

TENNESSEE VALLEY AUTHORITY

CHATTANOOGA, TENNESSEE 37401

400 Chestnut Street Tower II

September 10, 1979

Mr. James P. O'Reilly, Director  
Office of Inspection and Enforcement  
U.S. Nuclear Regulatory Commission  
Region II - Suite 3100  
101 Marietta Street  
Atlanta, Georgia 30303

Dear Mr. O'Reilly:

OFFICE OF INSPECTION AND ENFORCEMENT BULLETIN 79-15 - RII:JPO 50-259,  
50-260, 50-296, 50-327, 50-328, 50-390, 50-391, 50-438, 50-439, 50-518,  
50-519, 50-520, 50-521, 50-553, 50-554, 50-566, 50-567 - BROWNS FERRY,  
SEQUOYAH, WATTS BAR, BELLEFONTE, HARTSVILLE, PHIPPS BEND, AND YELLOW  
CREEK NUCLEAR PLANTS

In response to your July 11, 1979, letter which transmitted OIE Bulletin  
79-15, we are enclosing the results of our investigations for Browns  
Ferry, Sequoyah, Watts Bar, Bellefonte, Hartsville, Phipps Bend, and  
Yellow Creek Nuclear Plants.

If you have any questions regarding this matter, please call Tish Jenkins  
at FTS 854-2014.

Very truly yours,

TENNESSEE VALLEY AUTHORITY

*L. M. Mills*

L. M. Mills, Manager  
Nuclear Regulation and Safety

Enclosure

cc (Enclosure):

Mr. Victor Stello, Director  
Office of Inspection and Enforcement  
U.S. Nuclear Regulatory Commission  
Washington, DC 20555

Director of the Division of Operating Reactors  
Office of Nuclear Reactor Regulation  
U.S. Nuclear Regulatory Commission  
Washington, DC 20555

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ENCLOSURE

RESPONSE TO NRC-OIE BULLETIN 79-15

DEEP DRAFT PUMP DEFICIENCIES

BROWNS FERRY NUCLEAR PLANT (50-259, 50-260, 50-296)

- Item 1. Browns Ferry Nuclear Plant has 12 deep draft pumps similar to those shown in figure 1 of the subject IE bulletin in safety-related systems.
- Item 2. These pumps are manufactured by Byron Jackson, size 20 KXH, 4500 gpm at 275 total developed head, and are used for RHR service water and EECW.
- Item 3. The pumps are approximately 46 feet long from suction to discharge and 22 inches in diameter.
- Item 4. Browns Ferry Nuclear Plant began making power in June 1974 with unit 1. The startup tests for the RHR and EECW pumps were performed in June 1973 and December 1974. The startup tests were completed several months before each unit's fueling. Each pump was tested for capacity, rated pressure, automatic start and stop, and logic. Once each month, a pump operability test is performed on each pump and the data from these tests are compared to the pump design performance curve.
- Item 5. Operational problems are minimal, and there has been only one major repair. The pump leaks water from the stuffing box and requires continuous checking and adjusting of the packing. This is normal for this type of service. The only major repair was performed in August 1978. The pump failed to pump water. Upon disassembly of the pump, it was found to have a broken shaft and the bearings had excessive clearances. The pump was completely rebuilt. One other pump showed signs of a decrease in performance during testing. The pump was removed from service and inspection revealed impeller wear which reduced the pump's capacity.
- Item 6. Upon reviewing the in-service records of the pumps from 1974 until the present, we find that there have been one major pump failure and one routine pump rebuild. The two pump problems were on pumps that are in operation 50 percent of the time. This is indicative of an excellent pump record. The longest interval that each pump has been available for operation, without corrective maintenance, would be from 1974 until the present, with the exception of the two pump repairs described in item 5. Three of the RHRSW pumps (one per unit) were not added until the summer of 1976.

Some of these pumps are automatic start and an accumulated run time, cycles of operation, and duration of each cycle cannot be obtained in exact detail.

The design specifications are being met; therefore, no additional maintenance activities or tests are planned. TVA has the applicable information, identified on page 3 of 3 of Bulletin 79-15, available at the site for inspection by NRC personnel.

SEQUOYAH NUCLEAR PLANT (50-327, 50-328)

- Item 1. Sequoyah has 16 deep draft pumps similar to those shown in figures 1 and 2 of the subject OIE bulletin in use in safety-related systems.
- Item 2. Refer to Attachment A for the listing of manufacturer, model, capacity, and plant application.
- Item 3. Refer to Attachment A for the overall dimensions at each type pump.
- Item 4. TVA has not completed the investigation for these items. We
  - 5. anticipate transmitting the results of our investigation for
  - 6. Sequoyah on or before September 21, 1979.

WATTS BAR NUCLEAR PLANT (50-390, 50-391)

- Item 1. Watts Bar has 16 deep draft pumps similar to those shown on figures 1 and 2 of the subject OIE bulletin in use in safety-related systems.
- Item 2. Refer to Attachment A for the listing of manufacturer, model, capacity, and plant application.
- Item 3. Refer to Attachment A for the overall dimensions of each pump.

NOTE: The pumps identified in items 1, 2, and 3 have not been transferred from CONST to P PROD. These pumps are in the initial stages of being put into service. Therefore, there has been no appreciable accumulation of operational and maintenance history. However, all available information is given in items 4, 5, and 6.

- Item 4. A summary of startup, testing, and routine maintenance history is given below for each type pump:
  - a. Screen wash pumps - These pumps have been operated 15 minutes per day for 15 days.
  - b. Essential raw cooling water (ERCW) pumps - These pumps have been used to flush the system with a maximum duty of 4 days at rated flow. Since August 2, 1979, D, G, and H pumps have intermittently been used to supply cooling water at approximately rated flow.

- c. High-pressure fire pumps (HPFP) - These pumps have not been operated. They are currently undergoing final checks before initial operation.

Item 5. Operational problems and major repair efforts, as applicable, are described below:

- a. Screen wash pumps - Only one pump packing has been replaced; no other maintenance has been required.
- b. ERCW pumps - No maintenance has been required other than adjustment of packing.
- c. HPFP - No problems or repair efforts.

Item 6. Operational intervals are given below:

- a. Screen wash pumps - These pumps have been available for 15 days. They are operated for 15 minutes per day at approximately rated flow. One of the original packings was replaced during initial operation. Pumps have performed satisfactorily to date.
- b. ERCW pumps - While supplying cooling water at approximately rated flow, three of the ERCW pumps received the following duty:

G	48	hours	H	24	hours
G	8	hours	H	11.75	hours
G	12.5	hours	H	16	hours
D	72	hours	H	72	hours
D	144	hours	H	144	hours

In addition to these hours, all ERCW pumps (A through H) were operated intermittently for system flush. The average time for continuous operation was approximately 16 hours.

The longest continuous run has been at approximately rated flow for 144 hours. At the end of each service run, all pumps have been operable.

There have been no maintenance problems to date.

- c. HPFP - This item is not applicable since these pumps are not operational.

BELLEFONTE NUCLEAR PLANT (50-438, 50-439)

Item 1. Bellefonte has 8 deep draft pumps similar to those identified in figures 1 and 2 of the subject OIE bulletin in use in safety-related systems.

Item 2. Refer to Attachment A for the manufacturer, model, capacity, and plant application.

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- Item 3. Refer to Attachment A for the overall dimension of the pumps.
- Item 4. These pumps have not undergone testing yet. Only receipt
5. inspection and periodic preventive maintenance checks have
  6. been made. No deficiencies have been found to date.

HARTSVILLE AND PHIPPS BEND NUCLEAR PLANTS (50-518, 50-519, 50-520, 50-521, 50-553, 50-554)

Items 1, 2, 3, 4, 5, and 6

Hartsville and Phipps Bend have 9 deep draft pumps similar to those identified in figures 1 and 2 of the subject OIE bulletin planned for use in safety-related systems (Hartsville, 6; Phipps Bend, 3). These pumps have not undergone testing yet. Only receipt inspection and periodic preventive maintenance checks have been made. No deficiencies have been found to date.

Hartsville and Phipps Bend have additional deep draft pumps within the Reactor Island design (STRIDE). GE has informed TVA that GE plans to respond generically on NSSS and STRIDE pumps on a schedule that will not permit the information to be included in this report. TVA will provide information, as applicable, for the Hartsville and Phipps Bend Nuclear Plants on or before October 26, 1979.

Refer to Attachment A for a description of these pumps.

YELLOW CREEK NUCLEAR PLANT (50-566, 50-567)

TVA plans to have 4 CTM pumps and 4 screen wash pumps which utilize the deep draft design. However, the contracts on these pumps have not been awarded yet.

## ATTACHMENT A

## TVA SAFETY-RELATED, DEEP DRAFT, TURBINE-TYPE PUMPS (RESPONSE TO IEB 79-15)

TVA Plant	Pump ID	No.*	Manufacturer	Model No.	Flow(gpm)/Head(ft)	Plant Application	Dimension** Length/Dia.
					Capacity		
Sequoyah (2 units)	ERCW (orig)	8	Johnson Pump Company	21 QMC	9000/180	Essential Raw Cooling Water (ERCW)	58'-3"/ 2'-4-1/2"
	ERCW (new)	8	Johnson Pump Company	30 CC	11000/200	"	95'-7"/ 3'-0"
	Aux. ERCW	2	Johnson Pump Company	27 DC/ 24 QMC	12600/155	"	14'-9"/ 2'-4-1/2"
	ERCW Screen Wash	4	"	8 CC	270/350	ERCW Screen Wash Wash in Intake Pumping Station	90'-2"/ 8-1/2"
	HPFP	4	"	14 CC	1500/400	High Pressure Fire Protection and Flood Supply to Aux. Feedwater	57'-8"/ 13-1/2"
Watts Bar (2 units)	ERCW	8	Byron Jackson	32" RXL VCT	12000/200	Essential Raw Cooling Water	90'-0"/ 2'-0"
	ERCW Screen Wash	4	Johnson Pump Company	8 CC	270/350	ERCW Screen Wash in Intake Pumping Station	87'-10"/ 8-1/2"
	HPFP	4	Goulds Pumps, Inc.	VIT-12X16 BLC-3-Stg.	1590/330	High Pressure Fire Protection and Flood Supply to Aux. Feedwater	84'-8"/ 16-3/4"

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## ATTACHMENT A

## TVA SAFETY-RELATED, DEEP DRAFT, TURBINE-TYPE PUMPS (RESPONSE TO IEB 79-15)

Page 2

TVA Plant	Pump ID	No.*	Manufacturer	Model No.	Flow(gpm)/Head(ft)		Plant Application	Dimension** Length/Dia.
					Capacity			
Bellefonte (2 units)	ERCW	8	Weir Pumps	CW2N54- 60A	13,300/200		Essential Raw Cooling Water	70'-3"/ 2'-0"
Hartsville and Phipps Bend (6 units)	CTM	9	Hitachi American	SP-CV	28,800/133		Cooling Tower Makeup Pumps Used for Essential Service Water (ESW) Tornado Backup Mode	47'-4"/ 4'-8"
NSSS and STRIDE Pumps								
Yellow Creek (2 units)	CTM	4	Contracts on these pumps not awarded yet.		21,400/310		Cooling Tower Makeup Pumps Used for ERCW Backup Water Source	Not Known
	Screen Wash	4	"		210/250		Screen Wash Pumps in Intake Pumping Station Support the CTM Pumps for ERCW Backup.	Not Known

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