

Omaha Public Power District
444 South 16th Street Mall
Omaha, Nebraska 68102-2247
402/636-2000

May 24, 1990
LIC-90-0397

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

Reference: Docket No. 50-285

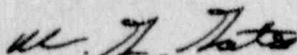
Gentlemen:

Subject: Licensee Event Report 90-13 for the Fort Calhoun Station

Please find attached Licensee Event Report 90-13 dated May 24, 1990.
This report is being submitted voluntarily to describe an event of
general interest.

If you should have any questions, please contact me.

Sincerely,



W. G. Gates
Division Manager
Nuclear Operations

WGG/tcm

Attachment

c: R. D. Martin, NRC Regional Administrator
A. Bournia, NRC Project Manager
P. H. Harrell, NRC Senior Resident Inspector
INPO Records Center
American Nuclear Insurers

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LICENSEE EVENT REPORT (LER)

ESTIMATED BURDEN PER RESPONSE TO COMPLY WITH THIS INFORMATION COLLECTION REQUEST: 50.0 HRS. FORWARD COMMENTS REGARDING BURDEN ESTIMATE TO THE RECORDS AND REPORTS MANAGEMENT BRANCH (P-30), U.S. NUCLEAR REGULATORY COMMISSION, WASHINGTON, DC 20555, 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)

05000218151 OF 04

PAGE (3)

TITLE (4)

Alignment Pin Damage While Moving Reactor Head

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)
04	24	90	90	013	00	05	24	90	N	05000218151
OPERATING MODE (9)		THIS REPORT IS SUBMITTED PURSUANT TO THE REQUIREMENTS OF 10 CFR §. (Check one or more of the following) (11)								
5										
POWER LEVEL (10)	0.010	20.402(b)		20.406(e)		80.73(a)(2)(iv)		73.71(b)		
		20.406(a)(1)(i)		80.38(e)(1)		80.73(a)(2)(v)		73.71(e)		
		20.406(a)(1)(ii)		80.38(e)(2)		80.73(a)(2)(vi)		<input checked="" type="checkbox"/> OTHER (Specify in Abstract below and in Text, NRC Form 366A)		
		20.406(a)(1)(iii)		80.73(a)(2)(i)		80.73(a)(2)(viii)(A)				
		20.406(a)(1)(iv)		80.73(a)(2)(ii)		80.73(a)(2)(viii)(B)				
		20.406(a)(1)(v)		80.73(a)(2)(iii)		80.73(a)(2)(ix)		Voluntary Report		

LICENSEE CONTACT FOR THIS LER (12)

NAME	TELEPHONE NUMBER
Mark Hollingsed, Shift Technical Advisor	4025331-16831

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

CAUSE	SYSTEM	COMPONENT	MANUFACTURER	REPORTABLE TO NPDs	CAUSE	SYSTEM	COMPONENT	MANUFACTURER	REPORTABLE TO NPDs

SUPPLEMENTAL REPORT EXPECTED (14)

YES (If yes, complete EXPECTED SUBMISSION DATE)	NO	EXPECTED SUBMISSION DATE (15)	MONTH	DAY	YEAR
<input checked="" type="checkbox"/>	<input type="checkbox"/>				

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

On April 21, 1990 at approximately 1930 hours, during the placement of the reactor head on the reactor vessel, the head was inadvertently lowered too far. It contacted the head alignment pins, bending the pins and causing superficial damage to the head flange. The head was immediately raised and moved back to the head laydown area. One alignment pin was bent approximately 12 to 14 degrees, and the other was bent approximately 5 degrees. At the time of the event, the plant was in Mode 5, Refueling Shutdown, for the 1990 Refueling and Maintenance Outage.

The alignment pins were straightened, the damage to the flange was repaired, and on April 25, 1990, the head was placed on the reactor vessel.

The cause of this event has been determined to be a procedural deficiency, in that there was no accurate method provided to determine the proper distance of the head above the alignment pins.

An improved method of maintaining appropriate clearance between the reactor head and the tops of the alignment pins will be developed and implemented.

This LER is submitted on a voluntary basis.

LICENSEE EVENT REPORT (LER)
TEXT CONTINUATION

ESTIMATED BURDEN PER RESPONSE TO COMPLY WITH THIS INFORMATION COLLECTION REQUEST: 50.0 HRS. FORWARD COMMENTS REGARDING BURDEN ESTIMATE TO THE RECORDS AND REPORTS MANAGEMENT BRANCH (P-530), U.S. NUCLEAR REGULATORY COMMISSION, WASHINGTON, DC 20555, 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) 0 5 0 0 0 2 8 5 9 0 0 0 1 3 0 0 2	LER NUMBER (6)			PAGE (3)	
		YEAR	SEQUENTIAL NUMBER	REVISION NUMBER		

TEXT (If more space is required, use additional NRC Form 308A's) (17)

At Fort Calhoun Station Unit No. 1, the reactor cavity area contains the lower cavity, upper cavity, and cavity walkway. The upper cavity is 25 feet below the cavity walkway, and surrounds the reactor vessel flange. During reactor head removal and replacement, two alignment pins on opposite sides of flange are used to maintain the alignment of the head with the reactor vessel. The pin on the south side of the flange is 13 feet, 5-1/2 inches high, and the north pin is 13 feet, 4-3/4 inches high. On April 25, 1990, during the 1990 Refueling and Maintenance Outage, work was in progress to place the reactor head back on the reactor vessel using procedure MM-RR-RC-0314, "Reactor Vessel Closure Head Installation".

To stay within the bounds of the safety analysis for a postulated dropping of the head, MM-RR-RC-0314 contains a restriction that the head must not be raised more than one foot above the tops of the alignment pins while over the reactor. The procedure also requires that before lifting the head, the portable stairs providing access from the reactor cavity walkway to the upper cavity must be moved out of the way. Before moving these stairs, all personnel exit the upper cavity. With no one in the upper cavity to provide sightings of the distance between the head flange and the pins, personnel on the cavity walkway must estimate the head clearance while looking down as the head is moved.

As part of the evolution, the head had been moved from the head laydown area to the cavity area west of the reactor and approximately 2 feet above the tops of the alignment pins. The head was then moved over the reactor and lowered closer to the pins, using sightings from personnel on the cavity walkway. At this point, the head was slowly swinging approximately 6 inches from east to west. The cavity stairs were then re-installed in the upper cavity, and maintenance personnel started walking down the stairs to perform final alignment checks and to spot for final adjustment of the head height. At approximately 1930 hours, as these personnel were partially down the stairs, the machinist foreman noticed that the head had stopped swinging. At the same time, the Containment Coordinator, who was watching the load cell of the Containment Polar Crane, observed that the load decreased 6000 pounds and continued decreasing. Shortly after the foreman observed the head to have stopped swinging, the head tilted to the west, and the north side of it appeared to come down 6 to 12 inches. The head then began pivoting on the south alignment pin in a 6 foot arc, with the top of the head leading the bottom in a "figure 8" pattern. During this period both the foreman and the Containment Coordinator shouted at and signalled the crane operator to raise the head. The crane operator immediately started raising the head; however, since the crane was in the "slow" mode, the head did not rise quickly. Recognizing this discrepancy, the crane operator selected the "normal" mode, raised the head clear of the alignment pins, and returned the head to the head laydown area.

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FACILITY NAME (1)

DOCKET NUMBER (2)

LER NUMBER (8)

PAGE (3)

Fort Calhoun Station Unit No. 1

0 5 0 0 0 2 8 5

YEAR

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NUMBER

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0 3 OF 0 4

TEXT (If more space is required, use additional NRC Form 305A's) (17)

Measurements determined that the south pin was bent approximately 5 degrees, and the north pin was bent approximately 12 to 14 degrees. Both pins were subsequently straightened to allow further use. A thread gage was used to check the alignment pin hole threads, and confirmed there was no damage to the threads.

The head flange area around the south alignment pin hole had a slight indentation in it, indicating that it rested momentarily on the south alignment pin. This area is outside the pressure boundary of the system; it was smoothed and cleaned using a file and a sharpening stone. Flatness was then confirmed using a straight edge. The flange area on the outside of the north alignment pin hole was lightly swiped, indicating that the head momentarily rested on the north pin also, then slid off it. Since this damage was on the outside of the hole, and therefore not on a sealing surface, no repairs were necessary on this section. Magnetic particle testing on the head flange revealed no unacceptable indications.

The NSSS supplier, Combustion Engineering, performed an evaluation to estimate the extent of the damage to the reactor vessel resulting from the horizontal force placed on the alignment pins. The conclusion was that the bearing stress on the flange was less than 20ksi, which is less than 40% of the yield stress of the flange material, and therefore, that there was no damage to the flange. After the evaluations, the head was successfully placed on the reactor vessel on April 25, 1990.

The most damaging accident that could have occurred during this event is the dropping of the head. The consequences of dropping the head have been evaluated in Update Safety Analysis Report (USAR) Section 14.24, "Heavy Load Incident". Among the assumptions are that the head is dropped in an orientation that causes the worst consequences, and that it is dropped from the highest administratively-allowed height (one foot above the tops of the alignment pins). To be an acceptable risk, the consequences of the accident have to comply with the following criteria of NUREG-0612, Section 5.1:

- 1) Any resultant release of radioactive material, based on calculations, will produce doses that are less than or equal to one-fourth the limits of 10 CFR Part 100 (i.e., 75 rem thyroid, 6.25 rem whole body).
- 2) Damage to fuel, based on calculations, will not result in a configuration of the fuel such that k-effective is larger than 0.95.
- 3) Damage to the reactor vessel, based on calculations, is limited so as not to result in water leakage that could uncover the fuel.

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FACILITY NAME (1) Fort Calhoun Station Unit No. 1	DOCKET NUMBER (2) 0 5 0 0 0 2 8 5	LER NUMBER (3)			PAGE (3)		
		YEAR	SEQUENTIAL NUMBER	REVISION NUMBER			
		9 0	— 0 1 3	— 0 0	0 4	OF	0 4

TEXT (If more space is required, use additional NRC Form 303A's) (17)

The USAR analysis has shown that all of these criteria can be satisfied, and that core cooling capability will exist in the event of a head drop. For the April 25 event, the head was resting on the tops of the alignment pins and was never dropped. Thus, this event was well within the bounds of a previously analyzed event and had minimal safety significance.

The cause of this event was determined to be a deficiency in procedure MM-RR-RC-0314, in that there was inadequate guidance for ensuring that acceptable distance of between the tops of the alignment pins and the bottom of the head flange was maintained. Before moving the head, the procedure required all personnel to exit the upper cavity, and the cavity stairs be removed. Since there was no load height indication provided on the Polar Crane control panel, these procedural steps left no accurate means for determining the height of the head flange.

The following corrective actions will be completed:

- (1) A method of maintaining appropriate clearance between the reactor head and the tops of the alignment pins during head movement will be developed by October 31, 1990.
- (2) The method developed by Corrective Action (1) above will be implemented during the 1991 Refueling and Maintenance Outage prior to placing the head on the reactor vessel.
- (3) Procedure MM-RR-RC-0314 will be revised to assign an individual to watch for unexpected movement while the Polar Crane is stopped during the movement of the reactor head. This revision will be implemented by October 31, 1990.

This is the first LER submitted by Fort Calhoun Station on equipment damage caused by a procedural deficiency. This LER is submitted on a voluntary basis to describe an event of general interest.