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)
Washington Nuclear Plant - Unit 2	0 5 0 0 0 3 9 7	1 OF 0 1

TITLE (4)
Grounds in MSRV Solenoids

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)
										0 5 0 0 0
0 3 2 2 8 4			8 4	0 2 7	0 1	0 7 1 9		8 4		0 5 0 0 0

OPERATING MODE (9)	4	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)	X 50.73(a)(2)(v) (d)	73.71(c)
		20.405(a)(1)(ii)	50.36(c)(2)	50.73(a)(2)(vii)	X 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)	50.72(b)(2)(iii)
		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
C.M. Powers, Reactor Engineering Supervisor	5 0 9 3 7 7 1 - 1 2 5 0 1 1 Ext. 2996

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	
C	S B	S P V	C 7 1 0	N							

SUPPLEMENTAL REPORT EXPECTED (14)		EXPECTED SUBMISSION DATE (15)	MONTH	DAY	YEAR
X YES (If yes, complete EXPECTED SUBMISSION DATE)	NO		0 9	0 1	8 4

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

Revision '0' of LER 027 reported failures of Main Steam Relief Valve solenoids due to grounding in the solenoid coils. As reported, all installed MSRV solenoids (both the 18 MSRV and 14 ADS solenoids) had voltage spike suppression diodes installed across each solenoid circuit. In addition, each solenoid was megger tested for internal grounding and coil resistance was measured. Each ADS solenoid was then cycled ten times and a final ground check was performed.

General Electric is conducting a review of these failures and similar events which occurred at LaSalle and Susquehanna and has issued an interim report (MFN #081-84, 6/15/84) to the NRC. (A copy of this GE report is attached to this LER.) According to the report, GE has not completed its evaluation as to reportability under 10CFR21 but does consider the condition to be germane to safety. GE has provided justification for continued Plant operation in the report. This justification is based on the inherent conservatism in the ADS system design based on total blowdown capacity and the use of redundant solenoids on each ADS valve.

Further Corrective Action

1) A report of the resolution of this condition will be provided upon completion of the GE investigation.

2) Operations will continue to monitor existing ground fault indicating annunciators to identify potential failures of solenoids.

Washington Public Power Supply System
P.O. Box 968 3000 George Washington Way Richland, Washington 99352 (509) 372-5000

Docket No. 50-397
July 19, 1984

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

Subject: NUCLEAR PLANT NO. 2
LICENSEE EVENT REPORT NO. 84-027-01

Dear Sir:

Transmitted herewith is Licensee Event Report No. 84-027-01 for WNP-2 Plant. This report is submitted in response to the report requirements of 10CFR50.73 and provides supplemental information to LER 84-027, Rev. 0.

Attachment 1 to this letter is a copy of an interim report from General Electric to the NRC which provides additional information and background related to the LER.

Very truly yours,

SK Affolter for

J. D. Martin (M/D 927M)
WNP-2 Plant Manager

JDM:mm

Enclosure:
Licensee Event Report No. 84-027-01
Attachment 1

cc: Mr. John B. Martin, Administrator
Region V, Office of Inspection and Enforcement
U.S. Nuclear Regulatory Commission
1450 Maria Lane
Walnut Creek, California 94596
Mr. A. D. Toth, NRC Resident Inspector (901A)
Ms. Dottie Sherman
American Nuclear Insurers
The Exchange Suite 245
270 Farmington Ave.
Farmington, CT 06032

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1/1

ATTACHMENT 1

F. A. Maclean

JUN 19 1984

HANFORD PROJECT

GENERAL ELECTRIC

NUCLEAR POWER SYSTEMS DIVISION
GENERAL ELECTRIC COMPANY • 175 CURTNER AVENUE • SAN JOSE, CALIFORNIA 95125
MC 682, (408) 925-1913

June 15, 1984

MFN#081-84

U. S. Nuclear Regulatory Commission
Office of Inspection and Enforcement
Washington D.C. 20555

Attention: Mr. Ernie Rossi

Gentlemen:

SUBJECT: TELECON - INTERIM REPORT

Please find the attached memo of my telecon, June 13, 1984 with Mary Wegner of I&E. The telecon provided an interim report on ground fault failures of actuator solenoids, Model IMF-2, which initiate operation of Automatic Depressurization System valves manufactured by Crosby Valve and Gauge Company.

Very truly yours,

R. W. Strong for

G. B. Stramback, Manager
Safety Evaluation Programs
Nuclear Safety and Licensing Operation

GBS:rm/A06156

cc: E. Kelly, NRC Region I
L. S. Gifford, GE-Bethesda
U. Potapovs, NRC-Bethesda
M. Wegner, NRC-Bethesda
F. A. Maclean, GE-Hanford
N. D. Weiss, GE-Susquehanna
H. R. Peffer, GE-LaSalle
H. D. Powell, GE-Riverbend

8407170579

MEMO OF TELECON

DATE: June 13, 1984

TIME: 12:20 P.M.

PERSON CALLING: G. B. Stramback

PERSON CALLED: Mary Wegner (NRC-I&E; 301-492-4511)

SUBJECT: INTERIM REPORT - CROSBY SOLENOIDS

Mary Wegner was called in order to inform the NRC of a condition considered at least germane to safety, but one which GE has not completed its evaluation as to reportability under 10CFR Part 21.

The utility owner for LaSalle 1 & 2 (Commonwealth Edison Company) verbally reported the concern and associated testing to Region III NRC on 4/4/84. Pennsylvania Power & Light Company issued a 10CFR Part 21 report for Susquehanna on 4/9/84 (PLA-2166). Washington Public Power Supply System sent a License Event Report (LER) for Hanford 2 on 4/17/84.

The concern involves a significant number of ground faults found in actuator solenoids which initiate operation of Automatic Depressurization System (ADS) valves manufactured by Crosby Valve and Gauge Company.

The electrical faults were discovered in several IMF-2 pilot solenoids during startup testing at Hanford 2 and Susquehanna 1 & 2. The inner magnet wires within the solenoids were grounded at the spool flange. In some cases, magnet wires burned open (i.e., open electrical circuit) apparently due to electrical arcing. There is a question concerning the adequacy of electrical insulation between the wire and the flange. Domestic plants using Crosby valves include Susquehanna 1 & 2, Hanford 2, LaSalle 1 & 2 and River Bend 1. However, River Bend 1 will not be using the IMF-2 solenoid; but an upgraded version qualified to NUREG-0588 Category 1 requirements.

Although coil grounds have not caused actual failure of any valves to lift, four solenoids from Susquehanna were found to have open coil windings during testing or lab analysis. Such openings could have resulted from excessive currents conducted through the point of fault which could occur only if an other equipment ground existed in the "ungrounded" DC power bus system.

ADS valves are designed to be actuated by either of two solenoids (A or B). Simultaneous open-coil winding failure of both solenoids could render one ADS valve inoperable for each failed solenoid pair. However, the ADS design is conservative such that adequate depressurization can be achieved with only half of the ADS valves remaining functional. A probability study was conducted using failure rate data acquired in field tests. The results of the study concluded there was a high probability that adequate ADS capacity existed even if the anomaly had not been discovered and corrected.

Since we have not completed our evaluation, a final conclusion as to reportability has not been reached. The following issues are still being evaluated by Engineering:

1. Sufficiency of electrical requirements.

2. Determination of whether a common-mode failure exists.

3. GE's recommendations for actions to be taken.

There is some testing that the vendor and/or GE will do to support the conclusions of the above issues. The attached summary of justifications and actions taken was provided to establish the justification bases for continued plant operation.

GE stated that next week we will provide our target date for completion of the evaluation.

RWS:csc:rm/I06142

ATTACHMENT

SUMMARY OF ACTIONS TAKEN AND JUSTIFICATION OF CONTINUED PLANT OPERATION

1. All solenoids except the ones in use at LaSalle 1 have been resistance checked, meggered at 500 volts (coil-to-case), actuated 5 to 10 times, then resistance checked again and/or remeggered. Of 240 tested, 33 were found to be grounded under the 500V stress condition. These tests have been effective in culling out solenoids most susceptible to grounding. A probability study was performed to evaluate the failure rate affect on the ADS logic. The results suggested that ADS capacity would have been sufficient even if the anomalies had not been discovered and corrected. It should be noted also, that the current population is an improvement over the previous population and should have an even higher reliability for successful ADS performance.

   Units at LaSalle 1, though not individually meggered, were functionally tested in February and no ground faults presently exist on either of the redundant divisions of the DC power buses. Prior to functional testing in February, the solenoids had successfully withstood hydrodynamic load testing of the containment. No solenoids have ever grounded on LaSalle 1.

2. The DC bus ground detection system provides advance warning of solenoid failures. It is tolerant of a single ground fault with no adverse consequences. Thus, a grounded solenoid will remain functional unless a simultaneous additional fault exists on the DC bus. With operators alerted to keep such faults cleared, grounded solenoids can be detected and replaced before any operational failures occur.

3. The neon test lamps provided on the ADS panels can be used to confirm solenoid continuity, as well as proper ADS channel logic operations. Every ADS solenoid has such indicators which cease to glow should the solenoid become open-circuited. Surveillance checks of these lamps assures coil wire has neither burned open nor become disconnected.

4. Every ADS valve can be actuated by either of two redundant solenoids (A or B). Operational and testing experience suggests the frequency of solenoid grounds will be sufficiently low that, combined with steps 2 and 3 above, redundant solenoids will provide assurance that ADS valves can remain functional.

5. In event of a postulated Design Basis Accident (DBA), the need for the Automatic Depressurization System is generally precluded by HPCI/HPCS and RCIC systems capability to keep the core covered. Normal depressurization occurs via the main steam lines through the turbine bypass system to the main condensers. The large-break LOCA would itself depressurize the vessel. ADS is required for the intermediate and small-break LOCA with coincident loss of high pressure injection systems. The probability of actual need for ADS is therefore quite low, particularly when coupled with the probability of the DBA itself. Even in the unlikely event ADS is required, the system is completely redundant including the solenoids on each valve as explained in Item 3 above.

RS:jg:rm/B05095*-1
6/14/84