

LICENSEE EVENT REPORT (LER)

FACILITY NAME (1) Fort St. Vrain, Unit No. 1										DOCKET NUMBER (2) 0 5 0 0 0 2 6 7										PAGE (3) 1 OF 0 7															
TITLE (4) "C" Circulator Trip On Buffer-Mid-Buffer																																			
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 10 CFR 5. (Check one or more of the following) (11)																																	
N		20.402(b)										20.405(c)										XX 50.73(a)(2)(iv)		73.71(b)											
POWER LEVEL (10)		0 0 0										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)(vi)													
		20.405(a)(1)(iii)										50.73(a)(2)(i)										50.73(a)(2)(vii)		OTHER (Specify in Abstract below and in Text NRC Form 366A)											
		20.405(a)(1)(iv)										50.73(a)(2)(ii)										50.73(a)(2)(viii)(A)													
		20.405(a)(1)(v)										50.73(a)(2)(iii)										50.73(a)(2)(viii)(B)													
		20.405(a)(1)(vi)										50.73(a)(2)(iv)										50.73(a)(2)(ix)													
LICENSEE CONTACT FOR THIS LER (12)																																			
NAME Jim Eggebroten, Superintendent, Technical Services Eng.																		TELEPHONE NUMBER																	
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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	CAUSE	SYSTEM	COMPONENT	MANUFACTURER	REPORTABLE TO NRC	CAUSE	SYSTEM	COMPONENT	MANUFACTURER	REPORTABLE TO NRC	CAUSE	SYSTEM	COMPONENT	MANUFACTURER	REPORTABLE TO NRC											
X	A	D	I	S	I	V	V	0	8	5	Y																								
SUPPLEMENTAL REPORT EXPECTED (14)																		EXPECTED SUBMISSION DATE (15)				MONTH		DAY		YEAR									
YES (If yes, complete EXPECTED SUBMISSION DATE)																		XX NO																	

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

On January 13, 1986, with the reactor shutdown and "A" and "D" helium circulators operating on emergency condensate for primary coolant circulation, control room operators prepared to place "C" helium circulator in service. At 0430 hours, "C" helium circulator bearing water and buffer helium were established. At 0450 hours, immediately after releasing the "C" circulator brake and seal, "C" circulator tripped on high buffer mid-buffer differential pressure.

It has been determined that water entered the "C" circulator buffer sense lines, thereby causing erratic buffer mid-buffer indication and the single circulator trip action.

"C" circulator's buffer sense lines were "blown down" with clean helium and the circulator was returned to service.

Single circulator trips are initiated for equipment protection purposes due to abnormal indications associated with a single circulator. Single actuations of the circulator trip circuitry are not considered to require Nuclear Regulatory Commission notification nor Licensee Event Reporting in accordance with the requirements of 10CFR50.72 and 50.73. However, due to recent concerns expressed by the Senior Resident Inspector, the Licensee will voluntarily report actuations of the circulator trip circuitry, until this item can be reviewed further with the appropriate Regional and Washington offices.

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LICENSEE EVENT REPORT (LER) TEXT CONTINUATION

APPROVED OMB NO 3150-0104
EXPIRES 8/31/85

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TEXT (If more space is required, use additional NRC Form 366A's) (17)

BACKGROUND:

The buffer helium system consists of two separate and independent loops with each loop serving two helium circulators in a primary coolant loop. Buffer helium is supplied to the buffer seals of each circulator at a design flow rate of 7.4 acfm. The independent circulator buffer helium control system maintains the helium water drain pressure such that approximately half of the buffer helium supply flow is directed upward into the primary coolant system and the other half is directed through the helium/water drain.

The differential pressure between the buffer supply line and the mid-buffer is monitored to detect an imbalance in buffer mid-buffer pressures that would indicate either bearing water leakage up the circulator shaft or primary coolant leakage down the circulator shaft (see Figure 1).

EVENT DESCRIPTION:

On January 13, 1986, the reactor was shutdown with all thirty-seven control rods fully inserted into the core and their power supply breakers open. The reactor core was pressurized to approximately 160 psia with an average fuel temperature of approximately 130°F. "A", "C", and "D" helium circulators were operating on their pelton drives via emergency condensate to provide primary coolant circulation.

At approximately 0205 hours, "D" circulator was shutdown and its auxiliaries were isolated to allow Environmental Qualification work. With "D" circulator shutdown and "C" circulator operating, control room operators discovered erratic buffer seal indications on "C" circulator. At 0327 hours, a decision was made to shutdown "C" circulator and restart "D" circulator. After returning "D" circulator to service, "A" and "D" circulators were operated for approximately one hour while "C" circulator remained shutdown. At 0430 hours, auxiliaries were re-established on "C" circulator. After verifying normal buffer mid-buffer indication, "C" circulator was prepared for restart. At 0450 hours, immediately after releasing the "C" circulator brake and seal, "C" circulator buffer indication went high, tripping the circulator.

At 0910 hours, the "C" circulator buffer sense lines were blown down with clean helium to remove any moisture that may have entered the lines. Approximately one quart of water was removed. At 0913 hours, "C" circulator was restarted and functioned normally.

This single circulator trip actuation functioned as designed with no effect on the operating circulators.

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Fort St. Vrain, Unit No. 1

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TEXT (If more space is required, use additional NRC Form 365A's) (17)

ANALYSIS:

As each circulator's auxiliary system controls operate independently of the other circulators', the buffer mid-buffer trip of "C" helium circulator had no effect on the operation of "A" and "D" circulators. In addition, with the redundancy provided by four helium circulators, it is considered incredible per FSAR Section 14.4.1 that all four helium circulators would become inoperable simultaneously.

This single circulator trip actuation provided "C" circulator protection as designed. There were no affects on the health and safety of the public.

Similar incidents were reported in Licensee Event Report 85-026.

CAUSE DESCRIPTION:

Recently, it was discovered that "D" circulator's helium/water drain isolation valves leak by the seat, as reported in LER 85-026. With "D" circulator shutdown and its auxiliaries isolated, these leaking valves allowed a reverse flow from the Loop II high pressure separator drain lines, through the "D" circulator high pressure separator, and into the "D" circulator helium/water drain cavity (see Figure 2). This reverse flow resulted from the differential pressure between the Loop II high pressure separator drain lines and the "D" circulator bearing water cavity. With "D" circulator shutdown and its auxiliaries isolated, the circulator bearing water cavity pressure fell to approximately atmospheric while "C" circulator's helium/water drain line functioned at approximately reactor pressure.

Since the "C" and "D" circulator high pressure separator drain lines join before entering the Loop II surge tank (see Figure 2), reverse flow through "D" circulator's high pressure separator drain line affected drain flow from the "C" circulator high pressure separator. This in turn affected "C" circulator helium/water drain flow and hence its buffer mid-buffer balance as evidenced by the erratic buffer mid-buffer indication. This buffer mid-buffer imbalance resulted in water entering the buffer mid-buffer sense lines. At 0450 hours, while attempting to return "C" circulator to service, it is believed that the small buffer seal pressure transient caused by releasing the seal, combined with the existing water in the buffer mid-buffer sense lines caused the high buffer mid-buffer condition and subsequently the circulator trip.

CORRECTIVE ACTION:

"C" circulator's buffer mid-buffer sense lines were "blown down" with clean helium. Approximately one quart of water was removed from the lines.

The leaking helium/water drain isolation valves on "D" circulator will be repaired.

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TEXT (If more space is required, use additional NRC Form 365A's) (17)

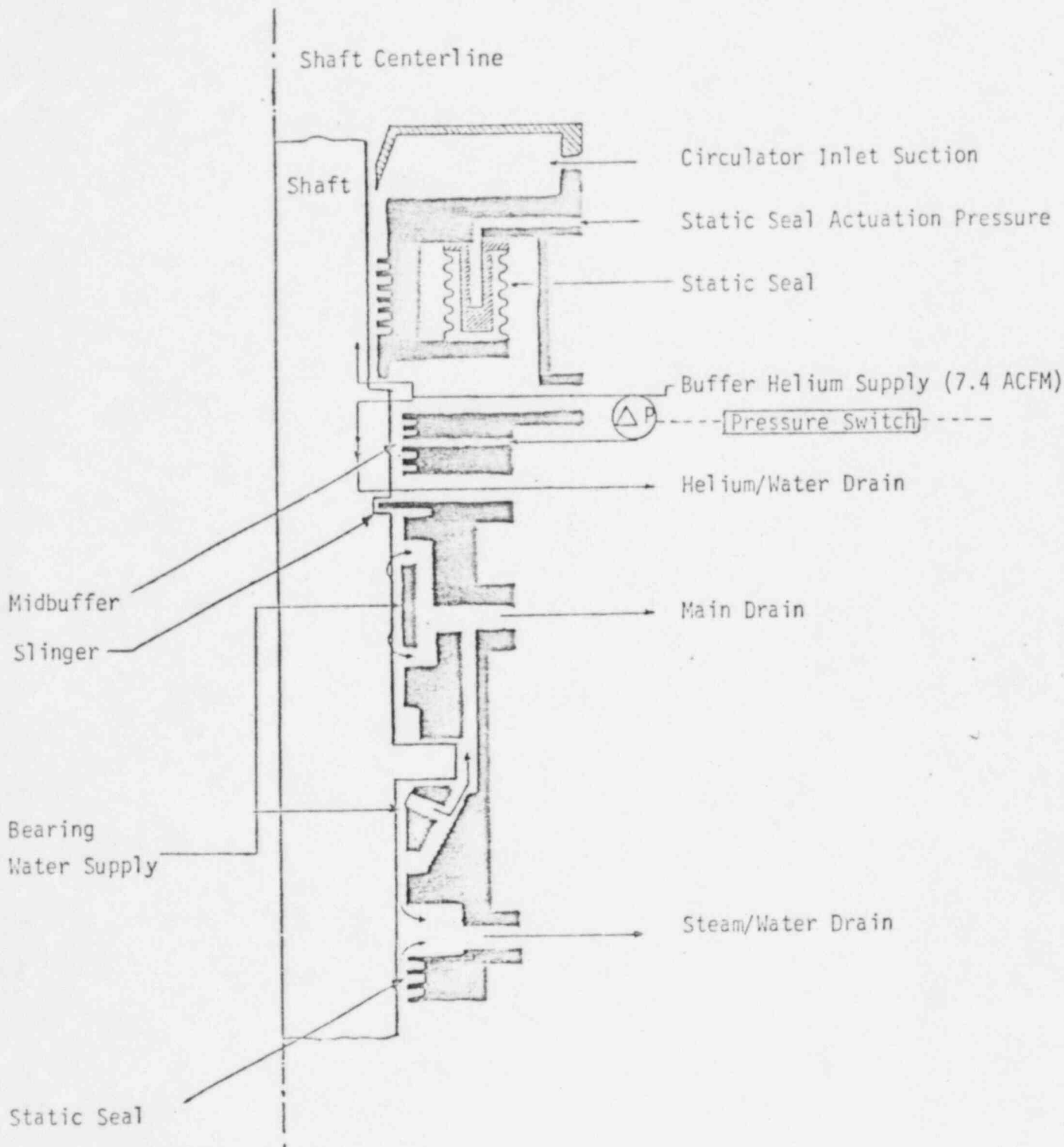
Check valves will be installed on each of the four helium circulator high pressure separator drain lines (see Figure 2).

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FACILITY NAME (1)	DOCKET NUMBER (2)	LER NUMBER (8)			PAGE (3)		
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Fort St. Vrain, Unit No. 1	0500026786	0	03	010	05	OF	07

TEXT (If more space is required, use additional NRC Form 366A's) (17)

FIGURE 1.



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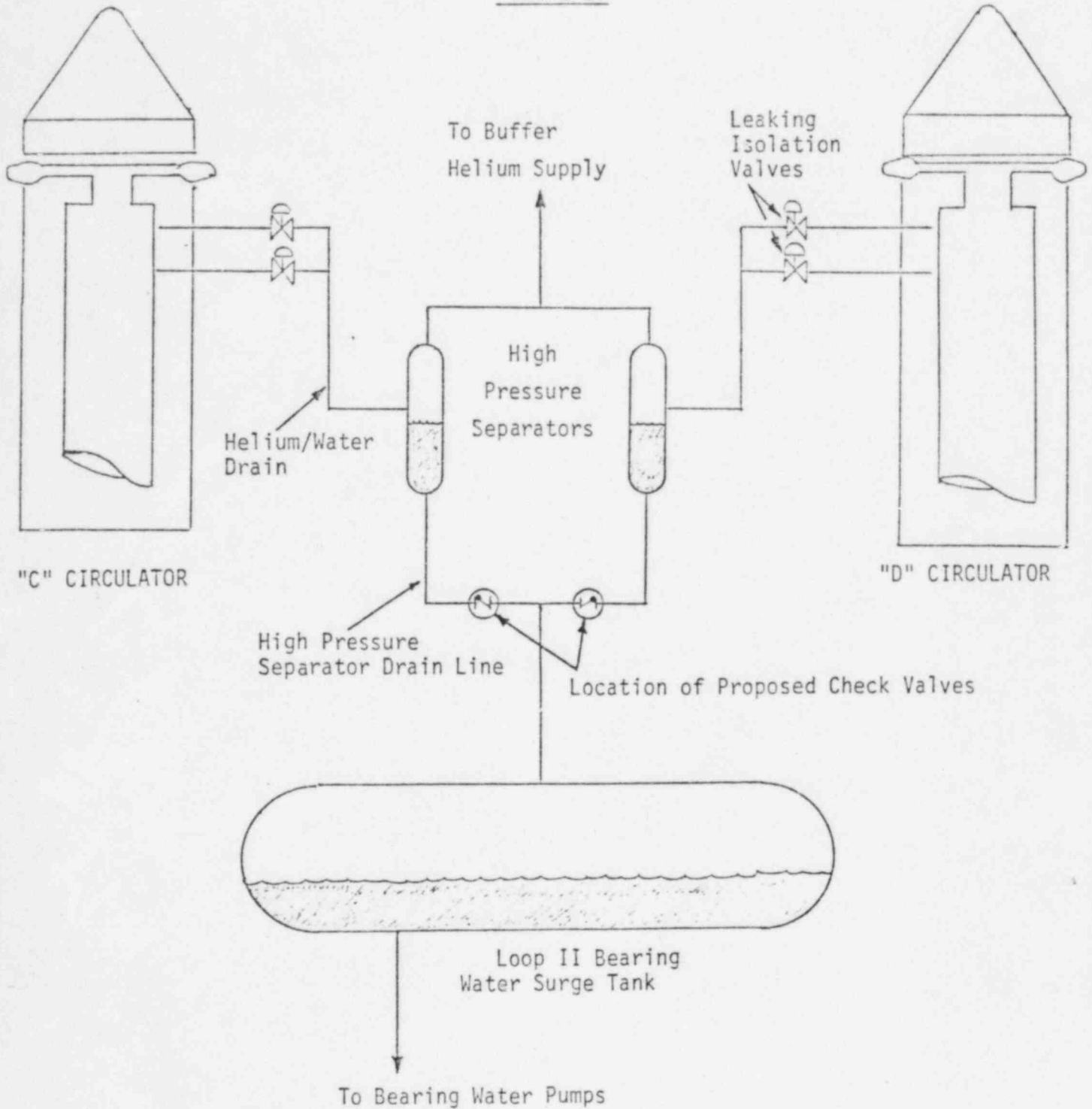
APPROVED OMB NO 3150-0104

(RES. 8/31/85)

FACILITY NAME (1) Fort St. Vrain, Unit No. 1	DOCKET NUMBER (2) 0 5 0 0 0 2 6 7 8 6	LER NUMBER (5)			PAGE (3)	
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TEXT (If more space is required, use additional NRC Form 365A's) (17)

FIGURE 2.




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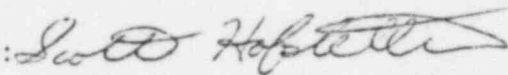
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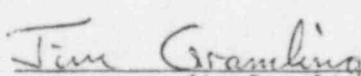


Jim Hill
Technical Services Senior Technician

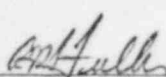


Jim Eggebroten
Superintendent, Technical Services Eng.

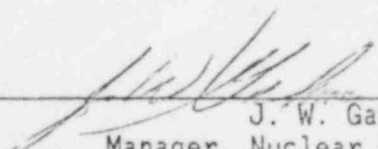
Licensing Review By: 



Jim Gramling
Nuclear Licensing-Operations Supervisor



C. H. Fuller
Station Manager



J. W. Gahm
Manager, Nuclear Production



Public Service

16805 WCR 19 1/2, Platteville, Colorado 80651

Public Service
Company of Colorado

February 12, 1986
Fort St. Vrain
Unit No. 1
P-86099

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

Docket No. 50-267

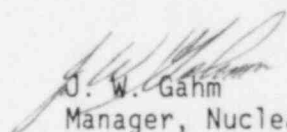
SUBJECT: Licensee Event Report
86-003, Final Report

REFERENCE: Facility Operating
License No. DPR-34

Gentlemen:

Enclosed please find a copy of Licensee Event Report
No. 50-267/86-003, Final, submitted per the requirements of
10 CFR 50.73(a)(2)(iv).

Sincerely,


J. W. Gahm
Manager, Nuclear Production

Enclosure

cc: Regional Administrator, Region IV
Attn.: Mr. E. H. Johnson, Chief
Reactor Projects Branch

cc: Director of Nuclear Reactor Regulation
Attn.: Mr. H. N. Berkow, Project Director
Standardization and Special
Project Directorate

cc: Director, MIPC

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