ENVIRONMENTAL IMPACT APPRAISAL

SUPPORTING ISSUANCE OF

OPERATING LICENSES

FOR

THE TENNESSEE VALLEY AUTHORITY'S

SEQUOYAH NUCLEAR PLANT, UNITS 1 AND 2

DOCKET NOS. 50-327 AND 50-328

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BY THE
DIVISION OF SITE SAFETY AND ENVIRONMENTAL ANALYSIS
SUPPORTING ISSUANCE OF OPERATING LICENSES
FOR
THE TENNESSEE VALLEY AUTHORITY'S
SEQUOYAH NUCLEAR PLANT, UNITS 1 AND 2
DOCKET NOS. 50-327 AND 50-328

DESCRIPTION OF PROPOSED ACTION

The proposed action is issuance of licenses to the Tennessee Valley Authority (TVA) for operation of the Sequoyah Nuclear Plant, Units 1 and 2 (Sequoyah). This action is supported by the following previous environmental reviews and decisions: (1) TVA's Final Environmental Statement (FES), (2) an evidentiary hearing held in July 1974, (3) the Initial Decision of the Atomic Safety and Licensing Board (ASLB), and (4) affirmation of the Initial Decision, as modified, by the Atomic Safety and Licensing Appeal Board (ASLAB).

In this Environmental Impact Appraisal (EIA), the staff presents its findings from the review of new information including: (1) environmental data from TVA's preoperational monitoring program; and (2) identified changes to the design or proposed operation of Sequoyah as provided by TVA in their October 30, 1978 submittal. In reviewing the new information, the staff identified four issues which presented potential for greater impact than previously assessed or which had not undergone previous staff review. The four issues are: (1) relocation of the Essential Raw Cooling Water (ERCW) intake; (2) revised estimate of ichthyoplankton entrainment; (3) chlorination for biocide treatment of water systems; and (4) definition of the thermal mixing zone.

Each of the issues involve potential impacts on water quality and aquatic

biota due to plant intakes or effluent discharges. Since these matters are regulated by the EPA under the Clean Water Act, the staff has communicated its concerns to EPA-Region IV for consideration in the drafting of the National Pollutant Discharge Elimination System (NPDES) permit. Through communications with EPA-Region IV, the staff has determined that each of the identified issues are mutually recognized as requiring control through the NPDES permit or other requirements of the Clean Water Act. Specific effluent controls are proposed in the Draft NPDES permit (Appendix A). The permit also requires an EPA-approved monitoring program for the purpose of demonstrating, pursuant to Sections 316(a) and 316(b) of the Clean Water Act, that operation of the Sequoyah plant meets the performance standards for intakes and thermal discharges which have been promulgated by the EPA.

ENVIRONMENTAL IMPACT OF THE PROPOSED ACTION

The environmental impact of the proposed operation of Sequoyah, as described in the FES, has been reconsidered by the staff on the basis of new information. Four issues were identified which presented potentials for greater impact than had been previously assessed or which had not been reviewed by the staff. These issues are addressed specifically below. Other changes in the Sequoyah design and operation, since 1974, have been adequately reviewed in TVA's subsequent submittals and are not reconsidered in this EIA.

(1) Relocation of the Essential Raw Cooling Water (ERCW) Intake

The plant, as originally proposed, would have been operated only in the once-through cooling mode. For the original design, the Condenser Cooling Water (CCW) and ERCW intakes were both to be located in the single Intake Pumping Station (IPS), located at the landward end of an intake

embayment. The intake embayment is formed by a skimmer wall structure, located as shown in Figure 1. For a temporary period of about one year, Unit 1 will be operated only in the once-through cooling mode and with use of the original ERCW intake located in the IPS.

Redesign of the plant to incorporate alternative cooling modes was necessitated by the adoption of more stringent thermal criteria than were being proposed at the time of initial planning and design of the Sequoyah plant. The use of combined-cycle cooling towers was proposed as the means to assure compliance with the more stringent thermal criteria. However, TVA noted that the alternative use of closed-cycle cooling would ultimately require the relocation of the ERCW intake (FES, p. 2.6-5). Two alternative locations were being considered by TVA at the time of FES issuance (Figure 1).

In its submittal dated October 30, 1978, TVA indicates the selection of "Alternative No. 1" as the permanent or "new" ERCW station location and provides an assessment which compares the potential impacts of the "new" ERCW station with the "old" ERCW station. TVA concludes that "[w]hile minimal impacts are expected with the use of either of the systems [ERCW stations], a comparative evaluation indicates a somewhat greater impact potential with the use of the old ERCW station." The staff considers the validity of this conclusion in its independent assessment, which follows.

For the temporary period of Unit 1 operation with the "old" ERCW station located in the IPS, total flow through the IPS will be approximately

579,000 gpm (∿97%). The ERCW flow is 17,000 gpm (∿3%). Average intake velocities through the forebays and traveling screens of the IPS are 1.2 fps and 2.3 fps, respectively, when flow is 579,000 gpm. (These velocity values are based on a water level in Chickamauga Reservoir at the normal minimum pool elevation of 675.0 ft, msl.) The per cent contributions to total velocity of the CCW and ERCW systems are in the same ratio as are the flows; i.e., 97% to 3%, respectively.

For two unit operation, once-through or helper, the CCW flow through the IPS will be approximately doubled (∿1.1 million gpm). The average intake velocities will remain essentially the same (i.e., 1.16 fps and 2.23 fps through the forebays and screens). The ERCW flow will also be doubled (34,000 gpm) for two-unit operation but the intake will be relocated to the "new" ERCW station in the skimmer wall structure (see Figure 1). The intake velocities associated with the "new" ERCW station are 0.23 fps and 0.55 fps through the approach conduits and traveling screens, respectively.

During closed-cycle operation, intake flow requirements are reduced substantially, i.e., to about 6% of the circulating water flow. However, this mode of operation is expected to be used quite infrequently (±4% of any calendar year) as compared to expected operation with once-through (±[illegible]%) and helper cooling (±16%). TVA has assessed the impacts of the plant intakes on the basis of two unit operation in the once-through or helper modes. The staff concurs in this basis for assessment because of the likelihood that, in some years, closed-cycle mode may never be required to meet the thermal criteria.

During operation in the once-through or helper modes, any environmental effects of the Sequoyah intakes will be predominantly those associated with the CCW system. This staff conclusion is based on a consideration of the flow rates and intake velocities at the IPS to the CCW intake. The CCW intake flow requirement (two units) represents about 7% of the mean annual reservoir flow past the plant. During the major spawning period, the hydraulic entrainment may be twice this mean annual value. (See next section for revised estimate of the potential ichthyoplankton entrainment rate.) The intake velocities at the IPS are considered high in comparison to more recent intake designs. A rule-of-thumb design basis velocity is 1.0 fps or less for providing protection of fish from intake impingement. Intake velocities on the order of 0.5 fps or below are generally regarded as more protective in regard to both impingement and entrainment. The "new" ERCW intake design provides the latter protection and is expected to perform acceptably.

The finding above, does not imply that plant intake effects will be minimized.

Relocation of the ERCW intake is not expected to decrease the losses at the Intake Pumping Station (IPS) by any measurable amount because:

(a) neither the volumetric flow rate nor the intake velocities at the Intake Pumping Station are appreciably reduced by the relocation; and

(b) both volumetric flow rate and intake velocities at the IPS remain at high values after the relocation.

Intake losses are influenced by many factors and cannot be predicted with certainty based on preoperational data. A priori assessments are often based on engineering design factors, including intake flow rates (volumes and velocities), and on the extrapolation of operating experience gained at existing intakes. For intakes which have unique design features and which are located on source waterbodies absent of existing intakes, operational monitoring is usually necessary to demonstrate the acceptability of the intake design. EPA is requiring such a demonstration program for Sequoyah pursuant to Section 316(b) of the Clean Water Act.

The staff concurs that an operational demonstration is appropriate for Sequoyah. Significant adverse impacts are not expected to be incurred however an operational demonstration is appropriate to support this conclusion. Also, the Sequoyah design, with multi-mode cooling alternatives, allows for additional controls by EPA, if necessary, to ensure acceptable operation of the Sequoyah intakes.

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(2) Revised Estimate of Ichthyoplankton Entrainment

TVA evaluated the potential for entrainment in the FES (pp. 2.6-14) through 2.6-17, 3.0-5, 7.12-32 and 33, 8.2-1 through 8.2-3 and 8.3-3). Since site specific data were very limited, TVA estimated fish entrainment based on larval fish data from Wheeler Reservoir on the Tennessee River in Alabama. Extrapolating these data to Chickamauga Reservoir, TVA estimated an average density of 29.59 larval fish per cubic meter for a 91 day period, April 27 to July 27. Assuming a daily withdrawal of 6.125 x 10^6 m^3 (2 units once-through), TVA estimated that 181 million larval fish would be entrained over the 91 day period. It was noted in the FES

that this value might be an underestimate since larval fish had been observed in Chickamauga Reservoir before April 27th. Assuming a survival to adulthood of 1 in 10,000 larval fish, the annual loss of 18,000 adult fish was expected. TVA did not believe this loss to be significant but indicated that the long-term effects could only be determined by intensive preoperational and operational monitoring of larval fish (FES, p. 8.2-3). TVA noted that they have "...the capability to modify plant operation during critical periods should environmental monitoring indicate significant adverse effects on fish populations in Chickamauga Reservoir" (FES, p. 8.3-3).

Results of preoperational monitoring include new information on larval fish densities, allowing a reassessment of the entrainment potential with site-specific data. In a preliminary draft of the "Preoperational Fisheries Report", TVA provided such a reassessment. Although this information was not included in the final report, TVA has confirmed the validity of the assessment (P. Hackney, personal statement during meeting at EPA-Region IV on January 25, 1979). Therefore, the following assessment is based on information presented in the preliminary draft report.

The 1976 study was designed specifically to provide estimates of potential entrainment. Biweekly collections were made at a transect adjacent to the plant site (Tennessee River Mile 485.0). The sampling period was from March 18 to September 1. Each biweekly collection included sample stratification by time of day (dawn, day, dusk, and night), by location along the transect (right shoreline, channel, and left shoreline) and by depth at the right shoreline (2 depths) and channel location (3 depths).

The zone of entrainment vulnerability is the deep channel stratum as a result of the skimmer wall and the "new" ERCW intake designs.

Sampling dates and the hydraulic entrainment rate (H=intake flow/river flow) for the sample dates in 1976 are given in Table 1. Hydraulic entrainment ranged from 6.6% to 27.1% with an average of 10.9% for the 13 sampling days. The FES indicated that the flow through the condenser at full plant load (2 units) was 7% of the mean annual river flow (FES, p. 2.6-17). From the standpoint of ichthyoplankton entrainment, use of the annual mean of 7% appears to be inappropriate as the basis for assessment. As indicated by the 1976 data, the hydraulic entrainment rates during the period of occurrence for ichthyoplankton averages 56% more than the annual mean.

Numbers and relative abundance of fish larvae collected at the intake transect during 1976 are given in Table 2. The clupeids (shads and skip-jack herring) made up about 96% of the collected larvae for all stations combined and about 76% of collections at the channel deep station (zone of intake vulnerability). Estimated annual transport, number entrained and per cent entrainment by taxon are given in Table 3. Of the 14 identified taxa of larval fish vulnerable to entrainment, the estimated annual entrainment is greater than 5% for eight taxa, equal to or greater than 10% for six taxa, and greater than 25% for three taxa. The estimated total entrainment of 252×10^6 larval fish is of the same order of magnitude as previously estimated in the FES (i.e., 181×10^6).

The staff is concerned that the estimated entrainment rates appear high for several taxa. Although the significance of the losses cannot be determined with certainty based on preoperational data, the potential for unacceptable effects is recognized. EPA is requiring intake studies as a part of the non-radiological operational program. Results of these studies will provide the bases for mitigative actions or other controls as may be determined necessary to assure protection of the aquatic environment. An alternative is available through the design of Sequoyah to operate the cooling system in the closed-cycle mode on a seasonal basis. The proposed schedule for cooling system operation is based on compliance with thermal standards; however, as noted by TVA (FES, p. 8, 3-3) the capability exists for modifying plant operation during critical periods if adverse effects are indicated by the monitoring programs.

(3) Chlorination for Biocide Treatment of Water Systems

In the FES (p. 2.5-3), TVA indicated that chemical treatment of the condenser cooling water (CCW) system should not be necessary. At that time, the proposed method for condenser tube cleaning was an automatic ball-type mechanical system. Biocide control of Asiatic clams in the Raw Cooling Water (RCW) and Essential Raw Cooling Water (ERCW) systems was to be accomplished with acrolein (FES, p. 2.5-4). Subsequent to issuance of the FES, acrolein was disallowed for use as planned and chlorination was selected by TVA as the substitute biocide treatment method (Amendment 53 to the Final Safety Analysis Report, Section 9.2.2.6).

The issue is raised here because the use of chlorination as proposed had not been reviewed previously by the staff. The EPA has reviewed TVA's

chlorination plan and has proposed effluent limitations in the draft NPDES permit (attached). EPA indicates* that these limitations have been proposed to assure compliance with the Tennessee Water Quality Standards. By letter of February 15, 1979, TVA indicates that they will meet the effluent chlorine limit of 0.1 mg/l, proposed in the draft permit.

Based on EPA's finding that the proposed chlorine effluent limitations will assure compliance with state water quality standards and on TVA's commitment to meet the proposed limitations, the staff concludes that no significant adverse impacts will result from the use of chlorination for biocide treatment of the water systems.

(4) Definition of the Thermal Mixing Zone

In the FES, TVA described the multi-mode cooling system and assessed the impacts of the thermal discharges from Sequoyah. The FES did not include the details of the thermal mixing zone, as now defined in the Draft NPDES permit. The issue is raised here because the specific mixing zone was not reviewed previously by the staff.

The thermal mixing zone, as currently proposed, is defined by the following:

"The receiving water shall not exceed (1) maximum water temperature change of 3°C (5.4°F) relative to an upstream control point, (2) a maximum temperature of 30.5°C (86.9°F), except when upstream temperatures approach or exceed this value, and (3) a maximum rate of change of 2°C (3.6°F) per hour outside of a mixing zone which does not exceed (1) a maximum length of 1500 feet downstream of the diffusers; (2) a maximum width of 250 feet upstream of the diffusers. The depth of the mixing zone measured from the surface varies linearly from the surface 250 feet

*U.S. EPA-Region IV, Fact Sheet, attached to Draft NPDES permit (No. TN0026450) for Sequoyah Nuclear Power Plant, Item 6.b. See Appendix A.

upstream of the diffusers to the top of the diffuser pipes and extends to the bottom downstream of the diffusers. The thermal mixing zone also includes the entire Intake Basin and Diffuser Pond." (Draft NPDES Permit, p. 18, Footnote 1)

TVA will be required to demonstrate the acceptability of the thermal discharge, pursuant to Section 316(a) of the Clean Water Act. The Draft Permit specifies the compliance schedule for thermal studies and non-radiological aquatic monitoring. Results of these studies will provide a basis for additional controls by EPA, if necessary, to assure compliance with thermal standards and to ensure that no adverse biological impacts are occurring.

AUTHORITY OF COOPERATING AGENCY

Before operation of the Sequoyah Nuclear Plant, the Tennessee Valley Authority must obtain a National Pollutant Discharge Elimination System (NPDES) permit from the Environmental Protection Agency (EPA) under provisions of the Clean Water Act. Because the possible environmental impacts discussed above are such that necessary mitigating conditions and restrictions will be incorporated into the NPDES permit as the proper exercise of EPA's authority under the Clean Water Act, the staff has determined that no further action by NRC is required.

In making its assessment, the staff has recognized the specialized expertise of the EPA, and the recognition of this agency's primary responsibility and authority in matters of environmental pollution control. The staff has met with EPA and several discussions between technical personnel have resulted in a clear understanding of environmental pollution concerns and issues. The staff further believes that any necessary condition of restrictive operation or the use of mitigative action to assure acceptable and minimal impact by the Sequoyah plant may best be incorporated into the NPDES permitting process,

where the total perspective of other regulatcry requirements such as water quality standards and effluent guideline limitations are considered. Recent decisions by the Atomic Safety Licensing Appeal Board (Tennessee Valley Authority, Yellow Creek Nuclear Plant Units 1 and 2, ALAB-515, December 27, 1978, 8 NRC 702) support the authority and use of the NPDES permit to reflect operating restraints and monitoring requirements to assure protection of the environment and minimization of impact.

In the process of issuance of the NPDES permit for the Sequoyah facility, the EPA through its normal promulgation procedure will provide for ample public participation through a notice of intent to issue the permit, and subsequently a period for public comment. The NPDES permit process will therefore present a wide forum for public evaluation of planned mitigative measures for environmental impact control, as well as assessment of any other issues of importance to the general public.

SUMMARY AND CONCLUSION

The staff as required under the National Environmental Policy Act (NEPA) and the NRC licensing procedure, has reviewed anticipated changes affecting environmental impact of the Sequoyah Nuclear Plant since issuance of the Final Environmental Sattement in February 1974. Information and assessment of these changes were submitted by TVA by Mr. J. E. Gilleland's letter of October 30, 1978 to Mr. Harold Denton, Director, Office of Nuclear Reactor Regulation.

Based on its review, the staff has determined that all previously unreviewed issues of potential environmental consequence are amenable to acceptable impact control and have been addressed by the EPA in their drafting of the

NPDES permit for operation of the Sequoyah plant. For the reader's reference, a copy of the draft NPDES permit is included as an integral part of this environmental impact appraisal (Appendix A). The staff has worked closely with EPA, Region IV, Atlanta in the development and preparation of the draft NPDES permit and presently views the conditions and requirements of the permit to be adequate to minimize environmental impact. Any changes that may result in the NPDES permit prior to licensing will be reviewed by the staff and appropriate comments provided to EPA. With incorporation of at least the conditions and limitations presently proposed by EPA for the NPDES permit and TVA's acceptance of those conditions and limitations, the staff has determined based on its review that operation of the Sequoyah plant will have no significant adverse impact on the environment beyond that described in the Final Environmental Statement prepared by the TVA in July 1974. The staff therefore concludes that the appropriate action is issuance of the operating license for the Sequoyah Nuclear Plant, and that no additional environmental impact statement for the proposed action need be prepared.

Copies of supporting documents for this Environmental Impact Appraisal are available at the Commission's Public Document Room, 1717 H Street, N.W., Washington, D.C. 20555, and at the Chattanooga - Hamilton County Bicentennial Library, 1001 Broad Street, Chattanooga, TN 37402.

TABLE 1

Calendar Dates and Hydraulic Entrainment Rates

1976 Preoperational Entrainment Study for Sequoyah Nuclear Plant

Sampling Period	Calendar Dates	Hydraulic Entrainment Rate (%)
1	March 18-19	8.0
2	March 31-April 1	6.6
3	April 14-15	16.2
4	April 28-29	16.1
5	May 12-13	27.1
6	May 26-27	13.0
7	June 9-10	8.4
8	June 23-24	8.3
9	July 8-9	6.8
10	July 21-22	7.0
11	August 4-5	8.2
12	August 17-18	7.5
13	August 31-September 1	8.3
	Mean for 13 sampling periods =	10.9

SOURCE: From TVA (undated) "Preoperational Fisheries Report for the Sequoyah Nuclear Plant (Preliminary)". Enclosure 2 of letter from J. E. Gilleland to Edson G. Case, March 23, 1978. Table 7.1, p. 146.

Table 2. Number and relative abundance (percent) of fish larvae collected adjacent to Sequoyah Nuclear Plant in 1976.

Taxon	All stations		Left overbank*		Channel		Channel deep		Right overbank	
	N	Percent	N	Percent	N	Percent	N	Percent	N	Percent
Unidentified fish	29	.04	12	.03	-	-	-	-	17	.08
Clupeidae**	76,122	93.81	41,241	93.07	15,243	93.27	1,308	76.36	19,458	95.84
Dorosoma cepedianum	33	.04	27	.06	1	.01	-	-	5	.02
D. petenense	1,686	2.08	1,423	3.20	46	.28	2	.12	217	1.07
Cyprinidae**	321	.40	180	.29	61	.37	23	1.34	130	.04
Cyprinidae (Pimephales type)1	19	.02	4	.01	-	-	-	-	15	.07
Cyprindiae (atherinoides type)2	9	.01	7	.02	-	-	-	-	2	.01
Cyprinidae (volucellus buchanani type)3	13	.02	11	.02	-	-	-	-	2	.01
Cyprinus carpio	43	.05	6	.01	22	.13	5	.29	15	.07
Notropis	15	.02	10	.02	3	.02	3	.18	2	.01
N. atherinoides	6	.01	2	***	2	.01	1	.06	2	.01
N. buchanani	1	***	-	-	1	.01	1	.06	-	-
Pimephales	10	.01	1	***	-	-	-	-	9	.04
Catostomidae**	18	.02	3	.01	8	.05	1	.06	7	.03
Catostromidae (Ictiobus/ Carpiodes type)4	3	***	3	.01	-	-	-	-	-	-
Ictalurus furcatus	14	.02	-	-	13	.08	10	.58	1	***
I. punctatus	9	.01	2	***	5	.03	4	.23	2	.01
Labidesthes sicculus	3	***	2	***	-	-	-	-	1	***
Morone (not saxatillis)5	1,004	1.24	584	1.31	335	2.05	46	2.69	85	.42
Lepomis	568	.70	353	.79	25	.15	4	.23	190	.94
Pomoxis	112	.14	52	.12	37	.23	2	.12	23	.11
Etheostomatinae (caprodes type)6	2	***	2	***	-	-	-	-	-	-

SOURCE: From TVA (undated), "Preoperational Fisheries Report for the Sequoyah Nuclear Plant", Enclosure 2 of letter from J. E. Gilleland to Edson G. Case, dated March 23, 1978, Table 7.5, p. 151.

Table 2 (Continued)

Taxon	All stations N	All stations Percent	Left overbank* N	Left overbank* Percent	Channel N	Channel Percent	Channel deep N	Channel deep Percent	Right overbank N	Right overbank Percent
Perca flavescens	5	.01	1	***	3	.02	1	.06	1	***
Aplodinotus grunniens	1,104	1.36	448	1.01	538	3.29	302	17.63	118	.58
Total	81,149		44,504		16,343		1,713		20,302	

*Combined catches for two netting stations.
**Not possible to identify further.
***Less than 0.005 percent.

1. Cyprinid, possibly Pimephales, Hybopsis, or Nocomis.
2. Cyprinid, possibly Notropis atherinoides.
3. Cyprinid, possibly Notropis volucellus or N. buchanani.
4. Catostomid, possibly Ictiobus or Carpiodes.
5. Either Morone chrysops or M. mississippiensis, but not M. saxatilis.
6. Darter, possibly Percina caprodes.

Table 3. Estimated annual transport and entrainment of fish larvae and eggs, Sequoyah Nuclear Plant, Chickamauga Reservoir, Tennessee, 1976.

Taxon	Number Transported	Number Entrained	Percent
Unidentified fish	1.480 E6	0	
Clupeidae*	2.274 E10	2.348 E8	1.03
Dorosoma cepedianum	1.304 E7	0	
D. petenense	6.187 E8	2.770 E5	.04
Cyprinidae*	4.466 E7	4.464 E6	10.00
Cyprinidae (Pimephales type)1	2.708 E6	0	
Cyprinidae (atherinoides type)2	1.065 E6	0	
Cyprinidae (volucellus/ buchanani type)3	2.014 E6	0	
Cyprinus carpio	7.572 E6	7.581 E5	10.01
Notropis	7.173 E6	4.835 E5	6.74
N. atherinoides	1.637 E6	9.344 E4	5.71
N. buchanani	3.262 E5	8.801 E4	26.98
Pimephales	9.680 E5	0	
Catostomidae*	4.110 E6	1.912 E5	4.65
Catostomidae (Ictiobus/ Carpiodes type)4	1.339 E6	0	
Ictalurus furcatus	4.263 E6	1.597 E6	37.46
I. punctatus	2.414 E6	6.439 E5	26.67
Labidesthes sicculus	3.982 E5	0	
Morone (not saxatilis)5	2.379 E8	8.059 E6	3.39
Lepomix	1,831 E8	6.303 E5	.34
Pomoxis	2.622 E7	3.544 E5	1.35
Etheostomatinae (caprodes type)6	1.025 E6	0	
Perca flavescens	1.984 E6	**	
Aplodinotus grunniens	4.414 E8	5.206 E7	11.79
Unidentified eggs	3.593 E6	1.071 E5	2.98
Aplodinotus grunniens eggs	1.905 E8	3.258 E7	17.10

* Not possible to identify further.
** One of five Perca flavescens collected was taken in the "zone of vulnerability" in a questionable data (not quantifiable) sample.
0. None captured in sample stratum assumed to be vulnerable to entrainment.
1. Cyprinid, possibly Pimephales, Hybopsis, or Nocomis.
2. Cyprinid, possibly Notropis atherinoides.
3. Cyprinid, possibly Notropis volucellusor N. buchanani.
4. Catostomid, possibly Ictiobus or Carpiodes.
5. Either Morone chrysops or M. Mississippiensis, but not M. saxatilis.
6. Darter, possibly Percina caprodes.

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SOURCE: From TVA, undated, "Preoperational Fisheries Report for the Sequoyah Nuclear Plant (Preliminary)". Enclosure 2 of letter from J. E. Gilleland to Edson G. Case dated March 23, 1978, Table 7.12, p. 163.

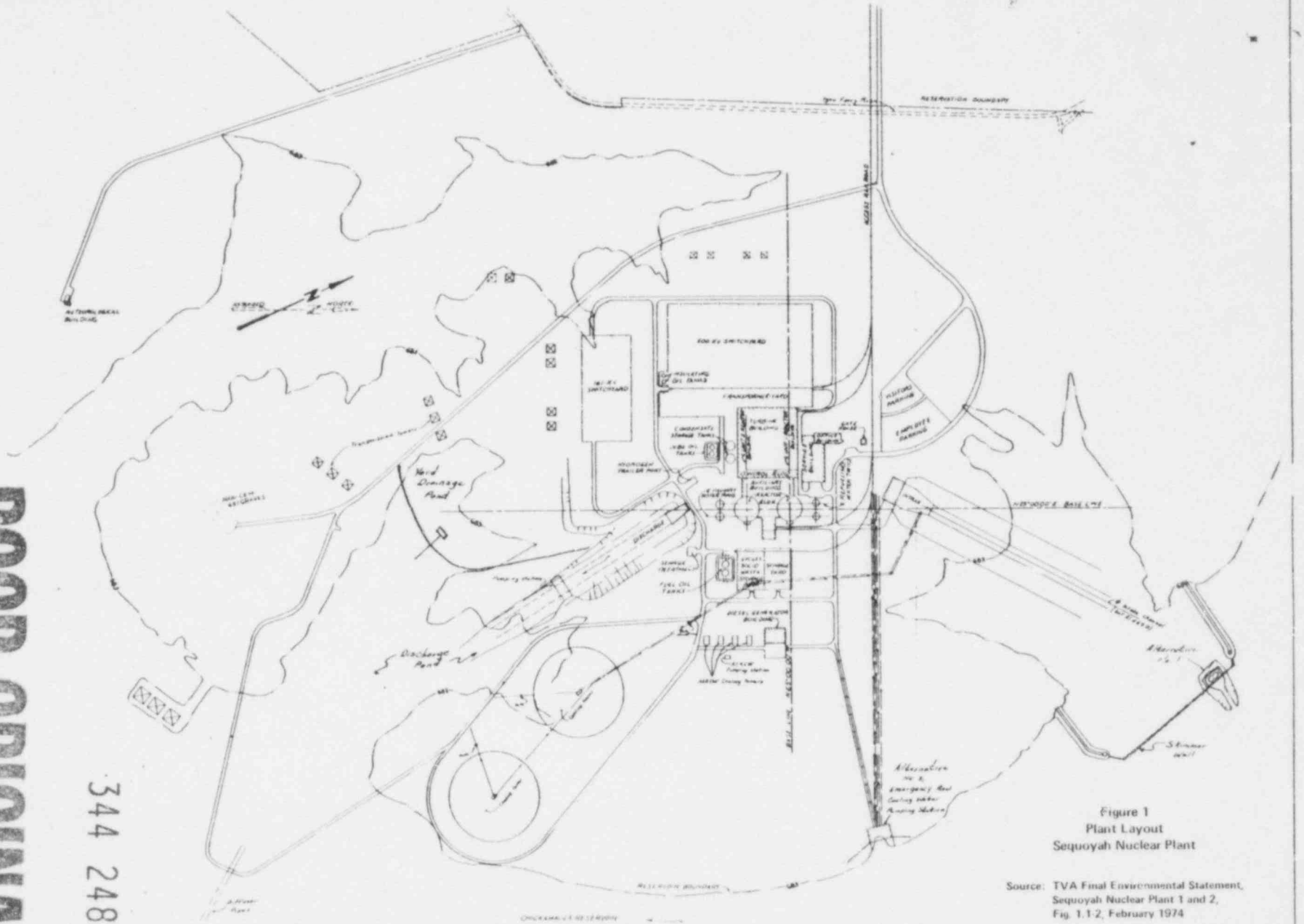

Figure 1
Plant Layout
Sequoyah Nuclear Plant

Source: TVA Final Environmental Statement, Sequoyah Nuclear Plant 1 and 2, Fig. 1.1-2, February 1974

References and Supporting Material*

1. Tennessee Valley Authority, Final Environmental Statement (FES), February 1974.

2. Atomic Safety and Licensing Board, Evidentiary hearings transcript, July 30-31, 1974, Chattanooga, Tennessee.

3. Atomic Safety and Licensing Board, Initial Decision, December 2, 1974.

4. Atomic Safety and Licensing Appeal Board Decision (ALAB-261), February 27, 1975.

5. Letter from Mr. J. E. Gilleland (TVA) of October 30, 1978 to Mr. Harold Denton (NRC) transmitting TVA report relating to environmental changes of environmental impact significance.

6. U. S. Environmental Protection Agency, NPDES Draft Permit, March 15, 1979 (Public Notice No. 79TN0002).

7. Clean Water Act of 1977.

8. TVA, Final Safety Analysis Report Amendment 52 dated March 6, 1978

9. TVA, Final Safety Analysis Report Amendment 53 dated April 5, 1978

10. Atomic Safety and Licensing Appeal Board Decision (ALAB-515), Tennessee Valley Authority Yellow Creek Nuclear Plant, Units 1 and 2, December 27, 1978.

11. TVA, Preliminary Draft, Preoperational Fisheries Report, March 1978.

*All references relate specifically to the Sequoyah Nuclear Plant, Unit Nos. 1 and 2 (Docket Nos. 50-327 and 50-328), except references 7 and 10.

APPENDIX A

Public Notice and Fact Sheet

Proposed National Pollutant Discharge Elimination System (NPDES) Permit

for

Sequoyah Nuclear Plant, Units 1 and 2

United States
Environmental Protection
Agency

Region 4
345 Courtland Street NE
Atlanta GA 30308

Alabama, Georgia, Florida,
Mississippi, North Carolina,
South Carolina, Tennessee
Kentucky

EPA

3/20/79

MAR 16 1979

REF: 4E-WE

Mr. Richard V. Watkins
Office of Nuclear Reactor
Regulation
U. S. Nuclear Regulatory Commission
Washington, D. C. 20555

Re: Sequoyah Nuclear Plant
NPDES No. TN0026450

Dear Mr. Watkins:

Enclosed is a copy of the Public Notice and Fact Sheet for the referenced facility for your information and comment. Please provide us with any comments no later than April 16, 1979.

Our records indicate that all supporting reports, documentation and information have been forwarded directly to you by TVA. Should you have any questions, please contact Messrs. Charles Kaplan or Paul Frey.

We appreciate your previous assistance and that of other NRC staff members relating to this project.

Sincerely yours,

George L. Harlow

George L. Harlow
Chief
Water Enforcement Branch
Enforcement Division

Enclosure

344 251

cc: Mr. Elmo Lunn, Tennessee
Division of Water Quality Control
Mr. Jack McCormick
Tennessee Regional Engineer
Mr. James Morris
Tennessee Valley Authority
Mr. Paul Frey
EPA, Athens

JOINT PUBLIC NOTICE

U.S. Environmental Protection Agency
Region IV, Water Enforcement Branch
345 Courtland Street
Atlanta, Georgia 30308
404/881-2328

in conjunction with

Tennessee Department of Public Health
Division of Water Quality Control
621 Cordell Hull Building
Nashville, Tennessee 37219
615/741-2275

Public Notice No. 79TN0002 March 15, 1979

NOTICE OF PROPOSED MODIFICATION OF
NATIONAL POLLUTANT DISCHARGE ELIMINATION SYSTEM PERMIT
AND NOTICE OF CONSIDERATION FOR STATE CERTIFICATION

The U.S. Environmental Protection Agency proposes to modify the National Pollutant Discharge Elimination System (NPDES) permit to the Tennessee Valley Authority, 268 401 Building, Chattanooga, Tennessee 37401, for its Sequoyah Nuclear Plant which is under construction in Hamilton County, Tennessee, in the vicinity of Tennessee River Mile 484 adjacent to Chickamauga Lake, Application numbers TN0020150, TN0021041, TN0021059, TN0023485, TN0026450 and TN0026468 and proposed Permit Number TN0026450. The applications describe 12 point source discharges to the Tennessee River, plant Intake Basin and Diffuser Pond from construction and/or will occur during operation of the plant which will generate and transmit electricity, SIC Code 4911. The Tennessee River has been classified by the State of Tennessee for all uses in this reach.

The proposed modification will incorporate future plant waste streams (which will result from plant operation) into the existing permit which includes plant construction and pre-operational wastes. Of the 12 point sources, seven are included in the existing permit and become part of the modified permit with limited or no changes. The draft permit also proposes 13 internal points of monitoring and limitations to assure compliance with applicable laws and regulations. In addition a mixing zone has been proposed for the thermal component of the discharge. The permit however will not be issued without a certification of the acceptability of the mixing zone by the State of Tennessee.

The proposed NPDES permit contains limitations on the amounts of pollutants allowed to be discharged and was drafted in accordance with the provisions of the Clean Water Act (33 U.S.C. Section 1251 et seq.) and other lawful standards and regulations. The pollutant limitations and other permit conditions are tentative and open to comment from the public. Note: Radioactive components of the discharges are regulated by the U. S. Nuclear Regulatory Commission and may not be included in the NPDES permit.

Persons wishing to comment upon or object to permit issuance or to the proposed permit limitations and conditions are invited to submit same in writing within thirty days of the date of this notice to the Enforcement Division, U. S. Environmental Protection Agency, 345 Courtland Street, Atlanta, Georgia 30308, ATTN: Mona Ellison. The NPDES number should be included in the first page of comments.

UNITED STATES ENVIRONMENTAL PROTECTION AGENCY

REGION IV

345 Courtland Street, N.E.
Atlanta, Georgia 30308

FACT SHEET

APPLICATION FOR
NATIONAL POLLUTANT DISCHARGE ELIMINATION SYSTEM
PERMIT TO DISCHARGE TREATED WASTEWATER
TO U.S. WATERS

Application No. TN0020150, TN0021041, TN0021059, TN0023485, TN0026450 and TN0026468; Permit Number TN0026450 Date March 15, 1979

1. SYNOPSIS OF APPLICATION

a. Name and Address of Applicant

Tennessee Valley Authority
268 401 Building
Chattanooga, Tennessee 37401

FOR

Sequoyah Nuclear Power Plant
Units 1 and 2
Hamilton County, Tennessee

b. Description of Applicant's Operation

Generation, transmission and distribution of electricity generally falling under Standard Industrial Classification 4911. Plant fuel is nuclear.

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c. Production Capacity of Facility

Guideline category * - Generating units
Number of Units - 2
Largest Unit (megawatts) - 1148 Date of commercial operation -1979
Nameplate rating (megawatts) - 2296

d. Applicant's Receiving Waters

Discharges 002, 011, and 024 enter the Tenneessee River in the vicinity of River Mile 484 and discharges 001, 004, 005, 006, 007, 008, 012, and 013 enter the Intake Basin or Diffusser Pond. Serial number 003, 009, 010, and 014 through 023 have been assigned for identification and monitoring purposes and discharge to one of the above serial numbers.

For a sketch showing the location of the discharge(s), see Attachments A, B and C.

e. Description of Proposed Pollution Abatement Facilities

Sedimentation of construction runoff; secondary treatment of domestic wastes; neutralization and/or sedimentation of plant operating wastes; and once-through cooling or helper/closed-cycle operation of cooling towers to assure that the thermal component of the discharge is in compliance with Tennessee Water Quality Standards.

Note: Radioactive components of plant discharge are controlled by the U. S. Nuclear Regulatory Commission and no limitations may be included in the NPDES permit.

* Federal Register Vol. 39, No. 196 (October 8, 1974)

Serial 010 1/, (Station Sump), 014 1/ (Demineralizer Regeneration Wastes), 015 1/ (Demineralizer Regeneration Wastes), 016 1/ (Liquid Radwaste), 017 1/ (Office Building Sump), 018 1/ (Office Building Sump), 019 1/ (Service Building Sump), 020 1/ (Diesel Generating Building, Oil and grease Interceptor), 021 1/ (Sodium Hypochlorite Building Floor and Equipment Drains) and 022 1/ (Raw Service Water Bleedoff)

Average Flow M^3/day (MGD) - 794(0.21) for 010, 54(0.014) for 014, 115(0.30) for 015, and Variable or zero expected for other serial numbers.
Average Winter Temperature °C(°F) - N/A
Average Summer Temperature °C(°F) - N/A
pH Range (std. units) - N/A or 6.0 to 9.0

Pollutants which are present in significant quantities or which are subject to effluent limitation are as follows: Oil and grease, total suspended solids, and/or Biochemical Oxygen Demand.

Serial 011 - Plant and Emergency Raw Cooling Water intake screens and strainer backwash (two points of discharge)

Average Flow - Variable
Average Winter Temperature °C(°F) - Ambient
Average Summer Temperature °C(°F) - Ambient
pH Range (std. units) - Ambient

Pollutants which are present in significant quantities or which are subject to effluent limitation are as follows: None

Serial 012 - (Cooling tower blowdown) and 013 (Recycled Cooling Water flow).

Average Flow M^3/sec. (MGD) - 2.0(45) and 68(1550), respectively
Average Winter Temperature °C(°F) - N/A
Maximum Summer Temperature °C(°F) - 38.3(101.0)
pH Range (std. units) - 6.0 to 9.0

Pollutants which are present in significant quantities or which are subject to effluent limitation are as follows: Temperature and Chlorine.

Serial 023 1/ - Steam generator blowdown

Average Flow - Variable
Average Winter Temperature °C(°F) - N/A
Average Summer Temperature °C(°F) - N/A
pH Range (std. units) - N/A

Pollutants which are present in significant quantities or which are subject to effluent limitation are as follows: Oil and grease, total suspended solids, total Copper and total Iron.

1/ - Internal plant waste stream; serial number assigned for identification and monitoring purposes.

A. EFFLUENT LIMITATIONS AND MONITORING REQUIREMENTS

During the period beginning on the effective date and lasting through expiration, the permittee is authorized to discharge from outfall(s) serial number(s) 001 1/ - Sewage Treatment Plant Effluent discharged to diffuser pond.

Such discharges shall be limited and monitored by the permittee as specified below:

Effluent Characteristic	Daily Limitations kg/day (lbs/day) Daily Avg.	Weekly Avg.	Daily Max.	Other Unit (mg/l except as noted) Daily Avg.	Weekly Avg.	Daily Max.	Monitoring Requirements Measurement Frequency	Sample Type
Flow-M^3/day (MGD)	N/A	N/A	N/A	N/A	114 (0.030)	N/A	1/day	Weir Reading
BOD_5	3.4 (7.5)	4.5 (10)	5.0 (11)	30	40	45	2/month	Grab
Suspended Solids	3.4 (7.5)	4.5 (10)	5.0 (11)	30	40	45	2/month	Grab
Fecal Coliform(#/100ml) 2/	N/A	N/A	N/A	N/A	N/A	N/A	2/month	Grab
Total Chlorine Residual	N/A	N/A	N/A	N/A	N/A	N/A	1/day	Grab
Settleable Solids (ml/l)			See Below				1/day	Grab
pH			See Below				1/week	Grab
Dissolved Oxygen			See Below				1/day	Grab

The concentration of settleable solids in the wastewater discharge must, at no time, exceed 1.0 ml/l as measured by the standard one-hour Imhoff cone test.

The concentration of dissolved oxygen in the wastewater discharge must be greater than 1.0 mg/l.

Any sludge or other materials removed by any treatment works must receive disposal adequate to prevent their entrance into or pollution of any surface or subsurface waters.

The pH of the wastewater discharge shall not be less than 6.0 nor greater than 9.0 standard units.

The wastewater discharge must contain no distinctly visible floating scum, oil sheen, or other floating matter.

Samples taken in compliance with the monitoring requirements specified above shall be taken at the following location(s): Sewage treatment plant effluent prior to mixing with any other waste stream.

1/ Previously permit number TN0021059

2/ Geometric mean

A. EFFLUENT LIMITATIONS AND MONITORING REQUIREMENTS

During the period beginning on the effective date and lasting through expiration, the permittee is authorized to discharge from outfall(s) serial number(s) 003 1/ - Sewage Treatment Plant Effluent discharged to Yard Drainage Pond.

Such discharges shall be limited and monitored by the permittee as specified below:

Effluent Characteristic	Daily Limitations kg/day (lbs/day) Daily Avg.	Weekly Avg.	Daily Max.	Other Unit (mg/l except as noted) Daily Avg.	Weekly Avg.	Daily Max.	Monitoring Requirements Measurement Frequency	Sample Type
Flow-M^3/day (MGD)	N/A	N/A	N/A	N/A	56 (0.0149)	N/A	1/day	Weir Reading
BOD_5	1.7 (3.7)	2.3 (5.0)	2.5 (5.6)	30	40	45	2/month	Grab
Suspended Solids	1.7 (3.7)	2.3 (5.0)	2.5 (5.6)	30	40	45	2/month	Grab
Fecal Coliform(#/100ml) 2/	N/A	N/A	N/A	N/A	N/A	N/A	2/month	Grab
Total Chlorine Residual	N/A	N/A	N/A	N/A	N/A	N/A	1/day	Grab
Settleable Solids (ml/l)			See Below				1/day	Grab
pH			See Below				1/week	Grab

The concentration of settleable solids in the wastewater discharge must, at no time, exceed 1.0 ml/l as measured by the standard one-hour Imhoff cone test.

Any sludge or other materials removed by any treatment works must receive disposal adequate to prevent their entrance into or pollution of any surface or subsurface waters.

The pH of the wastewater discharge shall not be less than 6.0 nor greater than 9.0 standard units.

The wastewater discharge must contain no distinctly visible floating scum, oil sheen, or other floating matter.

Samples taken in compliance with the monitoring requirements specified above shall be taken at the following location(s): Sand filter effluent prior to mixing with any other waste stream

1/ Previously permit number TN0023485. Serial number assigned for identification and monitoring purposes. On the effective date of this permit, permit number TN0023485 shall be revoked.

2/ Geometric mean

A. EFFLUENT LIMITATIONS AND MONITORING REQUIREMENTS

During the period beginning on start of commercial operation of Unit 1 and lasting through expiration the permittee is authorized to discharge from outfall(s) serial number(s) 007 - yard drainage pond-includes discharge from construction runoff and/or storm sewerage system, station sump and other low volume wastes, pretreated metal cleaning wastes and 003.

Such discharges shall be limited and monitored by the permittee as specified below:

Effluent Characteristic	Discharge Limitations		Monitoring Requirements	
	Daily Average	Daily Maximum	Measurement Frequency	Sample Type
Flow m^3/Day (MGD)	N/A	N/A	Continuous	Recorder
Oil and Grease (mg/l)	15	20	1/week	Grab
Total Suspended Solids (mg/l)	30	100	5/week	Grab
Total Chlorine Residual (mg/l)	N/A	N/A	1/week	Multiple Grabs

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The pH shall not be less than 6.0 standard units nor greater than 9.0 standard units and shall be monitored 5/week by grab sample.

There shall be no discharge of floating solids or visible foam in other than trace amounts.

Samples taken in compliance with the monitoring requirements specified above shall be taken at the following location(s):

Discharge from yard drainage pond prior to mixing with any other waste.

Note: Previously designated serial number 009

A. EFFLUENT LIMITATIONS AND MONITORING REQUIREMENTS

During the period beginning on the effective date and lasting through expiration, the permittee is authorized to discharge from outfall(s) serial number(s) 009 1/ Preoperational Metal Cleaning Wastes discharged to the yard drainage pond. Such discharges shall be limited and monitored by the permittee as specified below:

Effluent Characteristic	Discharge Limitations		Monitoring Requirements	
	Daily Average	Daily Maximum	Measurement Frequency	Sample Type
Flow-m^3/Day(MGD)	N/A	N/A	1/day	Weir, pump log, or calc.
Oil and Grease (mg/l)	15	20	2/	Grab
Total Suspended Solids (mg/l)	30	100	2/	8-hr. composite
Copper, Total (mg/l)	1.0	1.0	2/	8-hr. composite
Iron, Total (mg/l)	1.0	1.0	2/	8-hr. composite
Phosphorus as P (mg/l)	1.0	1.0	2/	8-hr. composite
Chemical Oxygen Demand (mg/l)	N/A	100 3/	2/	8-hr. composite

Metal cleaning wastes shall mean any cleaning compounds, rinse waters, or any other waterborne residues derived from cleaning any metal process equipment.

The quantity of pollutants discharged from this source shall not exceed the quantity determined by multiplying the flow of metal cleaning wastes times the above concentrations.

Wastes discharged from this source shall not be acutely toxic to indigenous aquatic organisms at the point of release from the yard drainage pond.

Until completion of repairs to the sludge filter press, but not later than June 30, 1979, water treatment plant filter backwash and clarifier sludge may be discharged to the unlined treatment pond.

Regeneration wastes from the temporary demineralizer utilized for preoperational metal cleaning operations may be discharged to the unlined treatment pond.

There shall be no discharge of floating solids or visible foam in other than trace amounts.

Samples taken in compliance with the monitoring requirements specified above shall be taken at the following location(s): discharge from the metal cleaning wastes treatment facility(s) prior to discharge to the yard drainage pond, except that flow of metal cleaning wastes to the ponds shall also be determined.

1/ Serial number assigned for identification and monitoring purposes.

2/ On start of discharge and once/week thereafter until termination of discharge with one sample taken immediately prior to termination of discharge.

3/ Limitation shall apply to organic acid waste cleaning solutions. Monitoring of organic acid waste concentration shall be prior to mixing with other waste streams, or rinse waters, except that joint treatment with high phosphate bearing metal cleaning wastes is permitted.

Note: Previously designated serial number 012.

A. EFFLUENT LIMITATIONS AND MONITORING REQUIREMENTS

During the period beginning on effective date and lasting through expiration the permittee is authorized to discharge from outfall(s) serial number 011 - Plant and ERCW intake screens and strainer backwash to the Tennessee River (two points of discharge).

Such discharges shall be limited and monitored by the permittee as specified below:

Intake screen backwash, strainer backwash and/or sluice return may be discharged to the Tennessee River at a point which precludes return to the plant intake, without limitation or monitoring requirements. However, material removed from the bar racks shall not be returned to the Tennessee River.

A. EFFLUENT LIMITATIONS AND MONITORING REQUIREMENTS

During the period beginning on the effective date and lasting through expiration the permittee is authorized to discharge from outfall(s) serial number(s) 013 - Recycled cooling water flow to to the Intake Basin.

Such discharges shall be limited and monitored by the permittee as specified below:

Effluent Characteristic	Discharge Limitations	Monitoring Requirements	
	Instantaneous Maximum	Measurement Frequency	Sample Type
Total Chlorine Residual (mg/l)	0.1	1/week	Multiple Grabs
Temperature $^{o}C(^{o}F)$	38.3(101.0)	1/day	Multiple Grabs

Limitations and monitoring requirements are applicable only during periods of closed-cycle cooling tower operation.

The pH shall not be less than 6.0 standard units nor greater than 9.0 standard units and shall be monitored 1/week on a grab sample.

There shall be no discharge of floating solids or visible foam in other than trace amounts.

Samples taken in compliance with the monitoring requirements specified above shall be taken at the following location(s): Recycled cooling water flow prior to entering the intake basin.

A. EFFLUENT LIMITATIONS AND MONITORING REQUIREMENTS

During the period beginning on start of discharge and lasting through expiration, the permittee is authorized to discharge from outfall(s) serial number(s) 015 1/ - Condensate demineralizer regeneration wastes discharged to cooling tower blowdown line (Units 1 or 2) - Low conductivity, high crud Such discharges shall be limited and monitored by the permittee as specified below:

Effluent Characteristic	Discharge Limitations kg/day (lbs/day)		Other Units (mg/l)		Monitoring Requirements Measurement Frequency	Sample Type
	Daily Avg	Daily Max	Daily Avg	Daily Max		
Flow-m^3/Day (MGD)	N/A	N/A	N/A	N/A	1/batch	Batch Calculation
Oil and grease	3.4(7.5)	4.5(10.0)	15	20	1/batch	Grab*
Total Suspended Solids	6.8(15.0)	23.0(50.0)	30	100	1/batch	Grab*

* Grab sample taken immediately prior to termination of batch discharge.

Note: Limitations and monitoring requirements are not applicable when discharge is directed to the radwaste system (016).

The pH shall not be less than 6.0 standard units nor greater than 9.0 standard units and shall be monitored 1/batch on a grab sample.

There shall be no discharge of floating solids or visible foam in other than trace amounts.

Samples taken in compliance with the monitoring requirements specified above shall be taken at the following location(s): Condensate demineralizer regeneration waste treatment facilities prior to mixing with any other waste stream.

1/ Serial number assigned for identification and monitoring purposes.

A. EFFLUENT LIMITATIONS AND MONITORING REQUIREMENTS

During the period beginning on start of discharge and lasting through expiration, the permittee is authorized to discharge from outfall(s) serial number(s) 017 1/ - Office Building sump 1, 018 1/ - Office Building sump 2, 019 1/ - Service Building sump, 020 1/ - Diesel Generating Building Oil and Grease Interceptor, 021 1/ - Sodium Hypochlorite Building Floor and Equipment Drains and 022 1/ Raw Service Water Bleedoff. Such discharges shall be limited and monitored by the permittee as specified below:

Effluent Characteristic	Discharge Limitations		Monitoring Requirements	
	Daily Average	Daily Maximum	Measurement Frequency	Sample Type
Flow - m^3/Day (MGD)	N/A	N/A	2/week	Grab or pump logs
Oil and Grease (mg/l) 2/	15	20	2/week	Grab
Total Suspended Solids (mg/l) 2/	30	100	2/week	Grab

The quantity of pollutants discharged from each serial number shall not exceed the quantity determined by multiplying the flow from that waste source times the concentrations listed above.

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Samples taken in compliance with the monitoring requirements specified above shall be taken at the following location(s): discharge from each source prior to discharge to the yard drainage system.

1/ Serial number assigned for identification and monitoring purposes.
2/ Not applicable to serial number 022.

A. EFFLUENT LIMITATIONS AND MONITORING REQUIREMENTS

During the period beginning on start of discharge and lasting through expiration the permittee is authorized to discharge from outfall(s) serial number(s) 024 - Diffuser Gate

Such discharges shall be limited and monitored by the permittee as specified below:

Effluent Characteristic	Discharge Limitations	Monitoring Requirements	
	Instantaneous Maximum	Measurement Frequency	Sample Type
Flow—m^3/Day (MGD)		Continuous	Recorder
Temperature Open/helper/closed °C(°F)	44.7(112.5)/36.1(97.0)/38.3(101.0) 1/	Continuous	Recorder
Total Chlorine Residual (mg/l)	See Below	1/week 2/	Multiple Grabs
Total Chlorine Residual (mg/l)	See Below	Continuous 2/	Recorder
Additional Monitoring	See Below	1/month	Grab

Total residual chlorine shall not exceed a maximum instantaneous concentration of 0.1 mg/l. In the event that the units cannot be operated at or below this level of chlorination, the applicant may submit a demonstration, based on biological toxicity data, that discharge of higher levels of chlorine are consistent with toxicity requirements of the Tennessee Water Quality Standards. Effluent limitations will be modified consistent with an acceptable demonstration.

Additional monitoring shall include chloride; oil and grease; sodium; sulfate; total, suspended, settleable, and total dissolved solids; ammonia nitrogen; and total copper, iron, manganese, and zinc.

The pH shall not be less than 6.0 standard units nor greater than 9.0 standard units and shall be monitored 1/day on a grab sample.

There shall be no discharge of floating solids or visible foam in other than trace amounts.

Samples taken in compliance with the monitoring requirements specified above shall be taken at the following location(s): diffuser gate prior to entry into the Tennessee River.

1/ The receiving water shall not exceed (1) maximum water temperature change of 3°C (5.4°F) relative to an upstream control point, (2) a maximum temperature of 30.5°C (86.9°F), except when upstream temperatures approach or exceed this value, and (3) a maximum rate of change of 2°C (3.6°F) per hour outside of a mixing zone which does not exceed (1) a maximum length of 1500 feet downstream of the diffusers; (2) a maximum width of 750 feet; and (3) a maximum length of 250 feet upstream of the diffusers. The depth of the mixing zone measured from the surface varies linearly from the surface 250 feet upstream of the diffusers to the top of the diffuser pipes and extends to the bottom downstream of the diffusers. The thermal mixing zone also includes the entire Intake Basin and Diffuser Pond.

2/ From start of chlorination and including the first two-month period of substantially full power operation, a grab sample shall be collected and analyses performed not less than four times (approximately equally spaced) during one shift of each day or until sufficient operating experience has been obtained to assure conformance with limitations and to calibrate the recorder. Subsequently the monitoring requirement may be reduced to one multiple grab per week during period(s) when chlorine is suspected to be present in the discharge. A report on this monitoring and calibration program shall be submitted by March 31, 1980.

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B. SCHEDULE OF COMPLIANCE

1. The permittee shall achieve compliance with the effluent limitations specified for discharges in accordance with the following schedule:

   a. Compliance with effluent limitations - effective date or start of discharge (001 through 024)

   b. Chlorination report (024) - 3/31/80

   c. Cease water treatment plant sludge discharge to metal cleaning waste pond (009) - 6/30/79

   d. Condenser tube report (III.E.)
      (1) Study Plan - Fuel loading date of Unit 1
      (2) First report - 15 months after commercial operation date of Unit 1
      (3) Subsequent reports - Annually after first report

   e. Plume report (III.F.)
      (1) Unit 1 report - March 31, 1980
      (2) Units 1 & 2 report - 15 months after commercial operation date of Unit 2
      (3) Subsequent reports - annually after Units 1 & 2 report, if required

   f. Operational aquatic monitoring program (III.G.)
      (1) Implement - Commercial operation date of Unit 1.
      (2) First report - April 30, 1980
      (3) Subsequent reports - annually after the first report.

2. No later than 14 calendar days following a date identified in the above schedule of compliance, the permittee shall submit either a report of progress or, in the case of specific actions being required by identified dates, a written notice of compliance or noncompliance. In the latter case, the notice shall include the cause of noncompliance, any remedial actions taken, and the probability of meeting the next scheduled requirement.

   Note: Any construction of new waste treatment facilities or alterations to existing waste treatment facilities will require a permit or authorization for construction in accordance with applicable state law and regulation.

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E. The permittee shall provide a technical study that correlates actual operations experience with condenser tubes and demonstrates a sufficiently low corrosion/erosion rate to assure protection of aquatic organisms. Details of the proposed study shall be submitted for approval by the Director, Enforcement Division, no later than the date of fuel loading of Unit 1. Annual reports of operations experience shall be submitted starting 15 months after commercial operation date of Unit 1.

F. On start of commercial operation, permittee shall implement a field program to verify model predictions and document the three-dimensional extent and configuration of the thermal plumes in the Intake Basin, Diffuser Pond and Tennessee River, in accordance with the plan submitted on Reports of field studies and model calibration evaluation shall be submitted for Unit 1 not later than March 31, 1980 and for Units 1 and 2 not later than 15 months after the commercial operation date of Unit 2. Subsequent reports shall be submitted annually after the Units 1 and 2 report, if necessary.

G. By the commercial operation date of Unit 1, permittee shall implement the operational stage non-radiological aquatic monitoring program in accordance with the plan as submitted on . Reports shall be submitted annually with the first report due April 30, 1980. The program shall continue for a period of not less than two years after commercial operation of Unit 2.

H. Copies of all plans and reports submitted in accordance with Parts III. C, E, F, and G. and Part I.B.1.b. shall be forwarded by the permittee as follows:

Number of Copies	Addressee
4	Director, Enforcement Division, EPA(Atlanta)
1	Chief, Ecology Branch, EPA(Athens)
2	Director for Environmental Projects, USNRC (Bethesda)
2	Regional Director, Fish and Wildlife Service (Atlanta)
1	Director, Tennessee Division of Water Quality Control (Nashville)
1	Regional Engineer, Tennessee Division of Water Quality Control (Chattanooga)

I. Copies of all routine radiological liquid effluent and water quality monitoring reports submitted to NRC shall be submitted to EPA and the State Director.

7. PROCEDURES FOR THE FORMULATION OF FINAL DETERMINATIONS

a. Comment Period

The Environmental Protection Agency proposes to issue an NPDES permit to this applicant subject to the effluent limitations and special conditions outlined above. These determinations are tentative and open to comment from the public.

Interested persons are invited to submit written comments regarding permit issuance or the proposed permit limitations and conditions to the following address:

Enforcement Division
Environmental Protection Agency
345 Courtland Street, N. E.
Atlanta, Georgia 30308
ATTN: Mona Ellison

All comments received within 30 days of the date of this fact sheet will be considered in the formulation of final determinations with regard to proposed permit issuance.

b. Public Hearing

The EPA Regional Administrator will hold a public hearing if there is a significant degree of public interest in a proposed permit or group of permits, or if he determines that useful information and data may be obtained thereby. Public notice of such a hearing will be circulated at least thirty days prior to the hearing, in newspapers in the geographical area of the discharge and to those on the EPA mailing list.

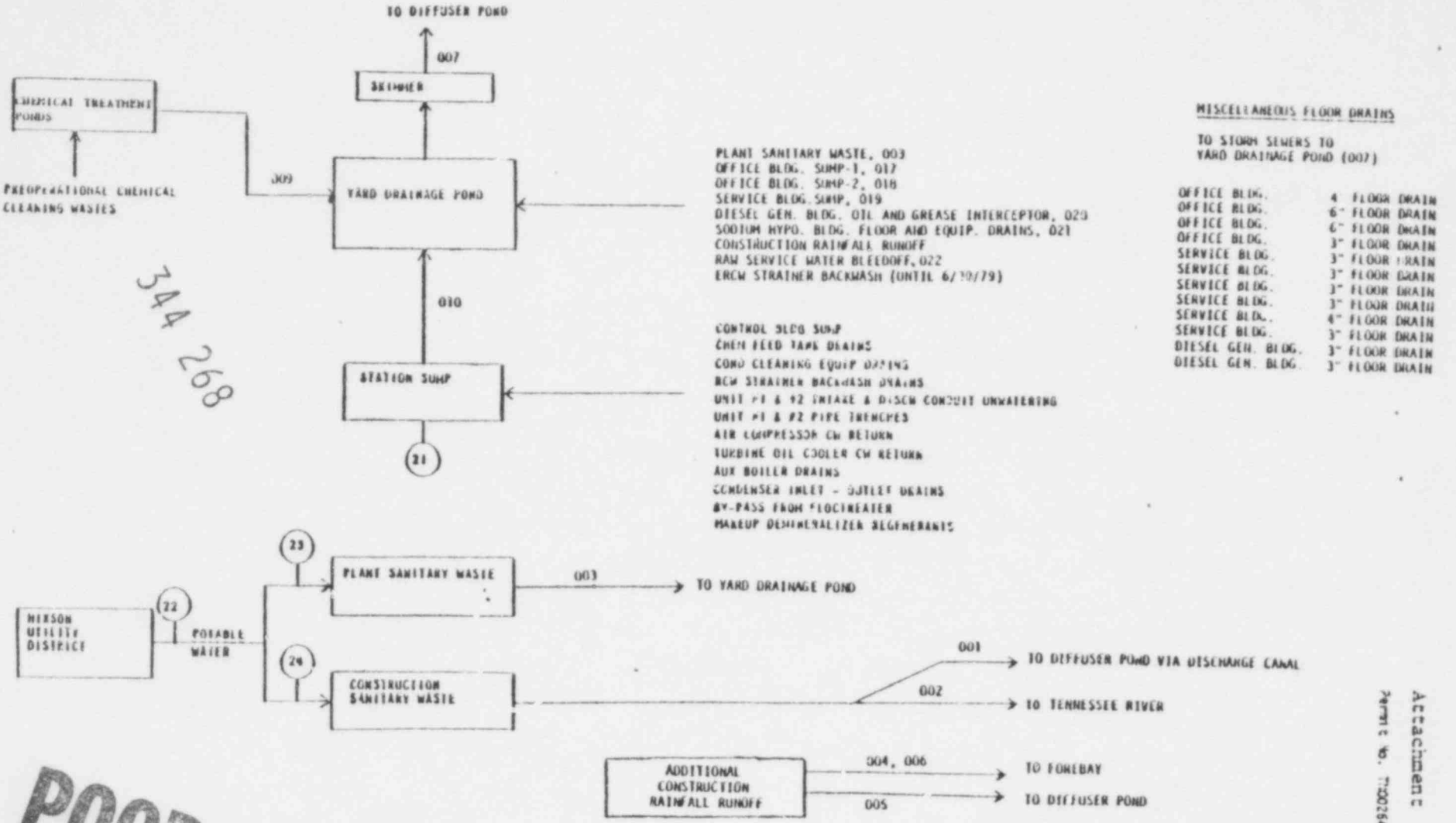
c. Issuance of the Permit

After consideration of all written comments and of the requirements and policies in the Act and appropriate regulations, and, if a public hearing is held, after consideration of all comments, statements and data presented at the hearing, the EPA Regional Administrator will make determinations regarding permit issuance. If the determinations are substantially unchanged from the tentative determinations outlined above, the EPA Regional Administrator will so notify all persons submitting written comments, and, if a public hearing was held, all persons participating in the hearing. If the determinations are substantially changed, the EPA Regional Administrator will issue a public notice indicating the revised determinations.

Unless a request for an adjudicatory hearing or legal decision is granted, the proposed permit contained in the Regional Administrator's determination shall become issued and effective and will be the final action of the U. S. Environmental Protection Agency.

Attachment A
Permit No. TN0026050

LOCATION OF DISCHARGES
TVA SEQUOYAH NUCLEAR PLANT
JANUARY 15, 1979



POOR ORIGINAL

Attachment C
Permit No. TN0026450