WATTS BAR 1&2 (OL)
50-390
50-391

APR 20 1978

Mr. Harry G. Moore, Ph.D.
Acting Director of Environmental Planning
Tennessee Valley Authority
268 401 Building
Chattanooga, Tennessee 37401

Re: Watts Bar Nuclear Plant
NPDES No. TN0020168

Dear Dr. Moore:

In response to your letter of April 14, 1978 for the subject plant, we offer the following replies.

1. Permit expiration date and language of Part III.P. are in conformance with present Headquarters directives. In the event that such directives change prior to permit issuance, applicable modifications will be made.

2. Serial 002. Mixing zone length and width will be corrected to 240-foot dimensions. Additional monitoring parameters have been includdd in the draft permit at the request of the State of Tennessee to assure that pollutants in the plant discharge are within an acceptable range. We did not concur with inclusion of all parameters requested but feel that data on those included is desirable.

3. Serial 007. Your comment is noted; however, we will place clarifying language on page 8.

4. Part III.A. Serial number will be changed.

Upon receipt of certification from the State of Tennessee, the draft permit and certification will be forwarded to NRC for inclusion in the DES. We will issue public notice at approximately the same time the DES is released.

C002
ES
1/1

If you have any additional questions do not hesitate to contamt Mr. Charles Kaplan of my staff.

Sincerely yours,

George L. Harlow
Chief, Water Enforcement Branch
Enforcement Division

cc: Mr. Harold Martin
Mr. Jack McCormick
Tenn. Dept. of Public Health

Mr. Oliver D. T. Lynch, Jr.
Nuclear Regulatory Commission

NRC

TENNESSEE VALLEY AUTHORITY

CHATTANOOGA, TENNESSEE 37401

April 14, 1978

Mr. John C. White
Administrator, Region IV
Environmental Protection Agency
345 Courtland Street, NE.
Atlanta, Georgia 30308

Re: Watts Bar Nuclear Plant
NPDES Permit No. TN0020168

Dear Mr. White:

We have reviewed the draft NPDES permit and Draft 316(a) Tentative Determination for the referenced facility, and have the following comments and requests.

The permit as drafted will expire on September 30, 1980, thus limiting the effective period to approximately two years. Although regulations do not require that the NPDES permits be issued for five-year terms this has been the practice for permits issued to date and is based on sound policy and legal considerations. Section 101(f) of the Federal Water Pollution Control Act states that it is the national policy to make the best use of available manpower and funds in implementing the Act. Significant costs and manpower resources are involved in obtaining an NPDES permit for a nuclear plant. We can see no benefit for requiring that the permit process, and resulting expenditure of funds and commitment of resources by TVA and EPA, be reported within two years.

Part III., section P suggests that the permit shall be modified or revoked and reissued to comply with applicable effluent limitations promulgated pursuant to the settlement agreement in Natural Resources Defense Council v. Train, 8 ERC 2120 (D.D.C. 1976). It is our view that neither the consent decree nor the FWPCA require or authorize the conditions specified in Part III., section P.

We also have the following comments and requests related to specific permit effluent requirements.

Part I, page 3, Serial 002

The mixing zone dimension indicated in the draft permit is 225 feet for both width and length. As shown in the TVA report WM28-1-85-100, February 1978, the dimensions for both length and width should be 240 feet.

Monitoring for suspended solids, settleable solids, total dissolved solids, ammonia nitrogen, copper, iron manganese, and zinc have been included for this serial discharge and the plant intake, Serial 019. The plant will operate with low cooling cycles of concentration and there will be no additions of the listed constituents to the cooling water. Any additions

of these constituents through inclusion of low-level wastes below detectable amounts in the discharge. Additionally, there is no justification for these requirements included in the guidelines for this category. We request that this monitoring requirement be deleted.

Part I, page 8, Serial 007

The source listed as a "neutral waste sump" is a neutralizer waste tank; however, we did not revise the flow diagram to indicate this change, nor do we request that the permit language be changed. The comment is included to clarify any misunderstanding.

Part III.A., page 20

The Serial 005 referred to in this section should be changed to Serial 004.

In addition to the draft permit and Draft 316(a) Tentative Determination, we have reviewed the March 24, 1978, letter from Mr. George L. Harlow to Mr. Jack McCormick, Tennessee Department of Public Health. The letter states that "any conditions felt warranted by your office can be included in your certification for this project and will be appended to the NPDES permit." Under the Clean Water Act of 1977, TVA is no longer exempt from state certification pursuant to Section 401. This section specifies that the certification must set forth limitations and requirements necessary to ensure compliance with Sections 301, 302, 303, 306, and 307 of the FWPCA. However, it does not provide that a state can include "any condition felt warranted" in a certification and provide that the condition becomes an NPDES permit condition.

Pursuant to discussions with Mr. Charles H. Kaplan of your staff, we have enclosed two copies of a revised Water Use Diagram and supplemental thermal data which was developed in response to specific questions from Mr. Kaplan. Two copies of the Water Use Diagrams of reproduction quality were sent directly to Mr. Kaplan.

If you have any questions concerning these comments and requests, please let me know.

Sincerely yours,

Harry G. Moore, Jr., Ph.D.
Acting Director of Environmental
Planning

Enclosures
cc (Enclosures): See page 3

cc (Enclosures):
Mr. Charles Kaplan, Coordinator
Thermal Analysis Unit
Enforcement Division
Environmental Protection Agency
345 Courtland Street, NE.
Atlanta, Georgia 30308

Mr. Elmo Lunn, Director
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621 Cordell Hull Building
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Mr. Earl Leming, Chief
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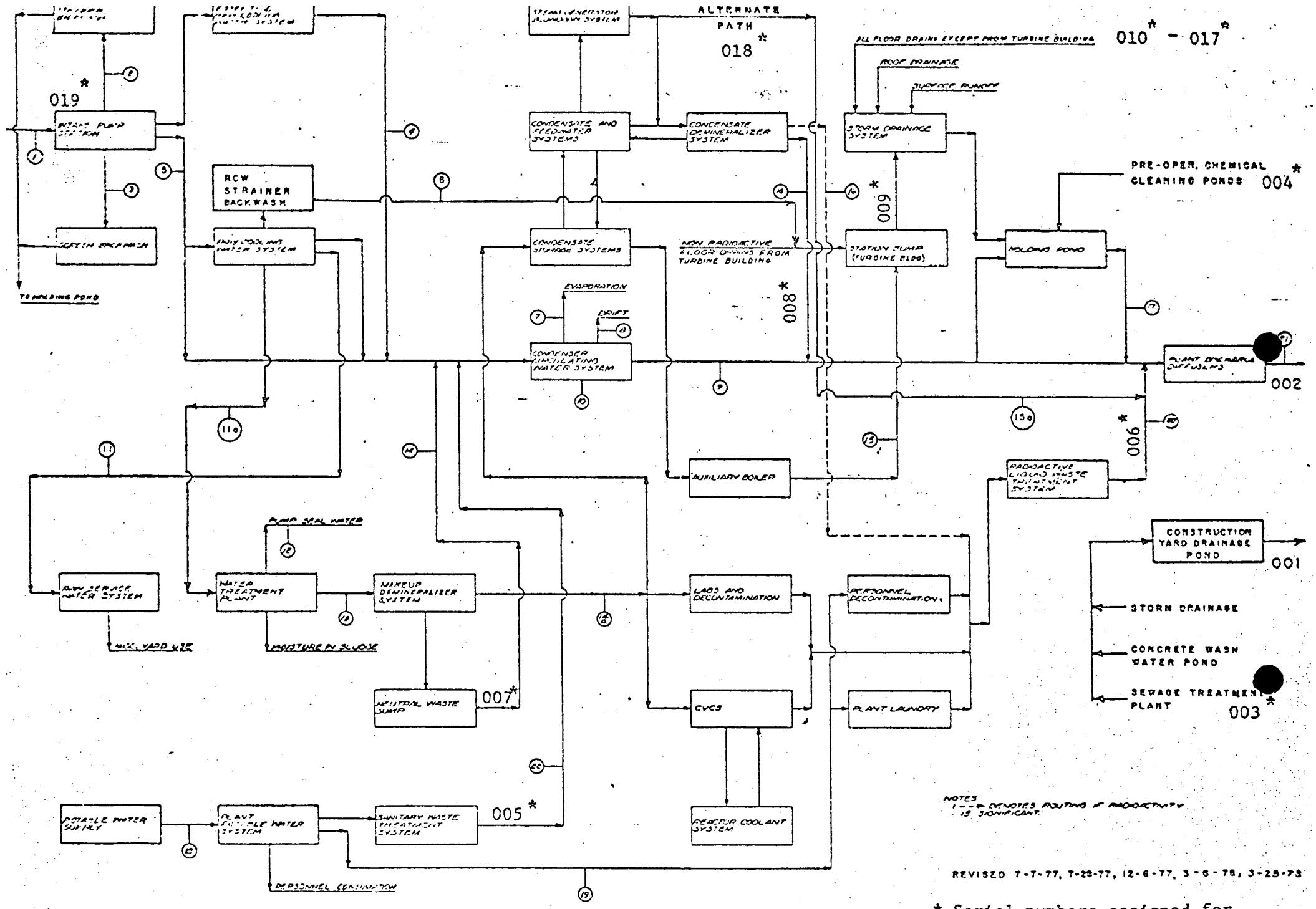

NOTES
1 --- DENOTES ROUTING IF RADIOACTIVITY IS SIGNIFICANT.

REVISED 7-7-77, 7-26-77, 12-6-77, 3-6-78, 3-25-78

* Serial numbers assigned for identification and monitoring purposes.

WATTS BAR NUCLEAR PLANT – WATER USE DIAGRAM

Additional Data Concerning Watts Bar Nuclear Plant

NPDES Permit Requested by Charles H. Kaplan of EPA

During Phone Conversation with Christopher D. Ungate of TVA,

February 28, 1978

1. Maximum Nuclear Plant Blowdown Temperature

   The instantaneous maximum blowdown temperature is 95°F and is based on a maximum instantaneous dry bulb temperature of 101°F and a maximum instantaneous wet bulb temperature of 83°F. These wet bulb and dry bulb temperatures did not occur simultaneously.

2. Cross-sectional Data at Diffuser Site

   See Table 1.

3. Duration of No Release Periods - Watts Bar Dam

   The frequency and duration of zero flow periods for 1959-1968 is shown in Table 2, indicating that five hours is the most frequent duration of no flow through the dam. Longer periods of no flow through Watts Bar Dam would be expected to occur during dry periods, typically during the late spring, summer, or early fall. The maximum expected period of no flow is 12 hours and would likely occur during these seasons. Additional information is discussed on page 2.6-9, 10 of TVA's Final Environmental Statement.

   Further studies of the duration and frequency of no flow periods would have to be conducted to determine whether the maximum expected period of no flow of 12 hours could be reduced. However, reduction of the maximum no flow period would likely result in the redistribution of hydropower generation to off-peak periods of

power demand. Besides being an inefficient use of hydropower, a reduced maximum no flow period through Watts Bar Dam would likely become constraining during months of warm weather, when the demand for peaking power is large. Report No. WM28-1-85-100 shows that Tennessee water temperature change and rate of change standards can be met during a 12 hour shutdown period. Therefore, no reduction in the maximum period of no flow through Watts Bar Dam seems necessary.

4. Tailrace Temperature Observations > 30°C

   One temperature greater than 30°C has been measured at Watts Bar tailrace (See Table 3)

5. Maximum Temperatures at Edge of Diffuser Mixing Zone for Summer Conditions

   See Table 4.

6. Generation Data, Watts Bar Steam Plant

   See Table 5 for steam plant operating data corresponding to the October 30, 1977, survey discussed in Report No. WM28-1-85-100. Table 5 shows that plant output is lowered during off-peak hours because the cost of generation at Watts Bar Steam Plant is relatively high compared to other TVA plants. These periods of low generation generally correspond to periods of no release through Watts Bar Dam, which also generally occur during off-peak hours. The period of no release during the October 30, 1977, survey occurred during the 12 hours preceding 1000 hours. Reduced generation at Watts Bar Steam Plant occurred concurrently and during most of this period and represented a worst case condition.

7. Historical Data Showing Ambient River Temperatures Approaching 30.5°C

When water temperatures exceed 83°F, the maximum temperature at the edge of the diffuser mixing zone caused by both plants could exceed 86.9°F. Slightly higher river temperatures could cause the maximum temperature at the edge of the diffuser mixing zone to exceed 86.9°F when only one of the plants is operating. Table 3 shows all the historical temperature data which exceeds 83°F (28.33°C) and compares the data to the total number of temperature observations during the given month.

8. Tailrace Temperature Variations

No other accurate temperature data is available to check for tailrace temperature variations at Watts Bar Dam between the weekly observations used in Tables 7 and 8 of Report No. WM28-1-85-100. Water temperatures are measured within the hydroplant, but factors other than the temperature of the incoming water seem to be affecting the measurements. Thermal monitoring and/or field tests could be conducted to study tailrace temperature variations.

9. Watts Bar Steam Plant Deactivation Schedule

At present, there is no deactivation schedule for Watts Bar Steam Plant.

Table 1

Cross-Sectional Information, TRM 527.8

Mixing Zone Width = 240 feet
Nominal River Width = 1100 feet

Water Surface Elevation (ft)	Cross-Sectional Area (sq. ft.)	Mixing Zone		
		Depth (ft)	Cross-Sectional Area (sq. ft.)	Percent of Reservoir Cross-Section
675	13,800	22	5,280	38
683	23,500	30	7,200	31

Table 2

Duration of Zero-Flow Periods Per Year

At Watts Bar and Chickamauga Dams

1959-1968

Duration (hours)	Ave. No. of Occurrences Per Year	
	Watts Bar	Chickamauga
1	14.0	2.5
2	21.2	2.9
3	29.9	6.2
4	31.7	7.5
5	32.0	6.9
6	26.6	6.7
7	17.0	4.2
8	9.9	2.4
9	4.5	1.1
10 or greater	3.2	1.0

Note: Table obtained from Tennessee Valley Authority, "Final Environmental Statement, Sequoyah Nuclear Plant, Units 1 and 2," Chattanooga, Tennessee.

Table 3

Summary of Temperature Data Exceeding 28.33°C (83.0°F)

TRM 529.9

Date	Temperature °C	°F
07/01/52	29.0	84.2
06/29/54	29.0	84.2
07/15/54	30.0	86.0
08/03/54	30.5	86.9
08/02/55	28.5	83.3
08/09/55	30.0	86.0
08/16/55	28.5	83.3
08/30/55	29.5	85.1

Month	Total No. of Observations	No. of Observations >28.33°C (83.0°F)
June	102	1
July	113	2
August	115	5
September	110	0

Notes

1. Data set same as that used for Tables 7 and 8 of Report No. WM28-1-85-100. These data were acquired by measuring the temperatures of weekly tailrace grab samples during a 27-year period (1950-1977).
2. Errata on Table 7 of Report No. WM28-1-85-100: Maximum August temperature is 86.9°F.

Table 4

Maximum Temperatures at Edge of Watts Bar Nuclear Plant Mixing Zone

Summer Conditions

Month	T_{Rmax} (°F)	T1 (°F)	T2 (°F)	T3 (°F)
June	84.2	84.9	86.7	87.2
July	86.0	86.6	88.5	88.9
August	86.9	87.4	89.4	89.8
September	81.5	82.3	84.0	84.7

Notes

1. Maximum river temperatures from Table 7, Report No. WM28-1-85-100.
2. T1 = maximum temperature at edge of diffuser mixing zone due to nuclear plant only

   $$= \frac{T_D - T_{Rmax}}{16} + T_{Rmax}$$

   where T_D = maximum nuclear plant discharge temperature = 95°F.
3. T2 = maximum temperature at edge of diffuser mixing zone due to steam plant only

   $$= T_{Rmax} + \frac{\Delta Tc}{4}$$

   where ΔTc = maximum steam plant condenser rise = 10°F
4. T3 = maximum temperature at edge of diffuser mixing zone due to both plants

   $$= \frac{T_D - (T_{Rmax} + \Delta Tc/4)}{16} + (T_{Rmax} + \Delta Tc/4)$$

5. Assumed Minimum River Flow of 3500-5000 cfs, maximum thermal discharge from both nuclear and steam plants, maximum drybulb and wetbulb temperatures and maximum river temperatures.

Table 5

Watts Bar Steam Plant Operating Characteristics

October 30, 1977

Condenser flow (cfs)	Unit A 197.9			Unit B 189.8			Unit C 193.9			Unit D 193.9		
Time (hrs)	T_{out} (°F)	ΔTc (°F)	Gen. (MW)	T_{out} (°F)	ΔTc (°F)	Gen. (MW)	T_{out} (°F)	ΔTc (°F)	Gen. (MW)	T_{out} (°F)	ΔTc (°F)	Gen. (MW)
0100	68	6	38	70	8	38	70	8	40	70	8	33
0200	68	6	45	70	8	35	70	8	47	70	8	32
0300	68	6	38	70	8	43	70	8	45	70	8	40
0400	68	6	40	70	8	34	70	8	41	70	8	21
0500	68	6	42	70	8	38	70	8	45	70	8	33
0600	68	6	40	70	8	40	70	8	39	70	8	29
0700	68	6	46	70	8	36	72	10	48	72	10	46
0800	72	10	54	70	8	50	72	10	48	72	10	56
0900	72	10	58	72	10	44	72	10	58	72	10	60
1000	72	10	56	72	10	54	72	10	58	72	10	54
1100	72	10	56	72	10	44	72	10	56	72	10	56
1200	72	10	60	72	10	52	72	10	50	72	10	58
1300	72	10	52	72	10	44	72	10	56	72	10	56
1400	72	10	57	72	10	49	72	10	52	72	10	55
1500	70	8	38	72	10	37	72	10	43	71	9	38
1600	70	8	38	70	8	40	72	10	46	71	9	35
1700	72	10	43	70	8	40	71	9	46	71	9	41
1800	72	10	54	71	9	41	71	9	46	71	9	57
1900	72	10	58	71	9	49	71	9	45	71	9	59
2000	72	10	58	71	9	44	71	9	46	71	9	60
2100	70	8	41	71	9	39	71	9	49	71	9	40
2200	--	--	38	69	7	37	71	9	40	71	9	33
2300	70	8	40	69	7	31	71	9	51	71	9	38
2400	--	--	34	69	7	40	71	9	42	71	9	38

Inlet temperature = 62°F