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

April 4, 1994 LIC-94-0076

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 94-003 for the Fort Calhoun Station

Please find attached Licensee Event Report 94-003 dated April 4, 1994. This report is being submitted pursuant to 10 CFR 50.73(a)(2)(vii). If you should have any questions, please contact me.

Sincerely,

W. G. Gates

W Vice President

WGG/jrg

Attachment

c: LeBoeuf, Lamb, Greene & MacRae L. J. Callan, NRC Regional Administrator, Region IV S. D. Bloom, NRC Project Manager R. P. Mullikin, NRC Senior Resident Inspector INPO Records Center

9404060008 940404 PDR ADOCK 05000285 S PDR

JE22 .

(5-92)	ORM 366				U.S. NUC	LEAR REG	ULATORY	COM	AISSION		1	APPROV	ED BY	OMB NO. RES 5/31/9	3150-0 5	104	
	(See	LIC	ENS for rec	EE	EVENT REF	PORT (L	ER)	ock)		ESTIMU INFORI COMM AND R REGUL THE F MANAG	ATED MATIC ENTS ECOF ATOF APEF 3EME	BURDEN ON COLLE REGARDI ROS MANA RY COMMI RWORK RE INT AND BU	PER ICTION NG BUR GEMENT SSION, N EDUCTIC JDGET, N	RESPONSE TO REQUEST: IDEN ESTIMATI BRANCH (MN WASHINGTON, DN PROJECT WASHINGTON,	0 COMP 50.0 HR E TO THI (BB 7714) DC 2055 (3150-010 DC 20503	LY WITH S. FO E INFOR , U.S. NI 5-0001, J H), OFF	H THIS RWARD MATION JCLEAR AND TO ICE OF
FACILITY	NAME (1)	For	t Ca	1hou	un Station U	Init No.	1		en er natis natigena	DOOK	ET NU	MBER (2)				PAGE 1 0	E (33) F 5
TITLE (4)		Inou		b ; 1 ;	ity of Day 4	lator Du	unoc Di	10 to	Excos	c iuo	C a	nd Ac	cum	lation			
E3./5	ATT DATE	1110	T	DII	LED MUMBED (P)	later ru	Imps Du	TT N' INA	EXCES	Sive	20	OTHER	EACH	THE ILLE			-
EVE	NILATE	(5)		T	SEQUENTIAL	REVISION	REPOR	1 P.UM	BEH (I)	FACILITY	NAN	NAME		DOCKE	DOCKET NUMBER		
MONTH	DAY	YEAR	YEAR		NUMBER	NUMBER	MONTH	DAY	YEAR				0500		5000		
03	04	94	94		003	00	04	04	94	FACILITY	(NAME			DOCKE	DOCKET NUMBER		
OPE	ATING	1	THIS	REP	ORT IS SUBMITTE	D PURSUA	NT TO TH	HE REC	UIREME	NTS OF	- 10	CFR 8	(Chec	k one or m	ore) (1	1)	Mary are an orall
MO	DE (9)	1		20.40)2(b)		20.405(0	c)				50.73(a)(2)(iv)		1	3.71(0)
PO	WER	100		20.40	05(a)(1)(i)		50.36(c)	(1)				50.73(a	(2)(v)		1	'3.71(c)
LEVI	EL (10)	100		20.40	05(a)(1)(ii) 05(a)(1)(iii)		50.36(c)	(2)(1)			X	50.73(a	(2)(vii))(A)	(Specifi	In Abstr	ACT
				20.40	(a)(1)(iv)		50.73(a)	(2)(ii)				50.73(a	(2) (viii)(B)	below a	and in Te	xt, NRC
				20.40	05(a)(1)(v)		50.73(a))(2)(iii)				50.73(a)(2)(x)	the second se	- Form 3	oury.	
						LICENSEE	CONTACT	FOR T	HIS LER (12)			a constant of the				
NAME		Jam	es R	. Ge	eschwender,	Station	n Licer	nsing	Engin	eer		(402)	NE NUM	BER (Include A 3-6857	rea Code)		
			C	OMPL	ETE ONE LINE FO	R EACH CO	MPONEN	T FAILL	JRE DESC	RIBED	IN 1	THIS REP	PORT ((13)			
CAUSE	SYSTEM	CON	PONEN	T	MANUFACTURER	REPORTABLE TO NPRDS			CAUSE	SYST	EM	COMPO	NENT	MANUFACTU	REA	REPORT TO NP	ABLE
С	BI		P		B580	Υ											
	-						Lunnous				-	1					-
Line	0			SL	JPPLEMENTAL REI	PORT EXPE	CTED (14)			-		EX	PECTED	MONTH	DAY	YEAF
TE	e /es, compiete	EXPECT	ED SUBA	10000	N DATE)	X	(NO					1	SUB	MISSION			
(11)				maran/m	a average								DA	VIE (15)			1
ABST	ACT (Lim	it to 14	00 spa	ces, i.	e., approximately	15 single-sp	aced type	written	lines) (16)				DA	(1b)		elenaan	
At rou for ini dis AC- sta	ACT (Lim 1624 or tine pr a long tially charge 10B was tus wi 0407 or	it to 140 n Mar ump r ger p when isol s dec thin n Mar	ch 1 otat eric the atic lare Tech	, 1 ion od o pu n v ed i inic	e., approximately 994, an atte . The Opera f time than mp is starte alve is ful noperable an al Specifica 994, a simi	empt wa ator no normal ed, but ly open nd action ation t lar inc	aced type s made ted th . Nori will . The on was ime lin ident	to s at pu mally come Oper take mits.	tart F mp mot (, amp down a ator en to r	Raw W tor a mete after immed resto	ate mps r tl ia re	er (R) s appe indica he ass tely s the p g RW P	V) Preared ation socia secur pump	ump AC- d to sta n will o ated pur red the to open AC-10C	l ay hi go hi pump rable	or gh gh	
At rou for ini dis AC- sta At The riv	ACT (Lim 1624 of a long tially charge 10B was tus wi 0407 of priman er, res	it to 140 n Mar ump r ger p when isol s dec thin n Mar ry ca sulti	ch 1 otat eric the atic lare Tech ch 4 use ng i	, 1 tion od o pu on v ed i nic t, 1 of in e	e. approximately 994, an atte . The Opera f time than mp is starte alve is ful noperable an al Specifice 994, a simi these event excessive sa	empt wa ator no normal ed, but ly open nd action ation t lar inc s was d nd accu	aced type s made ted th . Nori will . The on was ime lin ident etermi mulati	to s at pu mally come Oper take mits. occur ned t on ar	tart F mp mot (, amp down a ator en to r red in co be e	Raw W tor a mete after immed resto nvolv eleva the s	ate mps tl ine ine ite	er (RV s appe indica he ass tely s the p the p d sand tion a	V) Presared ation socia secun pump d con area	ump AC- d to stan ated pur red the to open AC-10C ntent in of the	l ay hi go hi pump rable n the pump	or gh gh	
At rou for inidis AC- sta At The riv The ord ins per of	ACT (Lim 1624 or tine pr a long tially charge 10B was tus wi 0407 or prima er, res norma er to r talled formed the In	it to 140 n Mar Jer p when isol s dec thin n Mar ry ca sulti l fre minim at t to a take	ch 1 otat eric the atic lare Tech ch 4 use ng i sses Stru	, 1 ion d o put n v d in in in in in in in in in in in in in i	e., approximately 994, an atte The Opera f time than mp is starte alve is ful noperable an al Specific 994, a simi these event xcessive sau for rotation possibilit ts of RW put hether dive re.	empt wa ator no normal ed, but ly open nd action ation t lar inc s was d nd accu n of RW y of ex mps AC- rsion b	aced type s made ted th . Nori will . The on was ime li ident ident etermi mulati pumps cessiv 10B an affles	to s at pu mally come Oper take mits. occur ned t on ar has e sar d AC- shou	tart F mp mot (, amp down a ator en to r red in cound f been d accu 10C, a ild be	aw W tor a mete after immed resto nvolv eleva the s incre umula and a plac	inter inter	er (RV s appe indica he ass tely s the y the y d sand tion ed on on. evalu	V) Presared ation socia secun pump d con area an Spar ation	ump AC- d to sta n will o ated pur red the to ope AC-10C ntent in of the interim ge line n will iver be	10B f ay hi go hi pump rable n the pump basi s wil be d in	or gh gh s. is in l be fror	it
At rou for ini dis AC- sta At The riv The ord ins per of	ACT (Lim 1624 of tine pr a long tially charge 10B was tus wi 0407 of primal er, re norma er to r talled formed the In	it to 140 n Mar ump r ger p when isol s dec thin n Mar ry ca sulti l fre ninim at t to a take	ch 1 otat eric the atic lare Tech use ng i ize the i sses Stru	, 1 ion d o pup n v ed i nic in e in e in cy the inle s w uctu	e. approximately 994, an atte The Opera f time than mp is starte alve is ful noperable an al Specifica 994, a simi these event excessive sat for rotation possibilit ts of RW put hether diver-	empt wa ator no normal ed, but ly open nd acti ation t lar inc s was d nd accu n of RW y of ex mps AC- rsion b	aced type s made ted th . Nori will . The on was ime lin ident ident etermi mulati pumps cessiv 10B an affles	written to s at pu mally come Oper take mits. occur ned t on ar has e sar d AC- shou	tart F mp mot (, amp down a ator en to r red in cound f been d accu 10C, a ild be	aw W tor a mete after immed resto nvolv eleva the s incre umula and a plac	interiore interiore	er (RV s appe indica he ass tely s the p the p d sand tion a ed on on. evalu- on t	V) Preserved ation social securo pump d con area an Spar atio he r	ump AC- d to sta n will o ated pur red the to open AC-10C ntent i of the interim ge line n will iver be	10B f ay hi go hi pump rable n the pump basi s wil be d in	or gh gh s. is in l be fror	it

NRC FORM 366A	D FORM 366A U.S. NUCLEAR REGULATORY COMMISSIO			APPROVED BY OMB NO. 3150-0104 EXPIRES 5/31/95				
	LICENSEE EVENT REPORT TEXT CONTINUATION	(LER)	ESTIMATE INFORMAT COMMENT AND RECU REGULATO THE PAPI MANAGEN	D BURDEN PER REI TION COLLECTION RE TIS REGARDING BURDE ORDS MANAGEMENT BI ORY COMMISSION, WAI DRWORK REDUCTION AENT AND BUDGET, WAI	SPONSE TO C IQUEST: 60.0 N ESTIMATE TO RANCH (MNBB SHINGTON, DC PROJECT (315 SHINGTON, DC 2	XOMPLY WITH THIS HRS. FORWARD D THE INFORMATION 7714), U.S. NUCLEAR 20555-0001, AND TO 0-0104), OFFICE OF R0503.		
	FACILITY NAME (1)	DOCKET NUMBER (2)		LEA NUMBER (8)		PAGE (3)		
			YEAR	BEQUENTIAL NUMBER	REVISION NUMBER			
Fort Calhou	n Station Unit No. 1	05000285	94	003	00	2 OF 5		

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

BACKGROUND

The Fort Calhoun Station (FCS) Raw Water (RW) System is primarily designed to provide cooling for the Component Cooling Water (CCW) System, which in turn provides cooling for various plant heat loads during normal and accident conditions. Four RW pumps (AC-10A, AC-10B, AC-10C and AC-10D) are installed in the Intake Structure to provide screened river water to the CCW heat exchangers. The RW pump discharge piping is arranged as two interconnected headers, valved at the pumps and in the Auxiliary Building. Each header is designed to accommodate full flow to the CCW heat exchangers under all modes of plant operation.

The Intake Structure consists of three cells separated by concrete walls perpendicular to the river. Two cells contain one raw water pump each and one cell (Cell 'B') contains two raw water pumps (AC-10B and AC-10C).

Technical Specification (TS) 2.4 addresses operability requirements for raw water pumps. This TS allows one RW pump to be inoperable indefinitely without applying any Limiting Condition for Operation (LCO) action statement, if river water temperature is below 60 degrees Fahrenheit. When the river water temperature is greater than 60 degrees, an inoperable RW pump is to be restored to operability within seven days or the reactor is to be placed in hot shutdown.

During normal operation, one or two raw water pumps are ordinarily in operation, depending on the river temperature and the system loads. During winter months one pump is normally in service, and during summer months two pumps may be in service due to high river temperature or heavy loading of the CCW heat exchangers. Raw water pumps are normally switched each day (daily rotation) to equalize pump run time and prevent excessive sand buildup around the suction bell.

EVENT DESCRIPTION

On March 1, 1994 at 1624, with FCS in Mode 1 at approximately 100% power, an attempt was made to start RW pump AC-10D for routine pump rotation. Pump AC-10A was running at the time, and Pump AC-10D was out of service due to Intake Structure Cell 'C' having been previously isolated and pumped down for travelling screen maintenance. River water temperature was below 60 degrees F.

NRC'FORM 386A (5-92)	C'FORM 366A U.S. NUCLEAR REGULATORY COMMISSIO				APPROVED BY OMB NO. 3150-0104 EXPIRES 5/31/95				
	LICENSEE EVENT REPORT TEXT CONTINUATION	(LER)	ESTIMATE INFORMAT COMMENT AND RECO REGULATO THE PAPE MANAGEM	D BURDEN PER RES NON COLLECTION RE I'S REGARDING BURDE DRY COMMISSION, WAI ENVORK RECUCTION IENT AND BUDGET, WAI	SPONSE TO D QUEST: 50.0 N ESTIMATE TO RANCH (MNBB 7 SHINGTON, DC 1 PROJECT (3150 SHINGTON, DC 2	OMPLY WITH THIS HRS. FORWARD THE INFORMATION 714), U.S. NUCLEAR 20555-0001, AND TO -00104), OFFICE OF 0503.			
	FACILITY NAME (1)	DOCKET NUMBER (2)		LER NUMBER (6)		PAGE (3)			
			YEAR	SEQUENTIAL NUMBER	REVISION NUMBER				
Fort Calhour	1 Station Unit No. 1	05000285	94	003	00	3 OF 5			

After taking the pump control switch to START, the Operator noted that motor amps appeared to stay high for a longer period of time than normal. Normally, amp meter indication will go high initially when a pump is started, but will come down after the associated pump discharge isolation valve is fully open. The Operator immediately secured the pump and AC-10B was declared inoperable, placing the plant in a seven-day LCO. Pump AC-10A remained in service.

In order to start the pump, the rotating assembly was manually rotated to dislodge accumulated sand, and the discharge isolation valve was opened. AC-10B was then successfully started and run. AC-10B was declared operable on March 1, 1994 at 2217. Also, while AC-10B was considered inoperable, Intake Structure Cell 'C' was re-flooded so that AC-10D could be returned to operable status, and AC-10C was started and run for approximately two hours to verify its operability. The frequency of RW pump rotation was temporarily increased to approximately once per twelve hours following this occurrence.

On March 4, 1994 at 0407, with FCS in Mode 1 at approximately 100% power, an attempt was made to start RW pump AC-10C for routine pump rotation. Pump AC-10B was running at the time, and Pump AC-10D was again out of service due to Intake Structure Cell 'C' having been re-isolated and pumped down for continued travelling screen maintenance. River water temperature was below 60 degrees F.

After taking the pump control switch to START, the Operator noted that motor amps appeared to stay high for a longer period of time than normal. The Operator immediately secured the pump and AC-10C was declared inoperable, placing the plant in a seven day LCO. Pump AC-10B remained in service.

In order to start the pump, the rotating assembly was manually rotated to dislodge accumulated sand, and the discharge isolation valve was opened. AC-10C was then successfully started and run. AC-10C was declared operable on March 4, 1994 at 1425. After AC-10C was run for approximately two hours, AC-10A was started for pump rotation. The frequency of RW pump rotation was temporarily increased to approximately once per eight hour shift following this occurrence.

Following review, it was determined that these events should be reported pursuant to 10 CFR 50.73(a)(2)(vii), based on the inoperability of two different RW pumps due to the same cause (i.e., excessive sand accumulation), within a relatively short period of time.

NRC FORM 366A	U.S. NUCLEAR F	APPROVED BY OMB NO. 3150-0104 EXPIRES 5/31/95				
	LICENSEE EVENT REPORT TEXT CONTINUATION	(LER)	ESTIMATE INFORMAT COMMENT AND RECC REGULATO THE PAPE MANAGEM	D BURDEN PER RES TION COLLECTION RE IS REGARDING BURDE PROS MANAGEMENT BI DRY COMMISSION, WAI SRWORK REDUCTION IENT AND BUDGET, WAI	SPONSE TO C QUEST: 50.0 N ESTIMATE TO RANCH (MNBB 7 SHINGTON, DC 1 PROJECT (3150 SHINGTON, DC 2	OMPLY WITH THIS HRS. FORWARD THE INFORMATION 714), U.S. NUCLEAR 20555-0001, AND TO 50104), OFFICE OF 9503.
	FACILITY NAME (1)	DOCKET NUMBER (2)	LER NUMBER (0)			PAGE (8)
			YEAR	SEQUENTIAL NUMBER	REVISION NUMBER	
Fort Calhou	n Station Unit No. 1	05000285	94	003	00	4 OF 5

CONCLUSIONS

The primary cause of these events was determined to be elevated sand content in the river. Higher than normal sand content can be caused by several factors, including low river water level (which typically occurs between November and March) and/or heavy rain up-river from the plant. During such times, sand can settle out around the suction area of a secured raw water pump and accumulate significantly in a matter of days. Excessive accumulation in the area of the pump intake can result in the pump ingesting a large "slug" of sand when it is initially started. This can stop the pump from rotating, resulting in high motor amps and the potential for tripping of the associated pump motor breaker.

Intake Structure sand accumulation is not a new issue and has been identified and documented as early as 1972. More recently, three occurrences of RW pump motor breakers tripping due to excessive sand accumulation were documented in 1992, one involving AC-10B (March 1992) and two involving AC-10C (November and December 1992). Research of the operating histories of RW pumps AC-10A and AC-10D indicate that sand accumulation has not been a problem in many years. In response to these occurrences, an Engineering Change 1. ice (ECN 93-431) was initiated in 1993 to install sparge lines at the inlets of raw are pumps AC-10B and AC-10C. ECN 93-431 had not yet been installed when the two instances discussed in this LER occurred.

SAFETY ASSESSMENT

The safety significance of the March 1 and March 4, 1994 occurrences is considered to have been minimal. In both cases, river water temperature was below 60 degrees F, therefore one RW pump would have been sufficient to provide adequate cooling water flow in the event of a design basis accident. On both occasions two RW pumps remained operable, and TS LCO time limits for restoring operability of a third RW pump were met.

Excessive sand accumulation around the suction area of RW pumps is an issue that is potentially applicable to all four RW pumps. However, each of the recently documented occurrences (i.e., the three 1992 occurrences and the two 1994 occurrences) involved one of the two RW pumps in Intake Structure Cell 'B' (i.e., AC-10B or AC-10C). None of these occurrences involved simultaneous failure of two or more RW pumps due to excessive sand accumulation, and none of these occurrences involved failure of an operating RW pump once it has been placed in service. As a result, the probability of an event involving simultaneous common cause failures of all RW pumps is considered to be extremely low. In the unlikely event of a loss of all the RW pumps the station abnormal operating procedures direct the use of the fire protection pumps to provide cooling to the RW-CCW heat exchangers.

NRC-FORM 366A (5-92)	FORM 366A U.S. NUCLEAR REGULATORY COMMISSION			APPROVED BY OMB NO. 3150-0104 EXPIRES 5/31/95				
	LICENSEE EVENT REPORT TEXT CONTINUATION	(LER)	ESTIMATE INFORMAT COMMENT AND RECO REGULATO THE PAPI MANAGEN	D BURDEN PER REI TION COLLECTION RE TS RECARDING BURDE DRDS MANAGEMENT F- DRY COMMISSION, WAI ERWORK REDUCTION HENT AND BUDGET, WAI	SPONSE TO C QUEST: 50.0 N ESTIMATE TO RANCH (MNBB 7 SHINGTON, DC 2 PROJECT (3150 SHINGTON, DC 2	DMPLY WITH TH HRS. FORWAR THE FORMATIO 714), U.S. NUCLEA 20555-0001, AND T H0104), OFFICE C 0503.		
	FACILITY NAME (1)	DOCKET NUMBER (2)	ALC UNIVERSITY AND	PAGE (3)				
			YEAR	SEQUENTIAL NUMBER	REVISION NUMBER			
Fort Calhoun	n Station Unit No. 1	05000285	94	003	00	5 OF 5		

CORRECTIVE ACTIONS

The following corrective actions have been or will be completed:

- 1. The normal frequency for rotating RW pumps has been temporarily increased to once per eight hour shift. This is being completed to minimize the possibility of excessive sand accumulation. Since this was undertaken, there have been no further incidents of sanding of the RW pumps.
- 2. Engineering Change Notice 93-431 is scheduled to be implemented by April 25, 1994 to install sparge lines at the inlets of RW pumps AC-10B and AC-10C. This schedule is dependent on river water temperature remaining below 60 degrees F until installation is complete, otherwise installation will be completed by December 1, 1994. Since the time that Fort Calhoun Station typically experiences sanding problems with the RW pumps (between November and March) has past, safety will not be compromised if it becomes necessary to delay this installation to December 1, 1994.
- 3. An evaluation will be performed to assess whether river vanes should be placed on the river bed in front of the Intake Structure to further reduce sanding. This evaluation will be based on the results of hydraulic modeling of the river and Intake Structure. This evaluation is currently scheduled to be completed by September 30, 1994.

PREVIOUS SIMILAR EVENTS

As previously discussed, there have been several occurrences of RW pump inoperability due to excessive sand accumulation. The March 1 and March 4, 1994 occurrences discussed in this LER are notable in that two different pumps were impacted within a relatively short period of time.