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

January 21, 1997
LIC-97-0003

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 96-015 Revision 0 for the Fort Calhoun Station

Please find attached Licensee Event Report 96-015 Revision 0 dated January 21, 1997. This report is being submitted pursuant to 10 CFR 50.73(a)(2)(i)(B). If you should have any questions, please contact me.

Sincerely,

S. K. Gambhir
Division Manager
Production Engineering

DDD/ddd

Attachment

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

NRC FORM 366 (4-95) U.S. NUCLEAR REGULATORY COMMISSION

APPROVED BY OMB NO. 3150-0104
EXPIRES 4/30/98

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.

LICENSEE EVENT REPORT (LER)

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

FACILITY NAME (1)	DOCKET NUMBER (2)	PAGE (3)
Fort Calhoun Station Unit No. 1	05000285	1 OF 5

TITLE (4)

Improper Fuel Loading next to an Inoperable Wide Range Nuclear Instrument

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
10	28	96	96	-- 015 --	00	01	21	97		05000
									FACILITY NAME	DOCKET NUMBER 05000

OPERATING MODE (9)	5
POWER LEVEL (10)	0

THIS REPORT IS SUBMITTED PURSUANT TO THE REQUIREMENTS OF 10 CFR§ (Check one or more) (11)

20.2201(b)	20.2203(a)(2)(v)	X 50.73(a)(2)(i)	50.73(a)(2)(viii)
20.2203(a)(1)	20.2203(a)(3)(i)	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	TELEPHONE NUMBER (Include Area Code)
Carl Stafford - Principle Reactor Engineer	(402) 533-6670

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 15 single-spaced typewritten lines) (16)

On October 28, 1996, during cycle 17 fuel reload, seven fuel assemblies were loaded into the reactor vessel near inoperable Wide Range Power Channel D (source range) while the operable channels in other quadrants of the core were unable to provide visual indication due to their distance from the assemblies. Technical Specification 2.8(4) requires neutron flux to be continuously monitored by at least two source range neutron monitors whenever core geometry is being changed, with each monitor providing continuous visual indication in the control room.

OP-11, "Reactor Core Refueling" did not contain guidance concerning the requirement to place the initial fuel assemblies near operable detectors and did not provide guidance to address contingency actions when an excore detector is inoperable. As a result, the fuel reload sequence was not revised to load near an operable detector.

The Omaha Public Power District has reviewed the practices associated with fuel reload and will not initially load fuel assemblies near inoperable detectors. OP-11 will be revised before the 1998 refueling outage to require reloading the fuel initially near operable detectors. A reload sequence will be developed for initially loading fuel adjacent to two operable excore detectors and contingency actions will be added to OP-11 should these detectors become inoperable prior to or during the reload process.

LICENSEE EVENT REPORT (LER)
TEXT CONTINUATION

FACILITY NAME (1)	DOCKET	LER NUMBER (6)			PAGE (3)
		YEAR	SEQUENTIAL NUMBER	REVISION NUMBER	
Fort Calhoun Station Unit No. 1	05000285	96	-- 015 --	00	2 OF 5

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

BACKGROUND

The nuclear instrumentation external of the core at Fort Calhoun Station includes four wide (source) range logarithmic channels (A, B, C and D), four power range safety channels (A, B, C, and D) and two power range control channels (A and B). The detectors for these channels are located in instrument thimbles in the biological shield around the reactor core.

The four wide range nuclear instrumentation channels monitor and indicate greater than ten decades of neutron flux. Each wide range channel generates a rate-of-change of power signal for indication, control and protection. A signal is also provided by the wide range channels to enable and/or inhibit reactor protection functions, and provide an audible indication of neutron flux. Each wide range detector assembly contains dual high sensitivity fission chambers surrounded by an aluminum housing.

When the reactor is shutdown, both fission chambers of the wide range detector are used to provide additional sensitivity for measuring neutron leakage in counts per second (cps). Once power reaches approximately 4.0 E-05 percent, approximately 1000 cps, the unshielded fission chamber is electronically cut-off since adequate counts are available from one detector. During fuel movement, low power physics testing and plant start-ups, external counters are connected to the wide range channels to support generation of count rate ratio plots (also referred to as inverse multiplication or 1/M plots). These plots are used for predicting if or when criticality will occur.

Technical Specification 2.8(4) requires, in part, that whenever core geometry is being changed, neutron flux shall be continuously monitored by at least two source range neutron monitors, with each monitor providing continuous visual indication to the control room.

EVENT DESCRIPTION

On October 28, 1996, Fort Calhoun Nuclear Station (FCS) was in Mode 5 (Refueling Shutdown) for a refueling outage. A plant modification was in progress to change out the four wide range nuclear instrument drawers in the control room. This modification was required to replace the existing equipment which had become obsolete, making replacement parts difficult to obtain.

A requirement of the modification was to have two wide range neutron flux detector instrumentation channels operable including source range and start up rate indication during fuel movement. An additional more restrictive requirement of the modification requested by operations was to have three channels operable prior to start of the fuel reload activities. Two of those channels requested by operations were "A" and "D". The

LICENSEE EVENT REPORT (LER)
TEXT CONTINUATION

FACILITY NAME (1)	DOCKET	LER NUMBER (6)			PAGE (3)
		YEAR	SEQUENTIAL NUMBER	REVISION NUMBER	
Fort Calhoun Station Unit No. 1	05000285	96	- 015 -	00	3 OF 5

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

requirement to have channels "A" and "D" operable was based on past fuel reload practices and experience.

During the Cycle 17 reload (as in at least the past three cycles) the fuel assemblies containing the neutron sources were placed in the reactor early in the fuel reload sequence to provide a background count rate for monitoring purposes. This was accomplished by placing four fuel assemblies against the East wall of the core shroud in locations T6, T8, T10, and T12 to provide support for the fuel assembly with the neutron source which is placed one row in from the periphery of the core shroud. Three additional fuel assemblies were placed in core locations S11, S9, and S7, with the fuel assembly containing the first neutron source being placed in location S9. This arrangement provides support on three sides of the fuel assembly which contains the source. The process was then repeated on the West wall of the core shroud to support the fuel assembly with the second neutron source.

When fuel reload activities were scheduled to begin, wide range channel "D" was not available. The delay in the completion of channel "D" of the modification was caused by hardware and testing problems. A field design change request (FDCR) was written to remove the requirement of having channels "A" and "D" operable for fuel reload activities. This change was made to keep fuel reload activities on schedule. This change resulted in reducing the requirement of having channels "A" and "D" operable, to having a minimum of any two channels of the wide range nuclear instrumentation system operable during fuel reload, without any preference as to which channels were available.

The FDCR and its possible impacts on the fuel reload were reviewed by Operations, Construction Management and Engineering prior to approval. Nuclear Engineering evaluated the change from a safety standpoint and concluded that the fuel reload could proceed as scheduled.

The decision to proceed with the fuel reload with wide range channel "D" inoperable was based on the following four points: 1) Three of the wide range system channels were operable, which exceeded the requirement of Technical Specification 2.8(4) of having two channels operable, 2) the boron concentration of the reactor coolant system was greater than the required Cycle 17 refueling boron concentration of 2100 parts per million (ppm), 3) without including the control element assemblies which were inserted in the fuel assemblies prior to reload, the shutdown margin was much greater than 5%, and 4) any criticality concerns would be detected by the three operable wide range channels during fuel reload activities.

After all of the initial condition requirements of Operating Procedure OP-11, "Reactor Core Refueling" were met, fuel reload activities commenced at 0442 hours on

LICENSEE EVENT REPORT (LER)
TEXT CONTINUATION

FACILITY NAME (1)	DOCKET	LER NUMBER (6)			PAGE (3)
		YEAR	SEQUENTIAL NUMBER	REVISION NUMBER	
Fort Calhoun Station Unit No. 1	05000285	96	-- 015 --	00	4 OF 5

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

October 28, 1996.

During fuel reload activities an inverse count rate ratio, 1/(Co/Ci), plot is maintained for at least two wide range system channels throughout core loading. The control room operator completes this calculation for each fuel assembly. Following the loading of each fuel assembly, the control room operator ensures that the reactor will not go critical and allows the next fuel assembly to be moved.

While placing fuel assemblies against the East wall of the core shroud in the vicinity of the inoperable channel "D" detectors, the value for the base count detected on channels "A"' and "C" remained at zero during the first five fuel assembly moves, and the count rate ratio value remained at one. During the sixth movement of fuel assembly T028, which contained the first neutron source, the base count value showed an increase to 0.010 cps on channel "A" and 0.008 cps on channel "C".

The next series of fuel assembly moves were on the West side of the reactor adjacent to the operable channel "A". These moves were to place the second source in the reactor using the same process to build out to the second row from the shroud to provide support for fuel assembly T027, which contained the second neutron source. During the next seven moves, the count rate as well as the count rate ratio values changed for each fuel assembly move.

During refueling an NRC inspector visited the control room on October 28, 1996 and witnessed the initial fuel reload activities as previously described. The inspector noted a lack of audible counts during loading of the initial seven fuel assemblies in the core, including the one which contained the neutron source. The inspector verified that the first seven fuel assemblies were loaded adjacent to channel "D", which was inoperable.

The inspector then observed the loading of the first fuel assembly in the West quadrant, in the vicinity of operable channel "A". The inspector noted that in addition to the audible count rate, a substantial increase in neutron flux indication was observed.

When the monitored neutron flux indication from the operable channels were compared for the two series of moves, they were quite different, even though the characteristics of the fuel assemblies placed in the two areas were similar.

A corrective action document (Condition Report 199601336) was written to document the event. On December 4, 1996, a Notice of Violation was received from the NRC. On December 20, 1996, the FCS Plant Manager determined that a violation of Technical Specification 2.8(4) had occured; in that, seven fuel assemblies were loaded into the

LICENSEE EVENT REPORT (LER)
TEXT CONTINUATION

FACILITY NAME (1)	DOCKET	LER NUMBER (6)			PAGE (3)
		YEAR	SEQUENTIAL NUMBER	REVISION NUMBER	
Fort Calhoun Station Unit No. 1	05000285	96	- 015 -	00	5 OF 5

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

reactor vessel near an inoperable Wide Range Logarithmic Power Channel D (a source range neutron monitor) while the operable channels in other quadrants of the core were unable to provide the required continuous visual indication due to their distance from the assemblies. This report is being submitted in accordance with 10 CFR 50.73(a)(2)(i)(B).

CONCLUSIONS

Fuel reload is controlled under procedure OP-11. This procedure did not contain guidance concerning the requirement to place the initial fuel assemblies near operable excore detectors. OP-11 was deficient in providing guidance to address contingency actions when an excore detector is inoperable prior to, or fails during, core reload. As a result, the fuel reload sequence was not revised and the first seven fuel assemblies loaded into the vessel were placed near an inoperable excore detector.

SAFETY ASSESSMENT

Review of the significance of this event indicates that there was no significance with respect to nuclear safety. At all times during the fuel reload, three of the four channels of the wide range nuclear instrumentation system were operable. In addition, the reactor coolant system was borated to greater than the Cycle 17 refueling boron concentration of 2100 ppm which provided a minimum shutdown margin of 5%. Additional safety margin against the reactor reaching criticality existed as the fuel assemblies were loaded with control element assemblies inserted.

CORRECTIVE ACTIONS

OP-11 will be revised prior to the next refueling outage to require reloading the fuel initially near operable detectors. Reload sequence will be developed for initally loading next to two operable excore detectors and contingency actions will be added to OP-11 should either or both of these detectors become inoperable prior to or during the reload process. This will ensure that the intent of Technical Specification 2.8(4) is met.

PREVIOUS SIMILAR EVENTS

There have been no previous similar events at Fort Calhoun Station.