LICENSEE EVENT REPORT

50-285/76-18

CONTROL BLOCK: [ ] (1–6)

(PLEASE PRINT ALL REQUIRED INFORMATION)

LICENSEE NAME	LICENSE NUMBER	LICENSE TYPE	EVENT TYPE
01 NEFCS1 (7–14)	00-00000-00 (15–25)	4111 (26–30)	03 (31–32)

CON'T	CATEGORY	REPORT TYPE	REPORT SOURCE	DOCKET NUMBER	EVENT DATE	REPORT DATE
01 (7–8)	[ ] (57–58)	L (59)	L (60)	05000285 (61–68)	051476 (69–74)	052676 (75–80)

EVENT DESCRIPTION

02 During preparation of waste summary report a possible violation of release rate for
03 containment purge 76A-11 was discovered. A complete review of calculations and data
04 indicated however that a violation did not in fact occur. (50-285/76-18)
05
06

	SYSTEM CODE	CAUSE CODE	COMPONENT CODE	PRIME COMPONENT SUPPLIER	COMPONENT MANUFACTURER	VIOLATION
07	MB (10)	A (11)	ZZZZZZ (12–17)	2 (43)	Z999 (44–47)	N (48)

CAUSE DESCRIPTION

08 The mathematical model which is the basis for containment analyses and release compu-
09 tations always assumes most conservative alternates. Therefore, results which confirm
10 only minimum detectable activity present by a sensitive spectrometer system(continued)

	FACILITY STATUS	% POWER	OTHER STATUS	METHOD OF DISCOVERY	DISCOVERY DESCRIPTION
11	G (9)	000 (10–12)	NA (13–44)	B (45)	During preparation of release summary (46–80)

	FORM OF ACTIVITY RELEASED	CONTENT OF RELEASE	AMOUNT OF ACTIVITY	LOCATION OF RELEASE
12	G (9)	H (10)	≤ 0.0007 Ci of I-131 (11–44)	Vent to atmosphere (45–80)

PERSONNEL EXPOSURES

	NUMBER	TYPE	DESCRIPTION
13	000 (9–11)	B (12)	Below measurable quantities (13–80)

PERSONNEL INJURIES

	NUMBER	DESCRIPTION
14	000 (9–11)	NA (12–80)

OFFSITE CONSEQUENCES

15 None

LOSS OR DAMAGE TO FACILITY

	TYPE	DESCRIPTION
16	Z (9)	NA (10–80)

PUBLICITY

17 NA

8403230243 760526
PDR ADOCK 05000285
S PDR

ADDITIONAL FACTORS

18 Cause Description (con't): may provide inaccurately high concentration release
19 rates.

NAME: Fred F. Franco PHONE: 402-426-4011

GPO 881-667

ATTACHMENT NO. 1

Analysis of Occurrence/Safety Analysis

During preparation of radioactive effluent release data summary for the semi-annual report submittal, it was found that the radioactive release rate of halogens and particulates with half-lives greater than eight days exceeded 9.6E-02 microcuries per second for containment purge (76A-11) performed on February 21, 1976. Initial computations indicated the release rate had been 0.417 microcuries per second. Analysis of radioactive constituents prior to release did not indicate higher activities than previous normal containment purges. The purge was performed in accordance with proper procedures. No stack radiation monitor alarms occurred during the release. Monitor recordings for RM-062 (the gaseous effluent monitor), RM-061 (the particulate effluent monitor) and RM-060 (the iodine effluent monitor) indicated that no Technical Specification release rate had been exceeded.

Commencing on January 9, 1976, and continuing thru the present time extensive modifications have been initiated in the radiochemistry parameters for the evaluation of gamma spectras obtained from a computerized Ge-Li detector gamma spectrometer. These modifications are in conformance with Regulatory Guide 1.21, "Measuring, Evaluating, and Reporting Radioactivity in Solid Wastes and Releases of Radioactive Materials in Liquid and Gaseous Effluents from Light-Water-Cooled Nuclear Power Plants", and incorporate analytical experience into the interpretation of the complex spectra.

In early March, 1976, the calculation of Minimum Detectable Activity was revised from a three sigma standard deviation to a one sigma standard deviation as recommended in Regulatory Guide 1.21. The computer software incorporated in the peak search program which evaluates the spectra is based on several criteria. The criteria for identification of specific isotopic peaks was also modified at this time to require a greater certainty for the presence of a specific peak prior to its identification and quantization.

Based on these new criteria and interpretation of similar gamma spectra it was suspected that the software peak search program used on February 21, 1976, identified iodine-131 activity below its sensitivity capability due to the peak uncertainty criteria and the broad energy range selection utilized at that time. Interferring gamma radioactivity attributable to noble gases present in the sample most likely caused the computer to quantitize xenon-135 as iodine-131 and therefore indicate a greater value for iodine-131 than actually present.

A review of the gamma spectra specifically for containment purge 76A-11 using the present peak search criteria and a 3 KeV energy range window provides a more accurate evaluation of the isotopic concentrations in the containment air sample. All gaseous concentrations remained identical to those previously determined; however, the iodine-131 concentration decreased from 6.89E-08 µCi/cc to $\leq$1.12E-08 µCi/cc. This consideration reduced the

Analysis of Occurrence/Safety Analysis (Continued)

release rate calculation from 0.417 μCi/sec to ≤ 8.79E-02 μCi/sec based on the release time required to release a volume of air equivalent to one containment volume (2.9734E+10cc).

The results determined from this computer re-evaluation of the original spectra suggested an extensive review of all containment purges since February 21, 1976. The results of this study and re-evaluation of data are summarized in Table I.

When the release rate of iodine-131 plus participate activity is based on the total release time of the purge rather than that amount of time required to release only the volume of air equivalent to one containment volume, all release rates are well under the Technical Specification limit. It is known that the entire activity contained in a volume of containment air cannot be removed during the time required to exchange the first containment volume. The true release rate must be based on an exponential factor correcting for dilution of containment air by fresh air supplied by the containment supply fans during the purge.

In addition, since RM-060 and RM-061 did not increase significantly or alarm during any of the suspected releases, it is concluded that Technical Specification 2.9(2)b has not been violated during containment purge 76A-11 as initially reported. Although the re-evaluation of data indicates that containment purge 76A-22 exceeded the allowed release rate for halogens and particulates with half-lives greater than eight days during the initial state of the purge, this cannot be considered a violation since stack monitors which repeatedly have demonstrated operability did not indicate a measurable rise in stack concentration. At this time the release rate can only be verified to have been ≤ 0.478 microcuries per second.

To prevent a future release rate violation, additional calculations will be incorporated into the present containment purge permit. These calculations will be performed prior to issuance of the release permit and will confirm in writing that all release rate limitations established by the Technical Specifications will not be exceeded. In addition, the lower detection limit of the iodine analysis will be improved.

Purge Number	Date	Original I-131 Act. (μCi/cc)	Re-evaluated I-131 Act. (μCi/cc)	Original I-131 & Part. Rel. Rate (μCi/sec) *	Re-evaluated I-131 & Part. Rel. Rate (μCi/sec) *	Max. Rel. Rate of I-131 & Part. based on exponential purge rate (μCi/sec) **	Ave. Rel. Rate of I-131 & Part. based on exponential purge rate (μCi/sec) ***
76A-11	2-21-76	6.89E-08	≤ 1.12E-08	0.4177	≤ 0.0879	≤ 0.0556	≤ 0.0324
76A-12-1	2-22-76	4.39E-08	≤ 2.22E-08	0.1205	≤ 0.0622	≤ 0.0393	≤ 0.0114
76A-12-3	2-23-76	1.90E-08	1.90E-08	0.1286	0.1286	0.05113	0.0171
76A-13	2-24-76	≤ 1.04E-08	≤ 3.48E-09	≤ 0.1008	≤ 0.434	≤ 0.0274	≤ 0.00287
76A-14	2-25-76	≤ 7.49E-08	≤ 2.50E-08	≤ 0.3229	≤ 0.1079	≤ 0.0682	≤ 0.0299
76A-15	2-25-76	≤ 2.79E-08	≤ 9.99E-09	≤ 0.3467	≤ 0.1243	≤ 0.0786	≤ 0.01053
76A-17	3-2-76	≤ 3.31E-08	≤ 1.20E-08	≤ 0.1225	≤ 0.0448	≤ 0.02836	≤ 0.00289
76A-18	3-3-76	≤ 5.70E-08	≤ 1.90E-08	≤ 0.1029	≤ 0.0344	≤ 0.02177	≤ 0.01469
76A-22	4-2-76	≤ 1.82E-08	≤ 1.82E-08	≤ 0.8257	≤ 0.8257	≤ 0.4778	≤ 0.0079

* Release rate based on the release of all I-131 & particulate activity in containment during the time required to release a volume of air equivalent to one containment volume (2.973E+10cc) pressure corrected.

** Release rate based on exponential release of I-131 & particulate activity in containment during the time required to release a volume of air equivalent to one containment volume (2.973E+10cc) pressure corrected.

*** Release rate based on exponential release of I-131 & particulate activity in containment during the entire purge time.

ATTACHMENT NO. 2

Corrective Action

Initial summary data indicated that Technical Specification 2.9(2)b had been exceeded for halogens and particulates with half-lives greater than eight days during a containment purge (76A-11) on February 21, 1976. The primary cause of the violation was that an actual release rate of 5100 CFM was experienced while the release permit specified a release rate of less than or equal to only 1000 CFM. The difficulty to totally control containment effluent releases at a release rate less than 10,000 CFM had previously been identified. Design Change Requests 74B-43 and 74B-64 had been initiated to correct the difficulty. Design Change Request 74A-1 is being completed to improve capability to concentrate and sample iodine of the containment atmosphere.

In addition, a thorough review of the method for analyzing and reporting airborne effluent concentrations and release rates has revealed further possible violations if present high conservative assumptions are continued. All containment purges since February 21, 1976, were inspected (see Table I) for summarized results.

By substituting more valid assumptions in place of highly conservative methods used for the basis of routinely reporting effluent data, compliance to effluent release rates and concentrations has been demonstrated. Completion of appropriate design change requests for flow control and adoption of more accurate analytical and calculational procedures provides sufficient operational and administrative control to prevent an actual Technical Specification violation. Until such modifications are completed, all containment purges will be monitored more closely.

ATTACHMENT NO. 3

Failure Data

This is the first time that the halogen and particulate release rate limit has been exceeded by the mathematical model.

Omaha Public Power District

1623 HARNEY ■ OMAHA, NEBRASKA 68102 ■ TELEPHONE 536-4000 AREA CODE 402

May 26, 1976
FC-178-76

Mr. E. Morris Howard
U. S. Nuclear Regulatory Commission
Region IV
611 Ryan Plaza Drive
Suite 1000
Arlington, TX 76012

Dear Mr. Howard:

Reference: Fort Calhoun Station Unit No. 1
Docket No. 50-285

In accordance with the Fort Calhoun Station's Technical Specifications, the Omaha Public Power District, as holder of facility operating license DPR-40, submits three copies of the following licensee event report 50-285/76-18 to satisfy the requirements of Regulatory Guide 1.16.

Sincerely,

W. C. Jones
Section Manager
Operations

WCJ/WDD:rge

Enclosure

cc: Director, Office of Management
Information and Program Control
U. S. Nuclear Regulatory Commission
Washington, DC 20555 (3)

Director, Office of Inspection and
Enforcement
U. S. Nuclear Regulatory Commission
Washington, DC 20555 (30)

Mr. L. C. Shalla
SARC Chairman
PRC Chairman
Fort Calhoun File (2)

5840

COPY SENT REGION IV