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May 10, 1990
Fort St. Vrain
Unit No. 1
P-90152

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

Docket No. 50-267

SUBJECT: Licensee Event Report 90-001-00, Final Report

REFERENCE: Facility Operating License No. DPR-34

Gentlemen:

Enclosed, please find a copy of Licensee Event Report No. 50-267/90-001-00, Final, submitted per the requirements of 10 CFR 50.73(a)(2)(x).

If you have any questions, please contact Mr. M. H. Holmes at (303) 480-6960.

Sincerely,

C. H. Fuller
Manager, Nuclear Production
and Station Manager

CHF/lmb

Enclosure

cc: Regional Administrator, Region IV
ATTN: Mr. J. B. Baird
Technical Assistant
Division of Reactor Projects

Mr. R. E. Farrell
Senior Resident Inspector, FSV

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LICENSEE EVENT REPORT (LER)

FACILITY NAME (1) Fort St. Vrain, Unit No. 1 DOCKET NUMBER (2) 051001021617 PAGE (3) 1 OF 016

TITLE (4) NON-ESSENTIAL 4160/480 VOLT BUS 5 TRANSFORMER FAULT DUE TO INSULATION BREAKDOWN

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)		
04	10	90	90	001		05	10	90	N/A	0510010		
										0510010		

OPERATING MODE (9) N

POWER LEVEL (10) 01010

THIS REPORT IS SUBMITTED PURSUANT TO THE REQUIREMENTS OF 10 CFR 5. (Check one or more of the following) (11)

20.402(b)	20.406(c)	50.73(a)(2)(v)	73.71(b)
20.406(a)(1)(i)	50.36(a)(1)	50.73(a)(2)(v)	73.71(c)
20.406(a)(1)(ii)	50.36(a)(2)	50.73(a)(2)(vi)	OTHER (Specify in Abstract below and in Text, NRC Form 356A)
20.406(a)(1)(iii)	50.73(a)(2)(i)	50.73(a)(2)(viii)(A)	
20.406(a)(1)(iv)	50.73(a)(2)(ii)	50.73(a)(2)(viii)(B)	
20.406(a)(1)(v)	50.73(a)(2)(iii)	50.73(a)(2)(ix)(1)	
20.406(a)(1)(vi)	50.73(a)(2)(iv)	50.73(a)(2)(ix)(2)	

LICENSEE CONTACT FOR THIS LER (12)

NAME J. M. Gramling, Supervisor, Nuclear Licensing-Operations TELEPHONE NUMBER 310131012101-1171013

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
X	E1A	X1FIMR	X191919	N					

SUPPLEMENTAL REPORT EXPECTED (14)

YES (If yes, complete EXPECTED SUBMISSION DATE) NO X

EXPECTED SUBMISSION DATE (15)

MONTH	DAY	YEAR

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

At 0541 hours on April 10, 1990, with the plant permanently shutdown for defueling, the non-essential bus 5, 4160/480 volt transformer, N-9215, experienced a fault. Control room operators were immediately alerted to the fault by an audible noise and actuation of numerous control room trouble alarms. Action was taken from the control room to disconnect 480 volt bus 5 from its power supply. Operations personnel dispatched from the control room discovered a small fire within the bus 5, 4160/480 volt transformer cabinet. The fire was extinguished with two hand held CO2 extinguishers at 0550 hours. An auxiliary tender remained in the area to watch for reflash until a permanent watch was established.

With the loss of non-essential bus 5, electrical power was lost to several non-essential loads including portions of the reactor and turbine building HVAC systems, some plant lighting, the reactor and turbine building overhead cranes, two reactor and turbine building motor control centers (MCCs), and the Loop II startup bypass drag valve, PV-21130-1. Loss of power to PV-21130-1 allowed the valve to drift closed and isolate secondary coolant flow. Bus 5 was re-energized at 0930 hours. Secondary coolant flow was re-established at 0954 hours.

Insulation breakdown on one of the bus 5 transformer's secondary coils has been identified as the cause of the fault. The coils of all three phases on this transformer were re-wound.

LICENSEE EVENT REPORT (LER) TEXT CONTINUATION

FACILITY NAME (1) Fort St. Vrain, Unit No. 1	DOCKET NUMBER (2) 0500026790	LER NUMBER (3)			PAGE (3)	
		YEAR	SEQUENTIAL NUMBER	REVISION NUMBER		
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FOOTNOTES: IF MORE SPACE IS REQUIRED, USE ADDITIONAL NRC FORM 305A'S (17)

BACKGROUND:

Fort St. Vrain has been permanently shutdown since August 18, 1989, and PSC is in the process of defueling the reactor. To date, the fuel elements from twelve of the thirty seven reactor fuel regions [AC]* have been removed from the core and placed in the fuel storage wells. These twelve regions have been refilled with defueling elements composed of graphite and containing boronated graphite poison pins for reactivity control. There is no fuel in the defueling elements.

On April 10, 1990, the plant was at normal defueling conditions with the Prestressed Concrete Reactor Vessel at atmospheric pressure, an average core helium outlet temperature of 110 degrees F, and core cooling being provided by the "C" helium circulator and the Loop II economizer-evaporator-superheater (EES) section [AB]*, both operating on condensate via the emergency condensate header.

EVENT DESCRIPTION:

At 0541 hours on April 10, 1990, the non-essential bus 5, 4160/480 volt transformer, N-9215, [EC]* experienced a fault. Control room operators were immediately alerted to the fault by a noise within the transformer cabinet and actuation of numerous control room trouble alarms. Action was taken from the control room to disconnect 480 volt bus 5 from its power supply. Operations personnel were dispatched from the control room to evaluate the cause of the noise and alarms. Personnel observed white smoke in the area of 480 volt non-essential bus 5 and notified the shift supervisor. The shift supervisor proceeded to the area, directed that the rear panel to the bus 5 transformer cabinet be removed, and assisted in extinguishing a small fire within the cabinet. The fire was contained within the transformer cabinet and was extinguished with two hand held CO₂ extinguishers at 0550 hours. An auxiliary tender remained in the area to watch for reflash until a permanent watch was established.

The loss of non-essential bus 5 resulted in a temporary loss of secondary coolant flow to the Loop II EES section. Primary coolant flow was not interrupted and remained in service throughout the event. Primary coolant temperature remained relatively constant throughout the event.

Although FSV emergency procedures do not require 10 CFR 50.72 NRC notification on fires of less than 10 minutes duration, plant management decided to make NRC notification as a conservative measure. At 0655 hours NRC notification was made per 10 CFR 50.72(b)(1)(vi).

At 0930 hours, non-essential bus 5 was re-energized via a cross-tie from 480 volt non-essential bus 4 [EC]*. At 0954 hours, secondary cooling was re-established in the Loop II EES section.

* Energy Industry Identification System (EIIS) Code

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NOTE: If more space is required, use additional NRC Form 306A's (17)

CAUSE OF EVENT:

An examination of the faulty bus 5 transformer identified that insulation breakdown had occurred on the secondary coils of the damaged transformer phase. It is believed that this insulation breakdown occurred prior to the fire and resulted in a short within the secondary coil windings of the transformer. There are no indications that the insulation breakdown occurred for reasons other than normal component wear. The transformer cooling ports that allow air flow through and around the coils were inspected and verified to be open and functional.

ANALYSIS OF EVENT:

Although this event met neither 10 CFR 50.72(b)(1)(vi) criteria of an event that "significantly hampers site personnel in the performance of duties necessary for safe plant operation", or FSV emergency procedure "EP-Class" criteria for declaring an unusual event (i.e., fire lasting more than 10 minutes), a conservative decision was made to make NRC notification per 10 CFR 50.72(b)(1)(vi). Notification was made at 0655 hours on April 10, 1990. This event is therefore being reported herein consistent with the 10 CFR 50.72 notification and the requirements of 10 CFR 50.73(a)(2)(x).

The immediate action taken from the control room to open the bus 5 transformer feed breaker upon initiation of the transformer fault reduced both the damage to the transformer and the magnitude of the fire. The resulting fire was confined to one of the three phase coils of the non-essential bus 5, 4160/480 volt transformer and was contained within the bus 5 transformer cabinet. The fire did not threaten any safety related equipment that is relied upon to maintain core cooling during accident conditions and was readily extinguished with two hand held CO2 fire extinguishers. The fire produced little smoke and PSC verified that there was no smoke damage to surrounding equipment or instrumentation.

Non-essential bus 5 supplies equipment loads that are classified as "non-essential" for maintaining reactor core cooling. These loads include the turbine and reactor building overhead cranes, the plant warehouse, turbine and reactor building MCCs, and some reactor and turbine building HVAC equipment.

LICENSEE EVENT REPORT (LER) TEXT CONTINUATION

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NOTE: If more space is required, use additional NRC Form 205A's (17)

One of the MCC loads lost during the event was the hydraulic unit that powers drag valve PV-21130-1. When operating the secondary coolant system in the startup bypass mode (as it was during the event), PV-21130-1 is in the flow path from the Loop II EES discharge to the decay heat exchanger. Upon loss of hydraulic power, PV-21130-1 fails "as is" but drifts closed due to system pressure. Therefore, upon loss of bus 5, the hydraulic power system of PV-21130-1 shut down resulting in a loss of hydraulic fluid flow and eventual valve closure. This isolated the flow path from the EES to the decay heat exchanger and therefore, temporarily interrupted secondary coolant flow. This temporary loss of secondary coolant flow was of no immediate concern for the following reasons:

- The core decay heat load at the time of the event was such that all core cooling (both primary and secondary) could be off for up to 181 hours before a calculated average bulk core temperature of 760 degrees F was reached.
- Alternate secondary coolant flow paths were available and could have been placed in service if needed.
- One PCRV liner cooling loop is capable of removing existing core decay heat production. Both PCRV liner cooling loops were operable and in service during this event.
- Primary coolant flow remained in normal service during the event.

Based on this analysis, it is concluded that this event did not pose a threat to plant safety or to the health and safety of the public.

CORRECTIVE ACTION:

The 4160 volt feed breaker to the non-essential bus 5, 4160/480 volt transformer was opened from the control room.

Operations personnel extinguished the fire with two hand held CO₂ fire extinguishers. An auxiliary tender remained in the area to watch for reflash until a permanent watch was established.

480 volt non-essential bus 5 was re-energized from the 480 volt non-essential bus 4 cross-tie at 0930 hours.

Secondary coolant flow was re-established at 0954 hours.

Equipment and instrumentation that were exposed to smoke were inspected for smoke damage. No damage was identified.

All three phase coils of the faulty transformer were re-wound and the transformer was returned to service.

LICENSEE EVENT REPORT (LER) TEXT CONTINUATION

APPROVED OMB NO. 3150-0104
EXPIRES: 5/31/88

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NOTE: If more space is required, use additional NRC Form 288A's (17)

The non-essential bus 4, 4160/480 volt transformer has been cleaned, inspected, and tested. No deficiencies or potential problems were identified. The reactor plant HVAC auxiliary transformer and the turbine plant HVAC auxiliary transformer will be cleaned, inspected, and tested by May 30, 1990. These three transformers are of the same type and vintage as the bus 5 transformer that experienced the fault. It should be noted that essential bus 4160/480 volt transformers 1, 2, and 3 are of a different vintage and type (i.e., oil cooled) and are monitored for degradation through oil sampling and analysis.

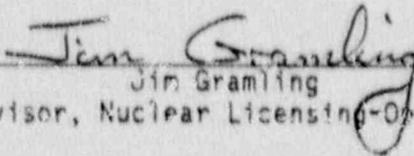
LICENSEE EVENT REPORT (LER) TEXT CONTINUATION

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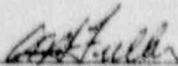
IF MORE SPACE IS REQUIRED, USE ADDITIONAL NRC FORM 366A'S (17)



 Jim Hill
 Nuclear Licensing Engineer



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