

LICENSEE EVENT REPORT (LER)

FACILITY NAME (1) **DIABLO CANYON UNIT 2** DOCKET NUMBER (2) **05000323** PAGE (3) **1 OF 4**

TITLE **TURBINE TRIP AND SUBSEQUENT REACTOR TRIP DUE TO HIGH-HIGH STEAM GENERATOR LEVEL WHILE TRANSFERRING FEEDWATER CONTROL FROM BYPASS TO MAIN REGULATING VALVES**

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)
07	05	86	86	020	00	08	04	86				05000
												05000

OPERATING MODE (9) **1** THIS REPORT IS SUBMITTED PURSUANT TO THE REQUIREMENTS OF 10 CFR § (11)

POWER LEVEL (10) **0.19**

10 CFR 50.73(a)(2)(iv)

OTHER (Specify in Abstract below and in Text, NRC Form 366A)

LICENSEE CONTACT FOR THIS LER (12) **DAVID P. SISK, REGULATORY COMPLIANCE ENGINEER**

TELEPHONE NUMBER **805-595-7351**

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

CAUSE	SYSTEM	COMPONENT	MANUFACTURER	REPORTABLE TO NRC	CAUSE	SYSTEM	COMPONENT	MANUFACTURER	REPORTABLE TO NRC

SUPPLEMENTAL REPORT EXPECTED (14) YES (If yes, complete EXPECTED SUBMISSION DATE) NO

EXPECTED SUBMISSION DATE (15) MONTH DAY YEAR

ABSTRACT (16)

At 0136 PDT, July 5, 1986, during startup with the unit in Mode 1 (Power Operation) at 19 percent power, a turbine trip and subsequent reactor trip occurred due to high-high water level in steam generator (SG) 2-1.

The unit was stabilized in Mode 3 (Hot Standby) in accordance with approved procedures. This event was caused by the inability of operators to respond quickly enough to the increased feedwater flow to SG 2-1 to prevent the high-high SG level setpoint from being reached.

The operations personnel training program for transfer from the bypass feedwater regulating valves to the main feedwater regulating valves was evaluated and determined to be adequate. Therefore, no additional training is necessary. However, to minimize the occurrence of similar events, an evaluation will be conducted to determine the feasibility of installing an automatic level control system on the feedwater bypass valves.

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I. Initial Conditions

The unit was in Mode 1 (Power Operation) at 19 percent power.

II. Description of Events

A. Event:

On July 5, 1986, with the unit in Mode 1 (Power Operation) at 19 percent power, operators switched from the bypass feedwater regulating valves (SJ)(FCV) to the main feedwater regulating valves. After the main feedwater regulating valves were placed in automatic control, but with the feedwater pump still in manual, all steam generator (SG) levels satisfactorily stabilized except SG 2-2. SG 2-2's level was trending upward.

Flow control valve (FCV) 520, feedwater control valve for SG 2-2, was placed in manual control to prevent SG 2-2's level from exceeding setpoints. While operators adjusted the water level in SG 2-2, a steam flow/feedwater flow mismatch developed in SG 2-1.

Operators noticed the increasing level in SG 2-1 when the level was approximately 55 percent and immediately manually closed FCV-510. Since no more "cool" water was being added, the average temperature of the water in the steam generator increased, producing a swell that resulted in a high-high water level setpoint signal (67 percent). This resulted in a turbine trip and resultant reactor trip at 0136 PDT.

The unit was stabilized in Mode 3 (Hot Standby) in accordance with approved procedures.

B. Inoperable structures, components or systems that contributed to the event:

None

C. Dates and approximate times for major occurrences:

July 5, 1986, 0136 PDT: Event date and discovery date

D. Other systems or secondary functions affected:

None

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E. Method of discovery:

The event was immediately apparent due to alarms and indications in the control room.

F. Operator actions:

The appropriate procedures were followed and the reactor trip breakers were reclosed. In accordance with a request from the shift foreman, Instrumentation and Control (I&C) inspected the level control system for SG 2-1 and determined the system was functioning as designed.

G. Safety system responses:

1. The turbine (TA)(TRB) tripped.
2. The reactor trip breakers (JC)(BKR) opened.
3. The control rod drive mechanism (AA)(DRIV) allowed the control rods to drop into the reactor.
4. Main feedwater isolation actuated.

III. Cause of Event

A. Immediate cause:

High-high water level in SG 2-1.

B. Root cause:

At low power levels, the feedwater control system initiates flow transients when changing power levels or feedwater system lineups. Transferring from the bypass feedwater regulating valves to the main feedwater regulating valves is a sensitive operation. When the operators were manually adjusting FCV-520 and the main feed pump differential pressure, they failed to respond quickly enough to the increasing feedwater flow to SG 2-1. Although the operators responded correctly and decreased the feedwater flow to SG 2-1, it was too late to avoid reaching the high-high SG water level setpoint.

IV. Analysis of Event

Since all safety systems responded as designed, there were no adverse safety consequences or implications resulting from this event.

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V. Corrective Actions

As discussed earlier, transferring from the bypass feedwater regulating valves to the main feedwater regulating valves is a sensitive operation. Although operators are trained on the simulator to perform this operation, continued experience on plant equipment is needed to maintain proficiency.

Operations personnel are trained on potential steam generator feedwater and level control difficulties during transfer from the bypass feedwater regulating valves to the main feedwater regulating valves during unit startup. This subject is also discussed during operator requalification training. Therefore, no additional training is necessary. To minimize the occurrence of similar events, an evaluation will be conducted to determine the feasibility of installing an automatic level control system on the feedwater bypass valves.

Events of this type are not unique to Diablo Canyon, as shown in INPO Report 86-012, which indicates that 29% of the Westinghouse plant trips reported in 1985 were due to feedwater level control problems.

VI. Additional Information

A. Failed components:

None

B. Previous LERs on similar events:

2-85-015 - "Personnel Error Resulted in a High Steam Generator Level Turbine Trip and Subsequent Reactor Trip." The 2-85-015 event was caused by personnel error in that during plant startup, operators closed the main feedwater pump recirculation valve with one main feedwater regulating valve still in manual. The 2-86-020 event involved a SG with the regulating valve in automatic, so the 2-85-015 corrective action of training on precautions to be followed when SG feed regulating valves are in manual was only partially applicable and incapable of preventing the 2-86-020 event.

2-85-010 - "Procedural Inadequacy and Inattention Caused a High Steam Generator Level Turbine Trip and Subsequent Reactor Trip." The 2-85-010 event occurred during the power ascension test program while operators attempted to return the feedwater system to normal after completing the testing on main feed pump 2-2. The procedural revisions initiated for OP L-2 and L-4 could not affect the 2-86-020 event since the revisions pertained to unusual plant conditions and not a normal startup.

PACIFIC GAS AND ELECTRIC COMPANY

PG&E

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JAMES D. SHIFFER
VICE PRESIDENT
NUCLEAR POWER GENERATION

August 4, 1986

PGandE Letter No.: DCL-86-229

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

Re: Docket No. 50-323, OL-DPR-82
Diablo Canyon Unit 2
Licensee Event Report 2-86-020-00
Turbine Trip and Subsequent Reactor Trip Due to High-High Steam
Generator Level While Transferring Feedwater Control from Bypass to
Main Regulating Valves

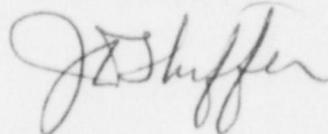
Gentlemen:

Pursuant to 10 CFR 50.73(a)(2)(iv), PGandE is submitting the enclosed Licensee Event Report concerning a turbine trip and subsequent reactor trip due to high-high steam generator level.

This event has in no way affected the public's health and safety.

Kindly acknowledge receipt of this material on the enclosed copy of this letter and return it in the enclosed addressed envelope.

Sincerely,



Enclosure

cc: L. J. Chandler
J. B. Martin
M. M. Mendonca
B. Norton
H. E. Schierling
CPUC
Diablo Distribution
INPO

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