NRC FORM 366 (7-77)

U. S. NUCLEAR REGULATORY COMMISSION

LICENSEE EVENT REPORT

CONTROL BLOCK: | | | | | | | (1) (PLEASE PRINT OR TYPE ALL REQUIRED INFORMATION)

01 | N E P C S 1 (2) | 0 0 - 0 0 0 0 0 - 0 0 (3) LICENSE NUMBER | 4 1 1 1 1 (4) LICENSE TYPE | CAT (5)

LICENSEE CODE: NEPCS1

CON'T 01 REPORT SOURCE: L (6) | DOCKET NUMBER: 0 5 0 0 0 2 8 5 (7) | EVENT DATE: 1 2 0 7 7 8 (8) | REPORT DATE: 0 1 0 2 7 8 (9)

EVENT DESCRIPTION AND PROBABLE CONSEQUENCES (10)

02 Air flow rate through charcoal filter units VA-26A, VA-26B and VA-66 were found to be

03 less than the minimum required by Technical Specification Table 3-5. In addition, the

04 halide removal test for VA-66 indicated that the maximum permissible leakage was

05 exceeded. The District has analyzed these problems as outlined in Attachments 1 and 2

06 and concluded that the safe operation of the plant is not compromised.

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08

SYSTEM CODE	CAUSE CODE	CAUSE SUBCODE	COMPONENT CODE	COMP. SUBCODE	VALVE SUBCODE
A A (11)	B (12)	C (13)	Z Z Z Z Z Z (14)	Z (15)	Z (16)

(17) LER/RO REPORT NUMBER	EVENT YEAR		SEQUENTIAL REPORT NO.		OCCURRENCE CODE	REPORT TYPE		REVISION NO.
	7 8	—	0 4 1	/	0 3	L	—	0

ACTION TAKEN	FUTURE ACTION	EFFECT ON PLANT	SHUTDOWN METHOD	HOURS (22)	ATTACHMENT SUBMITTED	NPRD-4 FORM SUB.	PRIME COMP. SUPPLIER	COMPONENT MANUFACTURER
X (18)	E (19)	Z (20)	Z (21)	0 0 0 0	Y (23)	N (24)	Z (25)	Z 9 9 9

CAUSE DESCRIPTION AND CORRECTIVE ACTIONS (27)

10 The cause of the flow deficiencies has not yet been determined; investigation is

11 currently proceeding. All charcoal trays from each of the units were removed and

12 cleaned using compressed air and a vacuum cleaner. Excessive leakage through VA-66

13 has been traced to the bypass valve. Flow and halide removal tests for each unit are

14 being rescheduled.

FACILITY STATUS	% POWER	OTHER STATUS (30)	METHOD OF DISCOVERY	DISCOVERY DESCRIPTION (32)
15 H (28)	0 0 0 (29)	NA	C (31)	Surveillance Test Procedure

ACTIVITY RELEASED	CONTENT OF RELEASE	AMOUNT OF ACTIVITY (35)	LOCATION OF RELEASE (36)
16 Z (33)	Z (34)	NA	NA

PERSONNEL EXPOSURES

NUMBER	TYPE	DESCRIPTION (39)
17 0 0 0 (37)	Z (38)	NA

PERSONNEL INJURIES

NUMBER	DESCRIPTION (41)
18 0 0 0 (40)	NA

LOSS OF OR DAMAGE TO FACILITY (43)

TYPE	DESCRIPTION
19 Z (42)	NA

PUBLICITY

ISSUED	DESCRIPTION (45)
20 N (44)	NA

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NRC USE ONLY

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LER 78-041
Omaha Public Power District
Fort Calhoun Station Unit No. 1
Docket No. 05000285

ATTACHMENT NO. 1

Safety Analysis

Charcoal Filter VA-66

The design function of charcoal filter unit VA-66 is described in Section 9.10.2.1 of the FSAR: "During spent fuel handling, the filter will be brought on the line to absorb gaseous iodines in the unlikely event of a fuel handling incident resulting in the release of large quantities of radioactivity." The ventilation exhaust system, in all open areas near the spent fuel pool, is designed and constructed to ensure that any releases of radioactivity in this area would pass through VA-66 prior to being discharged from the plant. Appropriately, all exhaust grilles in these areas converge upstream of VA-66. Thus, the only effect of the low flow rate would be to increase the time required for a release to pass through VA-66. The ability of VA-66 to mitigate the discharge of radioactivity from the plant would not be degraded.

Technical Specification Table 3-5 specifies that the charcoal absorbers show ≥99% freon removal. The measured freon removal for VA-66 was 99.08% (0.92% leakage) with the bypass valve closed manually and 88.42% (11.58% leakage) with the bypass closed by the air operator. As also required in Technical Specification Table 3-5, the charcoal in VA-66 has been shown to remove greater than or equal to 90% (99.64% as tested on November 2, 1978) elemental iodine under design conditions. Assuming 0% leakage past the charcoal cells, elemental iodine removal would be greater than or equal to 90% for VA-66. Assuming 11.58% leakage past the charcoal cells and 90% elemental iodine removal efficiency, the total unit efficiency would be 79.58%. However, assuming actual conditions, 11.58% leakage past the charcoal cells and 99.64 elemental iodine removal efficiency, the total unit efficiency would be 88.1%. The ability of VA-66 to mitigate a release of radioactivity is thus not significantly reduced. However, as an additional precaution, all spent fuel movements in the spent fuel pool have been cancelled until VA-66 bypass valve HCV-712A has been repaired and the freon removal efficiency has been verified to be within specifications.

Spent Fuel Pool Charcoal Filters VA-26A and VA-26B

The design function of charcoal filter units VA-26A and VA-26B is also described in FSAR Section 9.10.2.1: "These filters could be remote-manually brought onto line in the event of an accidental release of activity in these rooms (Safety Injection Pump Rooms) during a plant emergency in particular during the recirculation period following a DBA." A release in one of these rooms could take two possible pathways. The first is through the ventilation exhaust system and thus the charcoal filters; the second is through the doorway of the room. In order to ensure that a release would not pass through the doorway, observations were made to determine the direction of air flow at the doorway. In both cases, air flows into the room. Thus, any release within these rooms would remain in the room until removed through the ventilation exhaust/charcoal filter system. One effect of the low flow rate is to increase the length of time which would be required for removal of a release. The total amount of activity released from the plant will not be increased by this flow deficiency.

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ATTACHMENT NO. 1 (continued)

Safety Analysis (continued)

Spent Fuel Pool Charcoal Filters VA-26A and VA-26B (continued)

The design flow rate of the ventilation system for the safety injection pump rooms was intended to provide sufficient cooling air for the safety injection/containment spray pump motors during a loss of coolant accident (reference LER No. 77-33, Supplement No. 1). Special Test Procedures performed in February, 1978, and during the 1978 Refueling Outage indicate that the design air flow rates through the safety injection pump rooms appear to be very conservative and that a lower flow rate is acceptable.

General

After review of: 1) concentrations available in the spent fuel pool area and safety injection pump rooms following an accidental release of activity; and 2) possible paths available for release of radioactive gaseous effluents to the environment, the District concludes that 10 CFR Part 100 limits would not be exceeded as previously analyzed under Sections 14.15 and 14.18 of the FSAR. It is, therefore, concluded that flow deficiencies in units VA-26A/B and VA-66 would not present any undue hazard regarding the health and safety of the public.

It is also the District's conclusion that operation of the auxiliary building ventilation, as presently installed, is adequate to ensure a satisfactory operating environment for the safety injection/containment spray pumps.

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ATTACHMENT NO. 2

Cause Description/Corrective Actions

The District has continued to investigate the consequences of low flow through charcoal filter units VA-26A, VA-26B and VA-66. Gibbs and Hill, Inc., the architect-engineer responsible for the design and installation of this system, indicated that the charcoal filter units were sized to provide effective filtration of air exhausted from the safety injection pump rooms and spent fuel pool area, respectively. The volume flow rates, however, were chosen prior to selection of the charcoal filter units. In the case of the safety injection pump rooms, the design was intended to provide sufficient cooling air for the safety injection/containment spray pump motors. The exhaust flow rate for the spent fuel pool area was selected to provide for control and removal of any radioactive releases in that area.

Two attempts have been made to increase the flow rate through these filter units. The first attempt was a balancing effort by District personnel and proved to be largely unsuccessful. The second attempt, during December of 1977, was a thorough investigation and balancing by Eastern Air Balance Corporation. The results of Eastern's balance effort are outlined below.

	Design Flow (cfm)	Initial Measured Flow, 11/5/77 (cfm)	Final Measured Flow, 12/1/77 (cfm)
VA-26A	5,500	2,508	4,416
VA-26B	5,500	2,581	4,353
VA-66	12,800	8,455	10,378

As these results show, while the flow through each unit has increased substantially, the Technical Specification requirement of design flow ± 10% still could not be obtained.

The initial surveillance test performance during the 1978 Refueling Outage indicated a drop in the flow rates from the 12/1/77 values. See table below. As a result, all the charcoal trays from each of the units were removed and cleaned using compressed air and a vacuum cleaner. A retest of units VA-26A and VA-26B showed some improvement, but the 12/1/77 values were still not attainable. See table below. Retest data for VA-66 is not yet available.

	Design Flow (cfm)	Initial Measured Flow, 11/13/78 (cfm)	Final Measured Flow, 12/7/78 (cfm)
VA-26A	5,500	3,027	3,682
VA-26B	5,500	3,883	4,130
VA-66	12,800	6,623	Not Available

It is the opinion of the District, and Eastern Air Balance Corporation concurs, that the flows cannot be increased additionally without major modifications of the ventilation system. In an effort to eliminate the need for such modifications, the District is determining whether these flow deficiencies could adversely affect safe operation of the plant.

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ATTACHMENT NO. 2 (continued)

Cause Description/Corrective Action (continued)

Data evaluations are currently in progress and an update report on this subject will be made by February 1, 1979. Upon completion of this study, the ventilation system will either be modified, or a request will be made for a Technical Specification change to allow operation of the Auxiliary Building ventilation system at the existing conditions.

The initial halide removal test on VA-66 indicated that the maximum permissible leakage specified in the Technical Specifications (1%) could not be met. The actual leakage was identified as occurring through the bypass valve, HCV-712A, around the filter. After closing the valve by hand, the leakage was reduced to within specification (actual 0.92%). However, subsequent cycling of the valve and retesting showed that the acceptance criteria could not be met unless the valve was closed by hand cranking. A Maintenance Order was written to investigate and remedy the problem. The halide removal test will be repeated after the valve has been repaired.

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ATTACHMENT NO. 3

Failure Data

See LER 77-033 dated November 8, 1977 and Supplement No. 1 to LER 77-033 dated February 13, 1978.