



Omaha Public Power District
444 South 16th Street Mall
Omaha, Nebraska 68102-2247

September 28, 1998
LIC-98-0120

U. S. Nuclear Regulatory Commission
Attn: Document Control Desk
Mail Station P1-137
Washington, DC 20555

Reference: Docket No. 50-285

Subject: Licensee Event Report 1998-012 Revision 0 for the Fort
Calhoun Station

Please find attached Licensee Event Report 1998-012 Revision 0 dated
September 28, 1998. This report is being submitted pursuant to
10CFR50.73(a)(2)(ii)(B). If you should have any questions, please
contact me.

Sincerely,

S. K. Gambhir
Division Manager
Nuclear Operations

EPM/epm

Attachment

c: E. W. Merschoff, NRC Regional Administrator, Region IV
L. R. Wharton, NRC Project Manager
W. C. Walker, NRC Senior Resident Inspector
INPO Records Center
Winston and Strawn

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LICENSEE EVENT REPORT (LER)

(See reverse for required number of digits/characters for each block)

ESTIMATED BURDEN PER RESPONSE TO COMPLY WITH THIS MANDATORY INFORMATION COLLECTION REQUEST: 50.0 HRS. REPORTED LESSONS LEARNED ARE INCORPORATED INTO THE LICENSING PROCESS AND FED BACK TO THE INDUSTRY. FORWARD COMMENTS REGARDING BURDEN ESTIMATE TO THE INFORMATION AND RECORDS MANAGEMENT BRANCH (T-6 F33), U.S. NUCLEAR REGULATORY COMMISSION, WASHINGTON, DC 20555-0001, AND TO THE PAPERWORK REDUCTION PROJECT (3150-0104), OFFICE OF MANAGEMENT AND BUDGET, WASHINGTON, DC 20503.

FACILITY NAME (1)

Fort Calhoun Station Unit No. 1

DOCKET NUMBER (2)

05000285

PAGE (3)

1 OF 5

TITLE (4)

Inappropriate Approval of a Change to the Hydrogen Generation Design Basis

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 NAME	DOCKET NUMBER
08	28	1998	1998	-- 012 --	00	09	28	1998	FACILITY NAME	DOCKET NUMBER 05000
									FACILITY NAME	DOCKET NUMBER 05000

OPERATING MODE (9)	1	THIS REPORT IS SUBMITTED PURSUANT TO THE REQUIREMENTS OF 10 CFRs (Check one or more) (11)			
		20.2201(b)	20.2203(a)(2)(v)	50.73(a)(2)(i)	50.73(a)(2)(viii)
POWER LEVEL (10)	100	20.2203(a)(1)	20.2203(a)(3)(i)	X 50.73(a)(2)(ii)	50.73(a)(2)(x)
		20.2203(a)(2)(i)	20.2203(a)(3)(ii)	50.73(a)(2)(iii)	73.71
		20.2203(a)(2)(ii)	20.2203(a)(4)	50.73(a)(2)(iv)	OTHER
		20.2203(a)(2)(iii)	50.36(c)(1)	50.73(a)(2)(v)	Specify in Abstract below or in NRC Form 366A
		20.2203(a)(2)(iv)	50.36(c)(2)	50.73(a)(2)(vii)	

LICENSEE CONTACT FOR THIS LER (12)

NAME

Erick Matzke, Station Licensing Engineer

TELEPHONE NUMBER (Include Area Code)

402-533-6855

COMPLETE ONE LINE FOR EACH COMPONENT FAILURE DESCRIBED IN THIS REPORT (13)

CAUSE	SYSTEM	COMPONENT	MANUFACTURER	REPORTABLE TO EPIX	CAUSE	SYSTEM	COMPONENT	MANUFACTURER	REPORTABLE TO EPIX

SUPPLEMENTAL REPORT EXPECTED (14)

YES
(If yes, complete EXPECTED SUBMISSION DATE)

NO

EXPECTED SUBMISSION DATE (15)

MONTH DAY YEAR
11 13 98

ABSTRACT (Limit to 1400 spaces, i.e., approximately 15 single-spaced typewritten lines) (16)

On June 25, 1998, the Plant Review Committee (PRC) approved a change to the "Generation of Hydrogen in Containment" portion of the Updated Safety Analysis Report (USAR). The change incorporated a 1996 analysis of hydrogen generation rates. This was considered a revision to the analysis of record from 1987. The 1987 analysis did not require hydrogen purging prior to 30 days following a Loss of Coolant Accident (LOCA). The 1996 analysis was subsequently reviewed as part of a voluntary program in progress to upgrade the radiological consequences analyses. This review noted that a hydrogen purge would be required at 18 days following a LOCA. A review of the 1996 hydrogen generation analysis determined that some assumptions and input data to the analysis were overly conservative or were not representative of plant conditions and therefore should not have been included in the USAR change. Following this discovery, on August 24, 1998, the USAR change was withdrawn by the PRC.

The probable root cause for the failure to adequately assess the impact of the proposed USAR change is due to a lack of easily identifiable design basis information regarding the parameters or assumptions utilized in performing control room habitability calculations.

The design analysis is being reviewed and updated as needed. The USAR will be appropriately updated following completion of the analyses.

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

BACKGROUND

Fort Calhoun Station (FCS) Updated Safety Analysis Report (USAR) Section 14.17 "Generation of Hydrogen in Containment" is an evaluation of the potential accumulation of hydrogen in the containment following a hypothetical Design Basis Accident (DBA) Loss-of-Coolant Accident (LOCA). The results of this evaluation demonstrate that the hydrogen generation levels in containment can be safely and effectively controlled by the hydrogen purge system. This system will be used, when necessary, to prevent the hydrogen concentration from exceeding three (3) volume percent. A conservative lower flammability limit for hydrogen in air saturated with water vapor is approximately four (4) volume percent. Purging is initiated at 3 percent in order to allow for approximately 1 percent error in the readings of the hydrogen analyzer. Calculations of hydrogen production were performed to evaluate the time between the DBA and initiation of purge.

USAR Section 14.15 "Loss-of-Coolant Accident" evaluates the consequences of LOCA events on FCS. Section 14.15.8.2 "Post-LOCA Doses to Control Room Personnel" evaluates the impact of the LOCA accident on control room habitability. In evaluating these doses the USAR states, "The doses have been calculated based on the following assumptions and conditions: ... [item 9] The containment hydrogen purge operation is assumed to be initiated 46 days following the accident. Therefore, this source is not considered for control room habitability purposes."

EVENT DESCRIPTION

On June 25, 1998, the Plant Review Committee (PRC) approved a change to the "Generation of Hydrogen in Containment" portion of the USAR. This change incorporated a 1996 analysis (EA-FC-96-038, "Reanalysis of Hydrogen Generation in Containment") of hydrogen generation rates. At the time of its approval, the 1996 analysis was considered a revision to the analysis of record from 1987. The 1987 analysis did not require hydrogen purging prior to 30 days following a DBA Loss of Coolant Accident (LOCA). The 1996 analysis was reviewed as part of a program in progress to upgrade the radiological consequences analysis. This review of the 1996 hydrogen analysis indicated a hydrogen purge would be required at 18 days following a DBA LOCA. The radiological consequences of a hydrogen purge at 18 days following a DBA LOCA were not included in the design basis radiological consequences analysis. A review of the 1996 hydrogen generation analysis determined that the purpose of the analysis was to evaluate hydrogen inventory associated with the minimum purge flowrate conditions and therefore contained assumptions and input data that were excessively conservative and not accurately representing plant conditions. Therefore, the 1996 analysis should not have been included in the USAR change. Following this discovery, on August 24, 1998, the USAR change was withdrawn by the PRC.

The following chronological sequence of events has been developed to detail the background and sequence of the events leading up to the approval of the USAR change.

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In 1987 work was initiated to show that hydrogen-producing material in containment, which had not previously been incorporated in analyses, would not create enough hydrogen to cause a problem with flammability or detonation post-LOCA. Based on the projected time at which a 3 percent hydrogen concentration is reached, the time to an initial hydrogen purge from this analysis was determined to be 46 days.

The work performed in 1987, by the Omaha Public Power District (OPPD), Halliburton NUS Environmental Corporation and Oak Ridge National Engineering Laboratories, was reviewed by Combustion Engineering (CE) in 1988 to validate its conclusions. Several small changes to the analysis were made which reduced the time to an initial hydrogen purge to 43.5 days. The 1987 and 1988 work was combined and documented as Operations Support Analysis Report (OSAR) 87-48.

In 1990 justification, based on OSAR 87-48, was provided to the NRC to explain why hydrogen recombiners or connections for them in containment were not needed. The justification said that since FCS did not have the need to purge a hydrogen buildup in containment prior to the 30 day control room habitability consideration, and the purge system flowrate was sufficient to prevent hydrogen accumulation greater than 3 percent, the hydrogen recombiners were unnecessary.

On March 19, 1991, a safety evaluation was issued for license amendment number 138 by the NRC. This safety evaluation addressed the hydrogen purge system potentially impacting control room habitability if the hydrogen purge system does not function in accordance with the design assumptions.

Between 1991 and 1996 a parametric study was conducted to evaluate hydrogen inventory for minimum purge flowrate. This analysis determined the sensitivity of the hydrogen generation analysis to changes in containment temperature profile, additional hydrogen producing materials in containment, and other factors. This study did not use input assumption consistent with the USAR design basis.

On June 28, 1996, EA-FC-96-038 was prepared and reviewed to bring the 1991 to 1996 sensitivity cases into the OPPD document control system. It was not determined at this time that these cases did not represent the current design basis and should not form the basis for the initial hydrogen purge time. The 10CFR50.59 evaluation created for the USAR update does mention radiological consequences but failed to recognize the significance of the 30 day control room dose criteria.

On June 21, 1998, the resulting changes to USAR Section 14.17 were submitted for PRC approval. However, neither this update nor the 10CFR50.59 evaluation generated to support the update recognized the impact of these changes had on the radiological consequences related to control room habitability.

On June 25, 1998, the PRC approved the USAR revision to Section 14.17.

Between August 18-21, 1998, during the evaluation of the control room radiological consequences, it was discovered that the shortened purge time had

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an impact on the control room habitability analysis for LOCA.

Subsequent to the retraction of the USAR change, additional review of this issue has determined that the change approved on June 25, 1998, constituted a condition outside the design basis of the plant. On, August 27, 1998, at 1648 CDT upon it was conservatively determined that the plant was outside of its design basis. A one (1) hour non-emergency report was made to the NRC Operations Center at 1728 CDT pursuant to 10CFR50.72(b)(1)(ii)(B). This report is being made pursuant to 10CFR50.73(a)(2)(ii)(B). Currently, the radiological consequences analysis is consistent with the 1987 hydrogen generation analysis. No design or operating activities were conducted during this two month period that would have been affected by the incorrectly incorporated analysis.

SAFETY SIGNIFICANCE

OSAR-87-48 continues to be the current design basis. A preliminary investigation of questions about changes in parameters that could influence this analysis have been evaluated. Based upon the changes to the design basis since the OSAR-87-48 analysis, it has been concluded that the time frame for initial containment purge will not fall sooner than the 30 day design criteria and cause an invalidation of the control room habitability analysis.

In addition, investigation of the effects of hydrogen purge on the control room dose indicate that an initial purge time of greater than 25 days is within the dose limits.

This change to the USAR had little practical significance since operator actions following a LOCA are based on actual hydrogen monitoring which is expected to be consistent with the 1987 analysis, not with the 1996 analysis. Therefore, this event had minimal effect on the health and safety of the public.

CAUSAL ANALYSIS

Preliminary investigation indicates that the probable root cause for the failure to adequately assess the impact of the proposed USAR change is due to a lack of easily identifiable design basis information regarding the parameters or assumptions utilized in performing control room habitability calculations.

CORRECTIVE ACTIONS

Short Term

As previously noted the USAR update has been withdrawn and OSAR 87-48 is the current analysis of record.

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Long Term

1. The current design basis analysis (OSAR 87-48) is being updated to ensure all changes made to the plant have been included in the analysis. Appropriate changes to the USAR and other design basis documents will be made following completion of this update. The update will be completed by December 31, 1998.
2. The final root cause determination will be completed by October 16, 1998. A revision to this LER will be issued with the final root cause and any necessary corrective actions including a schedule for their completion by November 13, 1998.

PREVIOUS SIMILAR EVENTS

LER 96-03 reported a similar incident where a lack of information in the USAR on control room habitability resulted in a change to plant operation that caused the plant to operate in a condition outside of the plant's design basis.