

TENNESSEE VALLEY AUTHORITY

CHATTANOOGA, TENNESSEE 37401
400 Chestnut Street Tower II

September 21, 1982

Director of Nuclear Reactor Regulation
Attention: Ms. E. Adensam, Chief
Licensing Branch No. 4
Division of Licensing
U.S. Nuclear Regulatory Commission
Washington, D.C. 20555

Dear Ms. Adensam:

In the Matter of the Application of) Docket Nos. 50-390
Tennessee Valley Authority) 50-391

Enclosed for NRC is information concerning cement mortar lining at Watts Bar Nuclear Plant. This information was requested informally by the NRC project manager for Watts Bar. A copy of this letter and enclosure and one copy each of oversized TVA drawings 17W302-1 through -10 were forwarded directly to him.

If you have any questions concerning this matter, please get in touch with D. P. Ormsby at FTS 858-2682.

Very truly yours,

TENNESSEE VALLEY AUTHORITY

L. M. Mills
L. M. Mills, Manager
Nuclear Licensing

Sworn to and subscribed before me
this 21st day of Sept, 1982

Bryant M. Lawery
Notary Public
My Commission Expires 4/8/86

Enclosure

cc: U.S. Nuclear Regulatory Commission (Enclosure)
Region II
ATTN: James P. O'Reilly, Regional Administrator
101 Marietta Street, Suite 3100
Atlanta, Georgia 30303

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ENCLOSURE

Watts Bar Nuclear Plant Units 1 and 2
Response to NRC/NRR Questions on the ERCW Cement Mortar Lining

Question

1. At points of transition (i.e., 36" to 30" to 24") in the ERCW pipeline, identify transition element and locations.

Response

All transitions are standard, concentric increasers or reducers located in straight runs of pipe in the supply headers as follows:

<u>Type</u>	<u>Size</u>	<u>Unit</u>	<u>Train</u>	<u>Location</u>
Increaser	24"x30"	1	A	Approximately 150' NW of pumping station
		1	B	Approximately 150' NW of pumping station
		2	A	Approximately 150' NW of pumping station
		2	B	Approximately 150' NW of pumping station
Increaser	30"x36"	1	A	Due east of the unit 2 cooling tower
			B	Due east of the unit 2 cooling tower
Increaser	30"x36"	2	A	Due south of the unit 1 cooling tower
			B	Due south of the unit 1 cooling tower
Reducer	36"x30"	1	A	NW of unit 2 cooling tower
		1	B	NW of unit 2 cooling tower
		2	A	NW of unit 2 cooling tower
		2	B	NW of unit 2 cooling tower

TVA (WBN) mechanical drawings (17W302-1 through -10) of the ERCW system supplement the information provided above.

Question

2. Are screens or other mechanisms located downstream of the lined pipeline to protect safety-related components?

Response

The ERCW system includes automatic backwashing strainers in the intake pumping station upstream of the cement mortar lined pipe. There are no screens or strainers located downstream of the lined pipe.

Question

3. What components or equipment does the ERCW system provide raw water to?

Response

The equipment served by the ERCW system is listed in section 9.2.1.2 of the FSAR.

Question

4. What is system pressure at the intake pumps?

Response

The ERCW pump discharge pressure will vary depending on the mode of operation from 77 to 136 psig.

Question

5. What is pressure drop between pumps and key points in the system (i.e., transition points)?

Response

The pressure drop in the system will depend on the operating mode. A complete response to this question will be provided by October 15, 1982.

Question

6. Where are you most likely to have problems with the lining (i.e., transition, bend and elbows, straight sections)?

Response

In reviewing the operating experience with cement mortar lined pipe, virtually all failures of pipe that was lined in situ were due to the pipe being grossly out of round or at noncircular transitions. Additionally, problems were reported with prelined pipe where a discontinuity existed in the lining where piping sections were joined.

Since the cement mortar lined portion of piping contains no noncircular transitions and since all of the piping is carefully inspected for out-of-roundness before it is lined, TVA does not anticipate any problems with any portion of the lining.

Question

7. Do you use expansion joints?

Response

There are no expansion joints located in the portion of the ERCW system that will be lined with cement mortar.

Question

8. How do you account for the different expansion rates between steel pipe and concrete lining?

Response

The differential expansion due to thermal loading is insignificant based upon the maximum water temperature change of 75 degrees Fahrenheit ($^{\circ}\text{F}$), a modulus of elasticity for the lining of 4×10^6 lb/in², and a coefficient of linear expansion for the lining and pipe of approximately 6.8×10^{-6} per $^{\circ}\text{F}$ and 6.0×10^{-6} per $^{\circ}\text{F}$, respectively. The stress created by the differing expansion rates is approximately 240 lb/in² which can be tolerated in the compressive or tensile range by the pipe and the lining.

Question

9. It was stated during ACRS that the lining does not adhere to the steel piping. How do we account for structural integrity?

Response

TVA stated before the ACRS subcommittee on April 30, 1982 that the cement mortar does adhere to the pipe, but that we do not take credit for the adhesion of the mortar to the pipe. The lining is a continuous arch contained by the steel pipe wall and this arrangement gives the system structural integrity. The lining does not take a significant portion of the load. Bearing tests performed by TVA show the lining collapsed only after the formation of the plastic hinges in the steel pipe. In reality, the pipe failed first.