



UNITED STATES
NUCLEAR REGULATORY COMMISSION
REGION IV

611 RYAN PLAZA DRIVE, SUITE 1000
ARLINGTON, TEXAS 76011

JUN 22 1990

DOCKET 50-285

MEMORANDUM FOR: Bruce Boger, Acting Assistant Director, Division of Reactor Projects, Project Directorate IV

FROM: Samuel J. Collins, Director, Division of Reactor Projects, Region IV

SUBJECT: REQUEST FOR REVIEW OF THE FORT CALHOUN STATION (FCS) TECHNICAL SPECIFICATIONS (TS)

During the 1989 summer months, the licensee experienced problems with low Missouri River levels. To address the potential for low levels, the licensee revised Procedure AOP-01 (Attachment 1) to specify what actions would be taken at various levels. Note that many of the actions specified are based on the level in the cells of the intake structure instead of the level in the river.

During various times of the year, the screens for the intake structure cells can become clogged with debris or ice. The clogging can result in the level in a cell being significantly lower than the level in the river. Data recorded by the licensee (Attachment 2) indicate that cell level may be as much as 17 inches below river level.

The LCOs in TS 2.16 are based on the level of the river. It appears that using the river level as a basis of the limiting condition for operation may be nonconservative since cell levels may be significantly lower. The licensee addressed this apparent nonconservatism in a memo (Attachment 3).

It is requested that NRR review the basis of TS 2.16 to determine if the basis represents a nonconservative approach to safe plant operation. If it is determined that a nonconservative basis exists, it is requested that NRR pursue a TS change with the licensee. The Region IV contact with regard to this request is Les Constable (FTS 728-8151).

Samuel J. Collins
Samuel J. Collins, Director
Division of Reactor Projects

Attachments:

1. Parts of Procedure AOP-1, "Acts of Nature"
2. Missouri River Data
3. OPPD Internal Memorandum, dated December 22, 1989

cc w/attachments:

P. Harrell 9107020440 910622
R. Azua PDR ADOCK 05000285
L. Constable P PDR
D. Dudley, PDIV-1, NRR
A. Bournia, PM, NRR

010057

add. Breckley Ltr.

BF03

ATTACHMENT 1

Fort Calhoun Station
Unit No. 1

AOP-01

ABNORMAL OPERATING PROCEDURE

Title: ACTS OF NATURE

Setpoint/Procedure
Form Number (FC-68): 30273

Reason for Change: AOP Upgrade Project. To convert from a single-column narrative format to a two-column instruction/contingency action format as required by EOP/AOP Procedure Generation Package ("Writer's Guide")

Contact Person: Greg Guliani

AOP-01 - ACTS OF NATURE

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SECTION IV - LOW RIVER WATER LEVEL

1.0 PURPOSE

The purpose of this section is to describe the steps which must be taken in the event of low river level, including guidance for ice conditions.

2.0 ENTRY CONDITIONS

One or more of the following conditions may exist:

- a. U.S. Army Corps of Engineers forecasts the possibility of river level falling below 983 ft 0 inches.
- b. Actual river level has fallen below 983 ft 0 inches as verified from the intake structure.

SECTION IV - LOW RIVER WATER LEVEL (Continued)

INSTRUCTIONS

CONTINGENCY ACTIONS

- 3.1 MONITOR Circulating Water Pump operation, Raw Water Pump operation, and grid/screen differential pressures for possible loss of suction.

NOTE

Operations Management will inform the U.S. Army Corps of Engineers that the FCS low river level administrative limit has been reached when river level is ≤ 982 ft 0 inches and request increased river flow from Gavins Point. The Corps of Engineers can be reached during normal business hours at (402) 221-7354. The Omaha District Emergency Response Management Team is available 24 hours per day at (402) 221-4148. This number is a recording where a message is left and then the appropriate person is paged to return the call. 982 ft 0 inches was established as an administrative river level limit on 11/14/1989 by memo PED-SSE-89-953S.

- 3.2 IF river level goes to ≤ 982 ft 0 inches, THEN the Shift Supervisor will perform the following:

- a. NOTIFY Operations Management of requirement to contact U.S. Army Corps of Engineers.
- b. NOTIFY the Resident or Senior Resident NRC Inspector.

SECTION IV - LOW RIVER WATER LEVEL (Continued)

INSTRUCTIONS

CONTINGENCY ACTIONS

3.2 Continued

- c. NOTIFY NRC Operations
Center per Standing
Order R-11, Notification
Of Significant Events
based on a potential
press release from the
U.S. Army Corps of
Engineers.

NOTE

Control Room river level indication can be used for the purpose of maintaining a continuous river level watch so long as it is able to provide indication of a sudden drop in river level. However, in order to rely on this indication for the purpose of initiating preplanned actions, it can NOT differ from actual level by more than 3 inches.

- d. Compare ERF Computer
river level indication
with level reading taken
locally.

- 3.3 IF Circulating Water or Raw
Water are lost, THEN IMPLEMENT
AOP-10, Loss of Circulating
Water or AOP-18, Loss of Raw
Water, respectively.

- 3.4 IF conditions are present fo
ice formation on the traveling
screens, THEN OPERATE the
screens in "MANUAL FAST" or
"MANUAL SLOW" as necessary.

SECTION IV - LOW RIVER WATER LEVEL (Continued)

INSTRUCTIONS

CONTINGENCY ACTIONS

NOTE

The continuous river level watch can be stationed in the Control Room or the Intake Structure. This person will monitor river level and pump performance and will warn the shift supervisor of any sudden loss of water supply. (Tech. Spec. 2.16(2))

3.5 IF the river level goes to
5980 ft 0 inches, THEN
perform the following:

- a. ESTABLISH a continuous river level watch in the Control Room or the Intake Structure.
- b. Shift Supervisor will notify the Resident or Senior Resident NRC Inspector.
- c. DIRECT the Auxiliary Operator Nuclear or the continuous river level watch (if stationed in the Intake structure) to perform periodic cell level checks per Attachment 2 at least every 60 minutes.

SECTION IV - LOW RIVER WATER LEVEL (Continued)

INSTRUCTIONS

CONTINGENCY ACTIONS

3.5 Continued

- d. IF an ice jam develops,
as indicated by visual
sighting or an
unexpected decrease in
river level, THEN Shift
Supervisor will notify
U.S. Army Corps of
Engineers.
((402) 453-0202)

3.6 IF the operator performing
Attachment 2 reports exceeding
any of the following limits
for low cell level, THEN
perform the designated action:

- a. IF any cell level is
≤979 ft 0 inches, THEN
perform actions for
river level
≤979 ft 0 inches
(Step 3.7).
- b. IF Cell A level is
≤978 ft 0 inches OR
Cell C level is
≤977 ft 4 inches, THEN
perform actions for
river level
≤978 ft 0 inches
(Step 3.8).

SECTION IV - LOW RIVER WATER LEVEL (Continued)

INSTRUCTIONS

CONTINGENCY ACTIONS

3.6 Continued

- c. IF Cell A level is
≤978 ft 0 inches AND
Cell C level is
≤977 ft 4 inches, THEN
perform actions for
river level
≤977 ft 4 inches
(Step 3.9).
- d. IF any cell level is
≤976 ft 9 inches, THEN
perform the following:
 - i) ATTEMPT TO restore
level in the
affected cell by
stopping the
Circulating Water
Pump running on
that cell and by
backwashing the
GRIDS, if
necessary.

SECTION IV - LOW RIVER WATER LEVEL (Continued)

INSTRUCTIONS

CONTINGENCY ACTIONS

3.6 Continued

ii) IF the cell level
is NOT restored,
THEN start a Raw
Water Pump in a
cell with level
>976 ft 9 inches
AND stop the
affected Raw Water
Pump.

iii) IF the cell level
can NOT be
maintained
>976 ft 9 inches,
THEN the Shift
Supervisor will
determine Raw
Water System
operability and
take L.O actions
per Technical
Specification
2.4(1)c,
"Containment
Cooling".

SECTION IV - LOW RIVER WATER LEVEL (Continued)

INSTRUCTIONS

CONTINGENCY ACTIONS

3.7 IF the river level goes to
≤979 ft 0 inches, THEN perform
the following:

- a. Shift Supervisor will
notify the Resident or
Senior Resident NRC
Inspector of river
level.
- b. Shift Supervisor will
verify operability of
Raw Water System
checking Raw Water flow
>4200 gpm in the same
manner as determined for
the Raw Water System on
FC-75, Control Room Log.
- c. THROTTLE condenser flow
to prevent Circulating
Water Pump Cavitation
and to lower grid and
screen differential
pressure.

SECTION IV - LOW RIVER WATER LEVEL (Continued)

INSTRUCTIONS

CONTINGENCY ACTIONS

NOTE

Actions taken at 978 ft 0 inches river level are anticipatory based on the need to have the plant in Cold Shutdown prior to 976 ft 9 inches river level. Data shows the river has previously dropped 4 feet over a three day period. The maximum rate of level decrease was 1 inch per hour.

3.8 IF the river level goes to
≤978 ft 0 inches, THEN perform
the following:

- a. REFER TO the Emergency
Plan.
- b. COMMENCE plant shutdown
to Cold Shutdown at a
rate sufficient to
ensure the plant is in
Cold Shutdown before
river level reaches
976 ft 9 inches.
- c. REFER TO Technical
Specification 2.19(4)a
for 1 fire pump
inoperable.
- d. NOTIFY the City of Blair
Fire Department to
assemble equipment for
the impending loss of
fire suppression water
system at FCS.
((402) 426-6866).

SECTION IV - LOW RIVER WATER LEVEL (Continued)

INSTRUCTIONS

CONTINGENCY ACTIONS

3.8 Continued

- e. STOP the Circulating Water Pump in the cell with the operating Raw Water Pump OR shift to a Raw Water Pump in a cell without an operating Circulating Water Pump.
- f. THROTTLE other Circulating Water Pump flows to prevent the operating pumps from cavitating.

3.9 IF the river level goes to ≤ 977 ft 4 inches, THEN perform the following:

- a. Shift Supervisor will notify Resident or Senior Resident NRC Inspector of river level.
- b. REFER TO Technical Specification 2.19(4)b for no fire suppression water system operable.

SECTION IV - LOW RIVER WATER LEVEL (Continued)

INSTRUCTIONS

CONTINGENCY ACTIONS

3.9 Continued

NOTE

Fire header supply must be established from a backup source during low river level conditions to ensure alternate CCW cooling and EFWST emergency fill capabilities are maintained.

- c. ESTABLISH backup fire protection by contracting the Blair Fire Department for a pumper truck draft from the river or to connect the Training Center fire suppression water supply (approximately 150,000 gallons filled from the City of Blair water supply) to any fire hydrant on site ((402) 426-6866).

3.10 IF the river level goes to ≤ 976 ft 9 inches, THEN perform the following:

- a. VERIFY the plant is in Cold Shutdown.
- b. REFER TO the Emergency Plan.

3.10 IF the plant is NOT in Cold Shutdown, THEN use a main condensate pump from the hotwell or the CST to maintain Emergency Feedwater Storage Tank level OR implement AOP-30, Emergency Fill of Emergency Feedwater Storage Tank.

SECTION IV - LOW RIVER WATER LEVEL (Continued)

INSTRUCTIONS

CONTINGENCY ACTIONS

3.10 Continued

- c. IF a single Raw Water Pump stops pumping, THEN attempt to restore Raw Water with the other pumps.
- d. IF Raw Water is lost, THEN implement AOP-18, Loss of Raw Water AND attempt to restore Raw Water and Fire Protection Water by flooding Cell C from Cell B per Attachment 3.

3.11 WHEN river level returns to ≥ 983 ft 0 inches, THEN EXIT this procedure.

ATTACHMENT 2

INTAKE CHECKS FOR LOW RIVER LEVEL

1. Record data on Low River Level Log Sheet every 60 minutes or more frequently if desired.
2. IF the Missouri River level or any intake cell level drops to any of the following level limits OR drops from one of the limits to a lower limit, THEN the Shift Supervisor must be informed:

CELL LEVEL

- ___ Any cell ≤ 979.0
- ___ Cell A ≤ 978.0 OR Cell C ≤ 977.4
- ___ Cell A ≤ 978.0 AND Cell C ≤ 977.4
- ___ Any cell ≤ 976.9

RIVER LEVEL

- ___ ≤ 979.0
- ___ ≤ 978.0
- ___ ≤ 977.4
- ___ ≤ 976.9

3. IF icing conditions exist, THEN visually observe river each time data is recorded and notify Shift Supervisor if increased icing has occurred.
4. Cell level may be obtained using either of the following methods:
 - a. Cell Level = (River Level) - (Highest Grid DP for the Cell) - (Highest Screen DP for the Cell)
 - b. Cell Level = (1007.6") - (Distance from Intake Floor to Cell Water Surface)
5. IF remote river level indication does NOT trend with actual river level, THEN the Shift Supervisor must be notified.

ATTACHMENT 2

INTAKE CHECKS FOR LOW RIVER LEVEL (Continued)

Low River Level Log Sheet

Time									
Grid Diff.A.									
Grid Diff.B.									
Grid Diff.C.									
Grid Diff.D.									
Grid Diff.E.									
Grid Diff.F.									
Screen Diff.A.									
Screen Diff.B.									
Screen Diff.C.									
Screen Diff.D.									
Screen Diff.E.									
Screen Diff.F.									
CR River Level									
Local River Level									
Cell A Level									
Cell B Level									
Cell C Level									

NOTE

This example shows cell level calculation:

Cell B Level = R - G - S, where:

R = River Level in feet and inches.

G = The highest differential pressure in inches on Grids C or D.

S = The highest differential pressure in inches on Screens C or D.

ATTACHMENT 3

FLOODING INTAKE CELL C FROM CELL B

NOTES

1. The inlet of the intake structure is at the 970 ft 0 inch elevation, which is below the river bed elevation. The bottom of the intake structure then slopes down to the 966 ft 2 inch elevation. Therefore, if any water remains in the river, the bottom of the cells should contain some water.
 2. Cell A or B level can be restored using the same strategy if Cell C level cannot be raised due to excessive gate leakage.
-
1. CLOSE Cell C Sluice Gates CW-14E and CW-14F.
 2. CLOSE Cell C to Cell B Interconnection Gate CW-16B.
 3. ENSURE the following gates to other cells are open.
 - ___ CW-14A, Cell A Sluice Gate
 - ___ CW-14B, Cell A Sluice Gate
 - ___ CW-14C, Cell B Sluice Gate
 - ___ CW-14D, Cell B Sluice Gate
 - ___ CW-16A, Cell B to Cell A Interconnection Gate
 4. PLACE the submersible dewatering pump(s) into Cell B and attach power supply.
 5. Route the submersible pump(s) discharge to Cell C.
 6. START the submersible pump(s) to flood Cell C.
 7. WHEN water level in Cell C is high enough to sustain Raw Water Pump operation, THEN start Raw Water Pump AC-10D AND throttle Component Cooling Water HX valves to maintain Cell C level.

MISSOURI RIVER DATA

Date/Time	FLOW (CFS)		FCS	ELEVATION		Lowest Cell Level*	Ice Cover	Comments
	Gavins Pt	Omaha		Blair	Omaha			
1-23-90/1000	11,000	14,000	984'6"	986'9"	957'10"	E/983'1"	< 5%	Screen F isolated. Ice bridge above FCS released yesterday afternoon.
1-24-90/1000	10,500	13,400	984'8"	986'9"	957'11"	B/983'10"	0	Bay C isolated and de-watering to repair Screen F.
1-25-90/1000	10,500	13,000	984'3"	986'8"	958'0"	B/983'2"	0	Bay C isolated for screen F repair.
1-26-90/1000	10,500	13,000	984'2"	986'6"	957'11"	B/982'11"	0	Bay C isolated for screen F repair.
1-29-90/1000	14,000	13,100	984'0"	986'6"	957'8"	B/982'7"	0	Bay C isolated for screen F repair. Flow increased to 12,500 CFS over weekend and to 14,000 CFS this morning.
1-30-90/1000	14,000	14,000	984'5"	986'10"	958'0"	B/983'4"	0	Bay C isolated for screen F repair.

c: R. L. Jaworski
G. R. Peterson
J. D. Kecz

R. W. Short
A. G. Koenig
C. F. Simmons

* River Level minus highest screen/grid DP

ATTACHMENT 2

Memorandum

ATTACHMENT 3

Date: December 22, 1989

PED-SSE-89-10665

From: R. L. Jaworski

To: J. W. Chase

SUBJECT: USAR/Technical Specification Conformance with Low River Level Actions

REFERENCE: AOP-1, Rev. 2, "Acts of Nature"

The purpose of this memo is to explain Station Engineering's position on apparent discrepancies between the recently revised AOP-1 and the USAR/Technical Specification. AOP-1 was revised to include the actions necessary for decreasing Missouri River levels. The actions are to be taken at specific river and/or intake structure cell levels. The cell levels were included to account for river elevation losses through the grids and traveling screens.

Technical Specification 2.16 states, "If the Missouri River level is less than 976'9", the reactor will be placed in a cold shutdown condition using normal operating procedures. At river levels less than 980 feet, a continuous watch will be maintained to assure no sudden loss of water supply occurs."

Although the cell level directly affects the pumps (i.e., raw water, circulating water and fire), the river level is the appropriate level to use to initiate actions. The intent of the Technical Specification is to ensure that the plant is placed in a safe condition before the water supply is lost. The level in a single cell may drop temporarily due to debris or ice on the grids or screens. Each cell's grids and screens are designed for a circulating water pump, plus raw water pump, flow of more than 100,000 gpm, while raw water alone is only a few thousand gpm; therefore, when a circulating water pump is stopped, the remaining raw water pump flow will create a negligible screen/grid pressure differential. Because of this, low level in a cell when the river level is adequate does not constitute a loss of water supply. If actions taken to restore a cell level are not successful, the operator is directed to take the appropriate action based on the affected cell.

AOP-1 requires that a continuous watch be established at river level 980'0". At this level, hourly cell level measurements will be taken to ensure satisfactory pump submergence. If a cell level falls and remains below specific predetermined levels as described in AOP-1, actions are required as if the river level had fallen to that level. Additionally, if the river level falls below 978'0", the plant will commence shutdown to cold shutdown conditions. This assures that there is sufficient time to cool the plant down before raw water pump minimum submergence is reached. It is important to note that AOP-1 addresses the minimum Technical Specification and USAR requirements, and then as a proactive measure, monitors cell levels and initiates actions to ensure additional levels of safety. Based on this discussion, the AOP-1 actions are consistent with the stated specification and the intent of that specification; therefore, no changes to the Technical Specifications are required.

Two USAR statements apparently conflict with the AOP-1 actions. USAR Section 2.7.1.2 states that any water level below about elevation 983'0" msl would normally require that the plant be shutdown. USAR Section 9.8.6 states that during the winter, winter releases are controlled to maintain 983'0", and "The river level during the winter is controlled by the U.S. Army Corps of Engineers to at least an elevation of 983.0 feet; normally, the water level is maintained higher than 983.0 feet. Although agreement between OPPD and the Corps of Engineers to maintain minimum river water levels has not been formalized, the Corps of Engineers does cooperate with OPPD in these matters and would provide additional flow from upstream dams if such conditions would be impending." The first statement is an unsupported generality in the hydrology section which does not require any action. The other statements are unsupported under-standings at the time of plant construction which also do not require any action. A USAR change should be initiated to resolve these discrepancies. A change to section 2.7.1.2 should delete the statement referring to elevation 983'0" normally requiring shutdown. A change to section 9.8.6 should delete reference to the Corps of Engineers maintaining a specific level. It should state that the Corps of Engineers adjusts winter releases from Gavins Point as necessary to accommodate the needs of all Missouri River water users.

In summary, the Technical Specifications are presently adequate and accurate and do not conflict with AOP-1. Minor changes to the USAR should be made to reflect actual Station practices and Corps of Engineers obligations. If you have any questions regarding this memo, please contact Ron Short (x6913) or Rick Sanchez (x6916).

J. L. Jaworski
J. L. Jaworski
Manager-Station Engineering
Production Engineering Division

RLJ/RWS/CNB/RLS7js
RLJ/RWS/CNB/RLS7js

c: Sudesh Gambhir
Ken Morris
Gary Peterson
Jim Kacy
Del Trausch
Ken Hendry
Bob Odden
Carl Simmons
Francis Buck
Dan Johnson
Al Koenig