turn. At approximately 1845 on August 31, an extension was applied to the handwheel and operation was continued in the opening direction until the packing gland follower studs failed. A non-isolable RCS leak developed at an initial rate estimated at approximately 100 gpm.

Following initial unsuccessful efforts to reinsert the gland follower to reduce the leakage, the area was evacuated and action initiated to close containment (EIIS System Code NH). Pressurizer (EIIS Component Code PZR) level was maintained by operating the charging pumps and isolating letdown flow (EIIS System Code CB). The operating reactor coolant pump (RCP) was stopped, and action initiated to cooldown the pressurizer and depressurize the RCS to reduce the leakage and permit a temporary repair.

By 2020, containment closure had been restored and the purge and its radiation monitors were in operation. There was no effluent release from containment above regulatory limits. RCS leakage from 2HV-9378 was being collected in the containment sump and directed to the Liquid Radwaste System (EIIS System Code WD) for processing. The pressurizer was taken solid at 2140 on August 31.

At 1100 on September 1, a temporary repair was completed to 2HV-9378 which reduced the leak rate to approximately 1/4 gpm, effectively terminating the event.

D. CAUSES OF THE EVENT

1. Immediate Cause:

The leak resulted when excessive force was applied to the operator handwheel in order to manually open the valve. Use of a handwheel extension is prohibited for motor-operated valves by valve operating procedures, and it was not authorized by the MO.

The NCR required by the MO in the event nonconforming conditions were identified had been initiated, but it had not yet been dispositioned when the extension was applied to the operator handwheel and efforts to open the valve further were resumed.

In summary, the immediate cause of the event was failure to adhere to established administrative controls.

2. Intermediate Causes:

   a. Inspection of the gland follower studs demonstrated that they had been subject to severe wastage due to boric acid corrosion. The studs are carbon steel, and packing leakage from the RCS had reduced the diameter of the studs to 20% or less, compared to the original dimension. The possibility that such wastage could exist, and result in packing gland failure due to further efforts to open the valve, was not recognized during the initial inspections when the valve did not open remotely.

   b. Investigation of the cause of the failure of the valve to open using the motor-operator, and the difficulty experienced in opening the valve using the manual handwheel, is continuing. Access to the valve internals required core off-load and draining of the RCS to the bottom of the hot legs. The results of this investigation will be reported in an update to this LER.

   c. The MO which was issued to control the work on 2HV-9378 was overly broad in scope and vague concerning the limits placed on permissable efforts to open the valve. The perceived importance of promptly establishing redundancy in the shutdown cooling and LTOP flow paths resulted in failure to adequately plan the work performed.

3. Root Causes:

   a. Management controls were not effective in limiting efforts to open 2HV-9378 to properly planned and defined activities. The specific weaknesses in these controls which permitted this event to occur are being evaluated and will be identified in an update to this LER.

   b. Use of carbon steel bolting in this application requires assurance that RCS leakage will not result in excessive corrosion. Such assurance cannot be provided in this case.

   c. The root cause of the failure of the valve to open using the motor-operator continues under investigation and the results will be reported in an update to this LER.

E. CORRECTIVE ACTIONS:

Corrective actions taken to preclude recurrence, and the radiological control aspects of this event, will be addressed in an update to this LER.

F. SAFETY CONSEQUENCES:

The health and safety of plant personnel and the public was not affected by this event.

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

September 30, 1987

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

Subject: Docket No. 50-361
30-Day Report
Licensee Event Report No. 87-014
San Onofre Nuclear Generating Station, Unit 2

Pursuant to 10 CFR 50.73(a)(2)(ii), this submittal provides the required 30-day written Licensee Event Report (LER) for an occurrence involving a packing gland leak in a Shutdown Cooling System isolation valve. Our investigation into this occurrence is continuing. Therefore, a supplemental LER will be submitted upon completion of this investigation. Neither the health and safety of plant personnel nor the health and safety of the public was affected by this event.

If you require any additional information, please so advise.

Sincerely,

HEMorg

Enclosure: LER No. 87-014

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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