NRC Form 366
(9-83)

U.S. NUCLEAR REGULATORY COMMISSION
APPROVED OMB NO. 3150-0104
EXPIRES: 8/31/88

LICENSEE EVENT REPORT (LER)

FACILITY NAME (1)	DOCKET NUMBER (2)	PAGE (3)
Fort St. Vrain, Unit No. 1	0 5 0 0 0 2 6 7	1 OF 0 8

TITLE (4)

Air Flow In Fuel Storage Facility Did Not Meet Tech. Spec. Requirements

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)
1 2	1 4	8 5	8 5	—	0 2 8	—	0 0	0 1	1 3	8 6	N/A	0 5 0 0 0
												0 5 0 0 0

OPERATING MODE (9)	N	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
Jim Eggebroten, Superintendent, Technical Services Eng.	AREA CODE 3 0 3 — 7 8 5 - 2 2 2 4

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	

SUPPLEMENTAL REPORT EXPECTED (14)		EXPECTED SUBMISSION DATE (15)	MONTH	DAY	YEAR
YES (If yes, complete EXPECTED SUBMISSION DATE)	X NO				

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

On December 14, 1985, during the performance of surveillance SR 5.7.2b-A, the total air flow through the fuel storage facility did not meet the acceptance criteria of greater than, or equal to, 12,000 CFM. It is apparent that this condition existed prior to discovery and therefore, recent single cooling loop operations of the fuel storage facility were prohibited by LCO 4.7.3 requirements.

The failure of the fuel storage facility ventilation system to meet the surveillance acceptance criteria was due to air leaks in pipe chase walls connected to the reactor building ventilation system.

Leaks in the pipe chase walls were repaired and the fuel storage well emergency booster fan speed was increased to ensure compliance with the LCO 4.7.3 requirement of 12,000 CFM with only one cooling water coil operable on a fuel storage well. At the time of discovery, both cooling water coils were in service.

Proposed technical specification changes to require 9000 CFM total air flow through the fuel storage facility, in accordance with the Fuel Storage Accident Analysis (FSAR section 14.6.3.2), were submitted to the Nuclear Regulatory Commission on November 27, 1985.

This event is being reported per the requirements of 10CFR50.73(a)(2)(i)(B).

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BACKGROUND:

The fuel storage facility consists of three vaults, each vault containing three fuel storage wells. Each fuel storage well is installed in a shielded compartment and provided with suitable connections to the reactor plant cooling water system, reactor plant ventilation system, and monitoring instrumentation (Figure 1).

The internal structure of each fuel storage well provides for four columns of fuel elements and one column of reflector elements. Fuel element cooling is obtained by radiation and natural convection circulation of helium within the well, through and around the elements, transferring fission product decay heat to the walls of the storage compartment. Each well has two independent water-cooling circuits which are normally in operation. One of these circuits is adequate under assumed failure conditions in the other circuit. Additional protection from malfunctions in the cooling water system is provided by fire water connections which can supply emergency cooling water. Adequate ventilation is provided for the annulus between the wells and the concrete to prevent pressure buildup and to cool the fuel storage wells, should normal and backup cooling be completely lost.

During normal operation, air flow through the fuel storage facility is provided by the reactor plant exhaust fans. The air flow through each fuel storage vault is controlled by two inlet dampers. In the event that emergency air flow is required to one of the fuel storage wells, the respective fuel storage vault hand switch is closed, which will automatically start the fuel storage well emergency booster fan and fully open both inlet dampers in the fuel storage vault containing the affected fuel storage well.

Surveillance procedure SR 5.7.2b-A provides for annual calibration and testing of the fuel storage facility cooling and ventilation system instrumentation, in accordance with surveillance requirement SR 5.7.2b.

Technical Specification surveillance requirement SR 5.7.2 does not specifically require functional testing of the fuel storage facility total air flow. This apparent oversight was identified and a revised surveillance procedure was approved on November 11, 1985, to add steps for verification that the total air flow through the fuel storage facility is at least 12,000 CFM, in accordance with LCO 4.7.3b.

EVENT DESCRIPTION:

During the performance of revised surveillance test SR 5.7.2b-A on December 14, 1985, it was discovered that the total air flow through the fuel storage facility was 11,700 CFM. This was below the minimum requirement of 12,000 CFM, as required by LCO 4.7.3.

The last time the air flow rate through the fuel storage facility was verified was March 13, 1974. Because of the time involved, it must be assumed that recent single cooling loop operations in the fuel storage facility were prohibited by LCO 4.7.3, which requires the capability to draw 12,000 CFM through the fuel storage facility when only one cooling water coil is operable.

CAUSE DESCRIPTION:

An investigation into the cause of the reduced flow through the fuel storage facility revealed leakage in several pipe chase walls connected to the reactor building ventilation system (Figure 2).

The leaks in the pipe chase walls allowed more air into the reactor plant ventilation system downstream of the emergency booster fan. This reduced the relative negative pressure in the ventilation system at that point and, in effect, increased the pressure that the fuel storage well emergency booster fan had to overcome, thereby reducing its efficiency.

ANALYSIS OF EVENT:

LCO 4.7.3 states, in part, that "Both cooling water coils must be operating and their outlet cooling water temperatures 150 degrees Fahrenheit or less, for any storage well containing irradiated fuel. If only one cooling water coil is operable on a storage well, irradiated fuel storage is permissible if the outlet cooling water temperature is 150 degrees Fahrenheit or less, and the ventilation system is capable of supplying a total of 12,000 CFM to the Fuel Storage Facility. If the above conditions cannot be met for a well or wells containing irradiated fuel, immediate action shall be taken to re-establish the desired conditions. If the desired conditions have not been re-established within 24 hours, the irradiated fuel shall be transferred to a storage well, or wells, for which the desired conditions can be met." The Basis for Specification LCO 4.7.3 states, in part, that "In the event of a complete interruption of cooling to one of the fuel storage wells as a result of a rupture or blockage of both cooling coils, the affected storage well would be cooled by increasing the normal ventilation air flow through the fuel storage vault containing the affected fuel storage well. The ventilation system is capable of moving air through the vault at a rate of 9000 CFM until water cooling is restored or the well emptied. Normal ventilation flows of 1500 CFM are maintained through the other two vaults."

The Fuel Storage Accident Analysis (FSAR section 14.6.3.2) states that in the event of a complete loss of cooling water to one of the fuel storage wells, completely loaded with fuel elements equivalent in activation to the most activated fuel block assumed in the equilibrium core, the fuel storage cavity will be connected to the reactor building vent system, which would draw air through the fuel storage facility at a rate of 9000 CFM until water cooling is restored. Calculations show that the maximum fuel temperature would reach a peak value of 2200 degrees Fahrenheit approximately 90 hours after the accident. This is well below the temperature at which significant damage to the fuel particles occurs. The analysis shows that adequate time is available before the peak temperatures are reached to take corrective actions, but even in the event that no actions are taken, no uncontrolled release of activity to the atmosphere would occur as a result of this highly unlikely accident. The fission products being released from the fuel at an increased rate due to the increase in temperature would be vented to, and collected by, the gas waste systems. The analysis was based on the conservative assumption that the ventilation rate of 9000 CFM would be drawn through all three vault compartments. In reality, it would be possible to connect the entire vent system to the vault containing the defective storage well, resulting in an increased air velocity around the defective storage well, and thus an increased cooling rate.

The LCO 4.7.3b requirement is very conservative with respect to the accident analysis. The accident analysis assumes adequate cooling under worst case conditions with 3000 CFM through the affected vault (Reference 1).

The basis of LCO 4.7.3 and FSAR section 9.1.2.3 were based on design assumptions and not the limiting analysis (FSAR section 14.6.3.2). Technical Specification LCO 4.7.3 should have been written in accordance with the requirements of 10CFR50.36, which states, in part, that "Limiting conditions for operation are the lowest functional capability or performance levels of equipment required for safe operation of the facility."

Although the fuel storage facility total air flow failed to meet the requirement of 12,000 CFM, the air flow through the facility was greater than the limiting analysis of 9000 CFM which would prevent significant fuel particle damage, and the uncontrolled release of radioactivity to the environment.

The current heat load of the irradiated fuel stored within the fuel storage facility is approximately 4 percent of the design heat load (Reference 2).

CORRECTIVE ACTIONS:

The leaks in the pipe chase walls connected to the reactor building ventilation system downstream of the fuel storage facility emergency booster fan were repaired and the fan speed was increased to provide a total air flow of approximately 12,250 CFM, which will ensure compliance with LCO 4.7.3.

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

Proposed Technical Specification changes from the Fort St. Vrain Technical Specification Upgrade Program were submitted to the Nuclear Regulatory Commission on November 27, 1985 (Reference 3). LCO 4.7.3 was revised to require the capability to draw 9000 CFM total air flow through the fuel storage facility when only one cooling water coil is operable on any fuel storage well. Surveillance requirement SR 5.7.2 was revised to require functional testing of the fuel storage facility total air flow.

REFERENCES:

1) PSAR response to question VI.1

2) PSC letter dated 12/10/85, Walker to Berkow (P-85460)

3) PSC letter dated 11/27/85, Lee to Berkow (P-85448)

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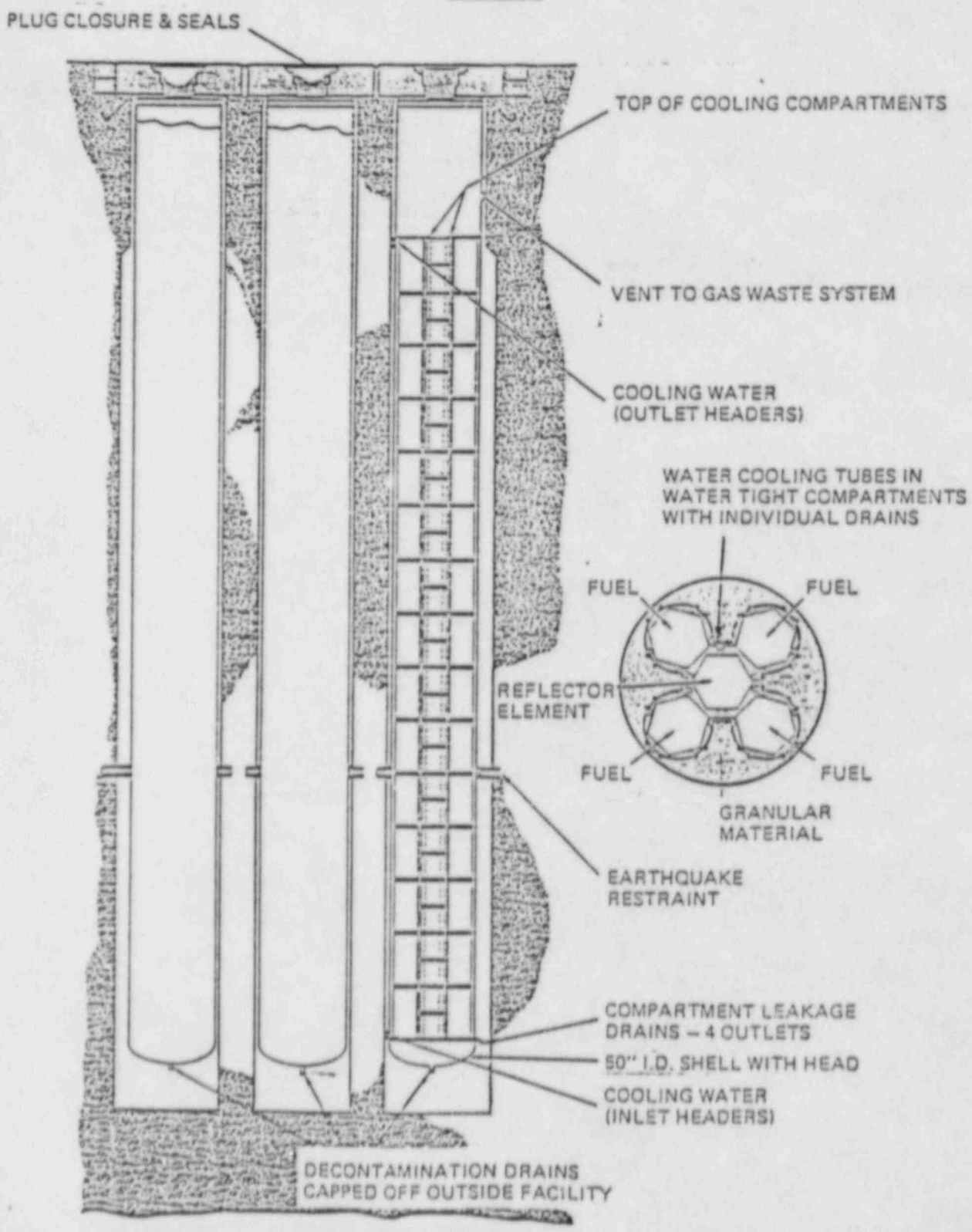
TEXT (If more space is required, use additional NRC Form 366A's) (17)

FIGURE 1



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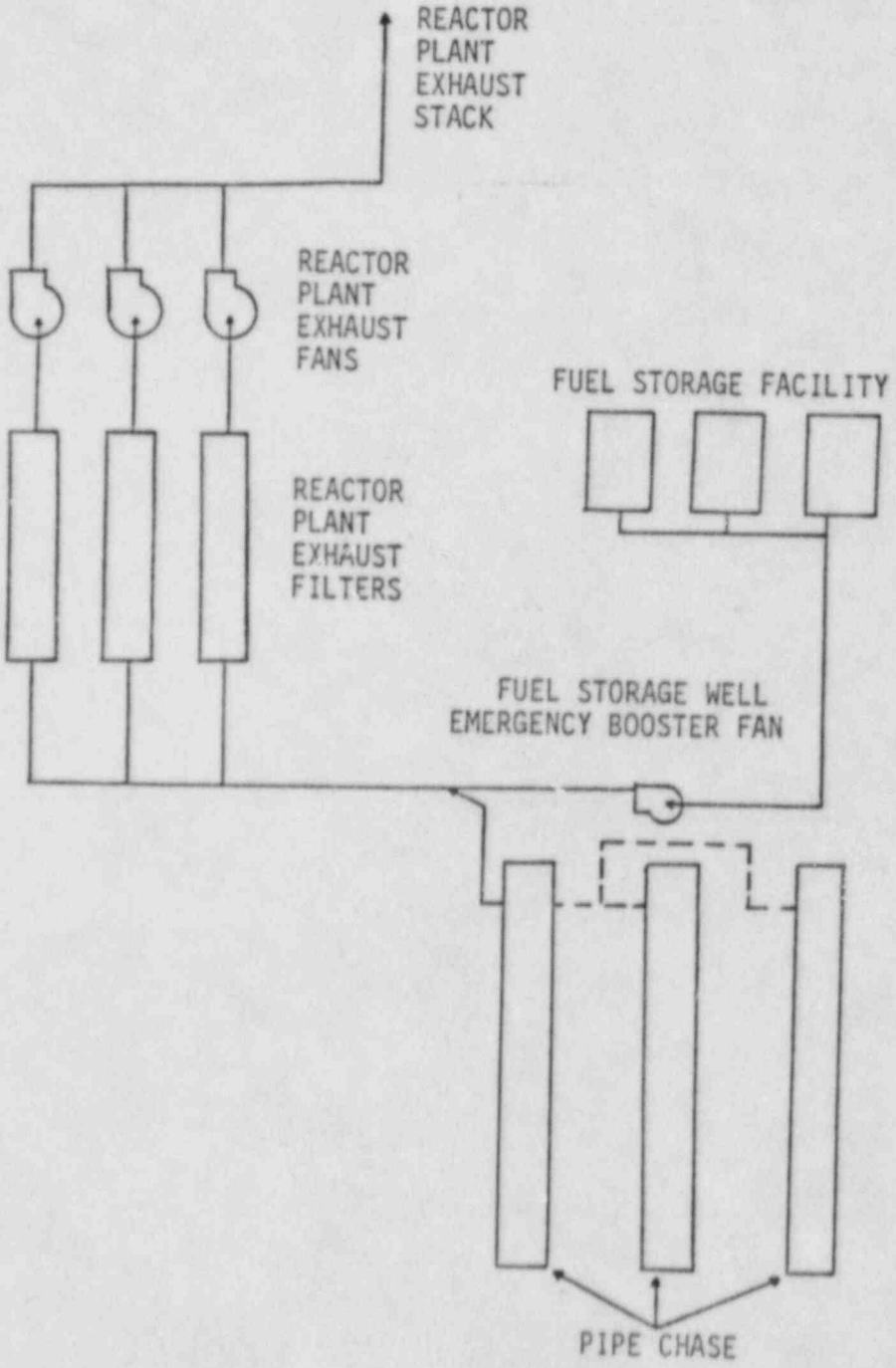
TEXT (If more space is required, use additional NRC Form 366A's) (17)

FIGURE 2



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January 13, 1986
Fort St. Vrain
Unit No. 1
P-86034

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

Docket No. 50-267

SUBJECT: Licensee Event Report
85-028, Final Report

REFERENCE: Facility Operating
License No. DPR-34

Gentlemen:

Enclosed please find a copy of Licensee Event Report No. 50-267/85-028, Final, submitted per the requirements of 10 CFR 50.73(a)(2)(i)(b).

Sincerely,

J. W. Gahm by MHFuch

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
Standarization and Special
Project Directorate

cc: Director, MIPC

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