JAN 22 1974

Docket Nos. 50-259
50-260
and 50-296

Mr. J. E. Gilleland, Assistant to
the Manager of Power
Tennessee Valley Authority
818 Power Building
Chattanooga, Tennessee 37401

Change No. 3
License No. DPR-33

Dear Mr. Gilleland:

We have completed our evaluation of your letter dated November 28, 1973 requesting changes in Appendix B to the Technical Specifications for the Browns Ferry Nuclear Plant, Unit 1. A copy of our evaluation is enclosed.

The proposed changes do not involve any unreviewed safety questions or a significant hazards consideration and there is reasonable assurance that the health and safety of the public will not be endangered. Further, the proposed changes do not adversely affect the Regulatory staff's conclusions regarding the impact of the Browns Ferry Nuclear Plant, Unit 1 on the environment. Accordingly, pursuant to Section 50.59 of 10 CFR Part 50, Appendix B to the Technical Specifications of Facility Operating License No. DPR-33 is hereby changed as follows:

1. In Section 2.2.1, change the Specification, Monitoring Requirements and Bases as shown on the enclosed page 4, revised November 1973.

2. In Section 2.2.2, change the Specification, Monitoring Requirement and Bases as shown on the enclosed page 5, revised November 1973.

3. In Section 3.1.2, change the number of tanks, total storage capacity and control as shown on the enclosed page 8, revised November 1973.

4. In Section 3.2, delete the two sentences in the last paragraph on page 10.

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5. In Section 4.0, revise the preamble paragraph for Environmental Surveillance as shown on the enclosed page 14, revised November 1973.

6. In Section 4.1.2(b), change the Specification and Bases as shown on the enclosed page 16, revised November 1973.

7. In Section 4.1.2(c), revise the Objective as shown on the enclosed page 17, revised November 1973.

8. In Section 4.1.2(e), change the word "larval" to "larvae" as shown on the enclosed page 18, revised November 1973.

9. In Section 4.1.2(f), change the Specification and Reporting Requirement as shown on the enclosed page 19, revised December 1973.

10. In Section 5.0, change the title from "Administration Controls" to "Administrative Controls".

11. In Section 5.3.3, delete "as indicated" from the first sentence and delete the activities "review" or "audit" in parenthesis after items a through g. The modified review and audit section will be as shown on the enclosed pages 20 and 21, revised November 1973.

12. In Table 4.1-1, for station 293.70, change "x^c" to "x^b" in the "Water Samples" column. The revised table will be as shown on the enclosed page 26 dated November 1973.

Sincerely,

/s/

V. A. Moore, Jr., Assistant Director
for Light Water Reactors Group 2
Directorate of Licensing

Enclosures:
1. Evaluation
2. Revised pages 4, 5, 8, 14, 16, 17, 18, 19, 20, 21, and 26.

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cc: Robert H. Marquis
General Counsel
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DATE	12/14/73	1-2-74	12/13/73	12/15/74	12/15/73	12/17/73

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JAN 22 1974

UNITED STATES ATOMIC ENERGY COMMISSION
EVALUATION BY THE DIRECTORATE OF LICENSING
TENNESSEE VALLEY AUTHORITY
DOCKET NO. 50-259
CHANGE IN APPENDIX B TECHNICAL SPECIFICATIONS

At the request of the staff, a requirement was incorporated in the Browns Ferry Technical Specifications to detect and quantify fish impingement upon the intake screens. The present technical specifications require the licensee to visually estimate the number of fish collected on a sampling device inserted in the discharge sluice while washing any one of the six screens. The visual inspection is required on a daily basis. Fish washed off the screen are classified as either 1) gizzard shad or 2) other species. If the number of fish killed of species other than gizzard shad exceeds 100 or the total number of all fish killed exceeds 1000, a report is required to be submitted to the AEC.

Browns Ferry Unit 1 achieved criticality on August 17, 1973. Four days previous to this, the first letter was received from TVA reporting that impinged fish on one of the four screens in use on July 26, 27 and 28, 1973 had exceeded the reportable levels in the Technical Specifications. On August 21, 1973, the second letter from TVA was received reporting that the impinged fish limits were exceeded on August 9, 10, 11, 12, 13, and 14. Since TVA indicated that they were proposing to request a change in the Technical Specifications' reporting level to 50,000 fish per day, a technical assistance request was issued to Technical Review on August 28, 1973 to evaluate the significance of the fish fatalities.

Following criticality, Browns Ferry started their power escalation tests. The frequency of reportable fish impingements also escalated from 12 in September, to 28 in October and to 13 out of the first 14 days in November.

At the request of the staff, a meeting was held at the Browns Ferry site on September 12, 1973 to investigate the fish impingement problem. In attendance were representatives of TVA's Division of Power Production; Division of Forestry, Fisheries and Wildlife Development; Division of Environmental Planning and the General Counsel's Office. The AEC staff was represented by the Environmental Project Manager and three members of the Environmental Specialists Branch. Subsequent to the meeting, the licensee replaced the inadequate sampling device and conducted a 10 day investigation recommended by TVA's fish biologists. During this 10 day test period, which included another visit to the site by the staff on October 12, 1973, all fish washed off each screen were collected, counted and identified. The number of fish impinged at various times of the day and night was also evaluated. From this study and subsequent investigations, it was determined that the procedure used in the present Technical Specifications to measure the number of impinged fish could greatly underestimate or-though much less likely-overestimate

the fish kills. Accordingly, a meeting was held with TVA in Bethesda on November 20, 1973 to discuss proposed changes in the Technical Specifications that would more accurately quantify the number of impinged fish and provide a more detailed breakdown of impinged fish by species in lieu of the present "gizzard shad and other."

The inadequacies of the present Technical Specification requirements have been identified as follows:

1. The present requirement does not accurately identify the total number of fish killed by impingement. Table 1 lists the fish kills as reported by TVA following the required procedure in the Technical Specifications compared with the actual fish kills. The latter was determined by collecting the total number of fish washed off all screens in use and actually counting and identifying the fish rather than visually estimating the loss.

   Two factors are particularly significant in this regard: a) the impingement is not equally divided among the screens in use and b) approximately 70% of the fish washed off the screens are impinged during the hours of darkness. The number one screen, next to the edge (retaining wall) of the intake channel, collects many more fish than the other screens. The #6 screen, farthest from the edge of the channel, collects the least number of fish. There is a linear drop-off in impingement with distance from the edge of the intake channel.

2. The present procedure provides an estimate of the magnitude of the problem but does not identify the cause , possible corrective actions or the significance of the losses. TVA biologists are of the opinion that Browns Ferry will not have a significant effect on the total fishery resource in Wheeler Reservoir if the total fish losses (impingement, entrainment, increased predation, etc.) are less than 5% per year.

3. Daily reporting of impingement losses is an unnecessary burden on the licensee and on Regulatory Operations. A once per month submittal of the data is adequate for evaluation purposes.

TABLE 1

Actual vs Estimated Fish Impinged on Intake Screens

	Estimate by present Tech Spec procedure		Actual Counts	
Date	Shad	Other Species	Shad	Other Species
10/4/73	3300	90	6469	426
10/5/73	3450	15	3364	485
10/6/73	3600	15	4360	350
10/7/73	2400	120	5570	386
10/10/73	1840	42	3726	232
10/11/73	2400	180	4167	283
10/12/73	1800	30	4424	264
10/13/73	3300	30	5268	471
11/ 2/73	<1000	<100	3466	400

To correct the above inadequacies in the present Technical Specifications, the staff proposed to TVA the following changes:

1. To delete the daily estimate of fish impingement on an unspecified screen and to substitute an actual count of the fish impinged on the #3 screen or the #1 screen if #3 is inoperative. These two screens provide a more representative sample than the other screens. The counting and identification of the impinged fish shall be performed three times per week, with a maximum interval of three days between counts.

2. To delete the present breakdown of impinged fish between "gizzard shad and other species" and to substitute the actual counts of fish in the following classifications: a) shad and herring, b) catfish, c) bass (including largemouth, smallmouth, spotted, stripped, white and yellow bass), d) crappie, e) sunfish, f) drum and g)other species. The more detailed breakdown, on the fish kills will provide information on whether a particular species is being selectively impinged or whether the loss is in proportion to the population in the reservoir.

3. To delete the present requirement to report any fish kills in excess of 1000 per day (100 non shad) within 24 hours, and to substitute a requirement that TVA report all fish impingement counts in a monthly progress report. This monthly report shall summarize the status of studies and investigations being conducted by TVA to evaluate the cause and significance of the impingement losses and to determine how the losses can be reduced. What the licensee is doing about the problem is more important than daily confirmation that the problem is continuing.

In addition to the changes in the Technical Specification on fish impingement, the licensee also proposed several other changes in Appendix B to reflect existing design or to effect changes indicated by operating experience.

In Section 2.2.1 Sanitary Wastes, TVA proposes to change the maximum limit on chlorine residual in the effluent from the extended aeration sewage treatment plants from 3ppm to 5ppm. The average chlorine residual will be maintained at 2ppm as in the present requirements. On the sewage effluent, the Alabama State Health Department regulations are controlling; there must be a sufficient chlorine residual to control coliform bacteria. The licensee also proposes to reduce the frequency of sampling for chlorine residual and effluent flow, to eliminate the daily analyses for clarity and settable solids and to clarity from which portion of the system the sample for residual chlorine is taken.

The present technical specifications specify that a grab sample shall be taken from the contact chamber daily and analysed for residual chlorine. The place to measure chlorine residual is in the effluent rather than within the system. The licensee has stated that the proposed limit on chlorine residual and the frequency of analysis is acceptable to the Alabama Water Improvement Commission.

In Section 2.2.2, Makeup Water Treatment Plant Spent Demineralizer Regenerants, the licensee proposes to delete the requirement to adjust the pH of the regenerant wastes in the collection sump prior to pumping to the settling pond. There would be no change in the environmentally important requirement that any effluent released from the plant must be within a pH range of 6.0 to 8.5. The proposed change is necessary to reflect current plant conditions. Makeup water is being provided at present by a mobile facility due to performance problems with the permanent facility. Since the mobile facility lacks a retention sump, regenerative wastes are routed directly to the settling pond. This pond also receives discharge from the permanent plant sump. Placing the control on plant effluent rather than on in-plant streams would simplify operations and reduce the amount of caustic required for neutralization due to dilution in the settling pond. The proposed change is not expected to have any effect on the quality of the environment.

In Section 3.1.2 Oils and Hazardous Materials - Storage and Handling, the licensee proposes to change the volume of storage shown for insulating oil and the type of control for insulating oil, sulfuric acid and liquid nitrogen. The changes are necessary for the technical specifications to conform with the as existing status of plant construction. There are only two tanks of insulating oil constructed containing 74,000 gals. rather than the 21 tanks containing 366,000 gals. as listed in the present technical specifications. According to the licensee, the latter was a typographical error.

The two tanks of insulating oil are surrounded by a 3" sand bed rather than a retention basin (sump) as indicated in the present Technical Specifications. This method of containing potential leakage is considered adequate. The sulfuric acid tank is surrounded by a limestone bed rather than a retention basin. The limestone will neutralize any acid that might leak out of the storage tank and is considered a safer method of control.

To reduce the potential hazard of leakage from the liquid nitrogen tank, the licensee has provided isolated storage of the tank. The control listed in the present Technical Specification (limestone bed) was apparently a typographical error; the limestone bed was suppose to have been the control shown for the sulfuric acid tank.

In Section 3.2, the staff proposes to delete the two sentences constituting the last paragraph on the page. These sentences state that monitoring of intake water velocities is not necessary. Since the licensee has been

requested to take velocity measurements in the intake channel and within the pump bays, these sentences are now inaccurate.

In the first introductory sentence in Section 4.0 Environmental Surveillance, the licensee proposes to delete the words "all elements of" between "plant operation on" and "the environment." As revised, the sentence will read: The program elements described below are designed to detect and measure the impact of plant operation on the environment. The revised wording is a more precise description of the surveys, studies, and monitoring programs to be conducted.

In Section 4.1.2(b), Phytoplankton Monitoring, the licensee proposes to remove the second paragraph under "Specification" and to relocate this paragraph, with the deletion of two sentences, as a second paragraph under "Bases." The paragraph in the present technical specifications is misplaced since it describes the reason enumeration and biomass estimates are being made. The two sentences being deleted describe the specific procedures (chlorophyll a extraction and total cell count) to be used to determine biomass of phytoplankton. Specific procedures for all analysis are covered by reference in Section 4.1.1.

In Section 4.1.2(c), Zooplankton Monitoring, the licensee proposes to reword the sentence under "Objective" to express it in terms of what the monitoring is intended to achieve. The present wording is the same as the first sentence under "Bases" and described the importance of zooplankton in the food chain rather than describing the objective.

In Section 4.1.2(e) Entrainment of Fish Eggs and Larval, the licensee proposes to change "larval" to"larvae" to correct a typographical error.

The changes in Section 4.1.2(f), Fish Impingement on Intake Screens have been previously discussed along with the reasons therefore. TVA is preparing an Administrative procedure which will describe the method to be used by the plant operator to determine impingement losses. This will include the screen to be used for the fish counts and the factor to multiply the count by to estimate total losses on all screens. At present, the #3 screen will be used if in service; if not, the #1 screen will be used. Based on the October 4-13, 1973 study, the present factor for screen #3 is 5.77. Until Unit #2 pumps are placed in operation (about June 1974), a bimonthly evaluation of these screen "weighting factors" will be performed by TVA's fish biologists. The evaluation will consist of a two day count of all fish impinged on each of the six screens, differentiated by species and size. Since the continuing surveys may show that the factor changes with season of the year, the detailed procedure is best handled as an administrative procedure.

In Section 5.0, the licensee proposes to change the title from "Administration Controls" to "Administrative Controls" to correct a typographical error.

In Section 5.3.3, the licensee proposes to delete the parenthetical delineation on whether the Division of Environmental Planning or the Division of Power Resource Planning was to perform the review or audit function for the listed activities. As revised, both divisions will contribute input.

In Table 4.1.1, the licensee proposes to change the reference to the type of analyses performed on water samples taken at river mile 293.70. The proposed change would reference footnote "b" rather than "c" and would reflect the nonradiological monitoring program that is being conducted.

The above changes in the Technical Specifications will not change the design of the facility or the procedures for operating the reactor plant. The only changes in tests or experiments are with respect to monitoring the effect of the facility on the environment. The changes do not effect the Commission's safety evaluation of the facility or the Commission's conclusion that the facility should be licensed. In accordance with the provisions of Section 50.59(e)(2), it is the staff's conclusion that the changes in Appendix B to the Technical Specifications described herein should be approved.

Richard S. Clark
Environmental Projects Branch 2
Directorate of Licensing

Gordon K. Dicker, Chief
Environmental Projects Branch 2
Directorate of Licensing

2 CHEMICAL

2.2.1 Sanitary Wastes

Objective

Secondary treatment of sanitary wastes from the plant's sewage treatment facilities shall be provided to insure adequate disinfection of the waste stream prior to discharge under all conditions of sanitary waste load.

Specification

Revised

The sanitary wastes from the plant shall be treated by extended aeration treatment plants followed by chlorine disinfection. The maximum total chlorine residual shall be limited to 5 mg/l. If a residual of 5 mg/l is exceeded, the chlorine feed shall be adjusted to reduce the total chlorine residual below the limiting condition.

Monitoring Requirements

The sanitary treatment facilities will be inspected daily. An operating log including an evaluation of aesthetic and physical conditions, along with a determination of some chemical parameters of treatment plant subsystems and effluent, will be maintained. Effluent flow will be measured and a grab sample will be analyzed at a minimum frequency of once in three days for chlorine residual.

Revised

The accuracy of measurement of the method used for chlorine residual is 0.5 mg/l.

All analyses will be performed by plant personnel using standard analytical procedures for waste water.

Surveillance instructions and records will be kept on file at the plant.

Bases

Two 15,000-gallon-per-day extended aeration sewage treatment plants were initially installed at Browns Ferry to handle construction and operating personnel loads with the intention of ultimately putting one unit in reserve as the construction load diminishes. It is anticipated that at times of unit outage and during any major overhaul periods both plants may have to be put into operation to handle the increased loads.

These plants have timers to regulate aeration times and include chlorination facilities to provide disinfection of the effluent prior to discharge.

To insure adequate disinfection of these treated wastes under all conditions of daily load variation, chlorine will be fed to the treatment plant effluent so as to maintain an average chlorine residual in the effluent from the chlorine contact chamber of approximately 2 mg/l. The maximum total chlorine residual will be 5 mg/l. The treatment plant will be inspected daily and a daily operating log will be maintained. When chlorine residuals in the final effluent are found to exceed the environmental limits, the chlorine feed rates will be appropriately adjusted.

Revised

2.2 CHEMICAL (continued)

2.2.2 Makeup Water Treatment Plant
Spent Demineralizer Regenerants

Objective

Treatment of makeup water treatment plant demineralizer waste (spent regenerant solutions) is provided to assure that the pH of the waste stream is within limits to protect the quality of the receiving stream and within applicable regulations.

Specification

Revised

The pH of the spent demineralizer regenerants shall be adjusted to within the range of 6.0 to 8.5 before release offsite.

Monitoring Requirement

Revised

The pH of spent demineralizer wastes shall be monitored in a waste collection sump or settling pond and shall be adjusted to within the range of 6.0 to 8.5 before offsite release.

All measurements will be performed by plant personnel using standard instrumentation and operating instructions. Surveillance instructions and records will be kept on file at the plant.

Bases

Regeneration of makeup water treatment plant demineralizers requires the use of sulfuric acid and sodium hydroxide, which results in releases of SO_4^{--} and Na^+ and excess sulfuric acid and sodium hydroxide used in the regeneration cycle. Treatment of these wastes will consist of pumping the acid and caustic wastes into a settling pond to allow for dilution and neutralization. The wastes will be held in the pond as long as is practicable. Normally, natural losses such as evaporation will reduce the pond level. When offsite releases of waste water from a pond become mandatory, pH will be monitored and adjusted to within the range of 6.0 to 8.5.

Revised

Should circumstances force the direct offsite release of regenerative wastes from the makeup plant, the pH of the waste will be monitored, recorded and adjusted to within the range of 6.0 to 8.5 before discharging.

Revised November 1973

3.0 DESIGN FEATURES AND OPERATING PRACTICES

This section describes those design features and operating practices not covered in Section 2.0, "Limiting Conditions for Operations" and which, if changed, could result in significant effects on environmental impacts.

3.1 Chemical Usage

3.1.1 Acrolein - If operating experience proves it to be necessary, Acrolein will be used in the raw cooling water instead of chlorine for Asiatic clam control. Acrolein would be fed to achieve a maximum concentration within the raw cooling water system of 0.3 mg/l for one-half hour each day for a maximum of 120 days per year. The acroleinated raw cooling water would be discharged to the main condenser cooling system for dilution prior to discharge to the river through the diffusers.

The frequency duration and amounts of acrolein are shown in the table below.

Frequency of Use	Duration	Maximum Concentration in the Raw Cooling Water System	Maximum Concentration in Condenser Cooling System	Concentration in Reservoir After Diffuser Mixing
120 days/yr	1/2 hr/day	0.3 mg/l	0.015 mg/l	0.0015 mg/l

3.1.2 Oils and Hazardous Materials--Storage and Handling - Storage facilities for oils and hazardous materials will be protected by containment facilities to insure no releases to the aquatic environment. The plant areas where oils or other hazardous materials are routinely handled are equipped with separate drain systems and containment sumps.

The table below shows the materials stored, the quantities, and method of control.

Item	Storage	Total Storage Capacity	Control	
Insulating Oil	2 tanks	74,000 gals.	Surrounded by 3" sand bed	Revised
Diesel Oil	2 tanks	142,000 gals.	Retention Basin (Sump)	
Lubricating Oil	2 tanks	60,000 gals.	Retention Basin (Sump)	
Sulfuric Acid	1 tank	3,400 gals.	Limestone Bed	
Turbine Lube Oil	6 tanks	34,200 gals.	Sump Provided	
Reactor Feed Pump Oil	9 tanks	9,000 gals.	Sump Provided	
Sodium Hydroxide	1 tank	3,200 gals.	Sump Provided	
Liquid Nitrogen	1 tank (insulated)		Isolated Storage	
Askarel	All transformers		Sumps Provided	
Chlorine	26 cylinders - 52,000 lbs.		Isolated Storage	

4.0 ENVIRONMENTAL SURVEILLANCE

The program elements described below are designed to detect and measure the impact of plant operation on the environment. If on the basis of this program it is established that no significant adverse environmental impact has resulted or is likely to result from operation of the Browns Ferry Nuclear Plant, elements of the environmental surveillance program may be modified or terminated. Revised

4.1 Ecological Surveillance

4.1.1 Abiotic

(a) Water Quality Surveys

Objective

Water quality surveys are performed quarterly in Wheeler Reservoir. Baseline levels for water quality parameters in Wheeler Reservoir were established by previous sampling and will be compared to that data received once the plant is in operation. Significant variations in compared numbers will be utilized to define potential water quality problem, and provide solution to these problems.

Specification

Water quality data in Wheeler Reservoir are determined quarterly at the locations shown in Table 4.1-1. Parameters monitored include dissolved oxygen, temperature, biochemical oxygen demand (5 day, 20° C.), chemical oxygen demand, pH, alkalinity, specific conductance, sodium, sulphates, chlorides, nitrogens (NH_3, NO_2, NO_3, and organic), and solids (dissolved, suspended, and total). All field and laboratory analysis associated with the reservoir monitoring program will be performed by the Division of Environmental Planning's Water Quality Branch. All analyses will be performed using standard documented analytical procedures for water quality analysis. Details of the analytical procedures are on file in the Water Quality Branch, Chattanooga, Tennessee.

Reporting Requirement

Water quality data are stored on the STORET computerized data handling system that is operated by the U.S. Environmental Protection Agency and are also kept on file in the Water Quality Branch office. These data are used for identifying existing water quality conditions in the plant area. The results will be summarized in semiannual reports of the nonradiological monitoring program.

Bases

The reservoir monitoring program will, at a minimum, evaluate the parameters directly associated with the "added" waste discharges originating from Browns Ferry. Maintenance of these parameters at or within the standards will help to assure satisfactory water quality conditions within Wheeler Reservoir. In conjunction with other TVA program interests, additional water quality parameters and locations

Reporting Requirement

The results will be summarized in semiannual reports of the nonradiological monitoring program.

Bases

The four benthic macroinvertebrates selected for study represent the predominant benthic fauna in Wheeler Reservoir. Normally currents in a reservoir do not affect the location and movement of benthic populations. Thus, these organisms can be studied at a specific location over an extended period to determine significant population changes.

(b) Phytoplankton Monitoring

Objective

Quarterly monitoring of phytoplankton will be conducted at the locations shown in Table 4.1-1 to assess changes in phytoplankton populations. Since algal growth and photosynthesis vary with changes in water temperature, light intensity, and nutrient concentrations, the data will have some natural variability.

Specification

All phytoplankton monitoring will be performed by the Division of Environmental Planning's Environmental Biology Branch using standard accepted procedures for phytoplankton sampling, enumeration, and biomass and productivity determinations. These procedures are on file in the office of the Environmental Biology Branch, Muscle Shoals, Alabama.

Reporting Requirement

The results will be summarized in semiannual reports of the nonradiological monitoring program.

Bases

Changes to populations of phytoplankters, either in numbers or species, may indicate effects from the plant, particularly from heat introduction. Changes may occur that are not detectable because of the high variability associated with sampling on a quarterly frequency. Additionally, prolonged exposure to high temperatures during late summer or fall enhances the growth of blue-green algae. In algal communities exposed to these conditions, dominance usually shifts successively from diatoms to green algae and eventually to blue-green algae.

Enumeration and biomass estimates are used to assess the standing crop of phytoplankton. Productivity measurements are used to determine the vitality of phytoplankton cells. The procedure is based on the amount of carbon-14 assimilated by viable cells over a measured period of time in a water sample of known volume.

Revised

(c) Zooplankton Monitoring

Objective

The objective of the zooplankton monitoring is to assess population changes and movement within the areas monitored and provide a basis for determining the effect of the plant on the zooplankton population. Revised

Specification

Quarterly zooplankton samples will be collected at the locations shown in Table 4.1-1. All zooplankton monitoring will be performed by the Division of Environmental Planning's Environmental Biology Branch using standard accepted zooplankton sampling and enumeration procedures. These procedures are on file in the office of the Environmental Biology Branch, Muscle Shoals, Alabama.

Reporting Requirement

The results will be summarized in semiannual reports of the nonradiological monitoring program.

Bases

Because zooplanton are important links in the aquatic food chain, taxonomy and population changes will be important indices in evaluating the effects of plant operation on reservoir ecology. However, since zooplankters are capable of limited movement and do change their vertical distribution during the daily cycle, data derived from sampling specified depths at discrete times may not present a complete picture. Since a relatively high degree of variability due to sampling procedures is expected, these studies are limited to providing a historical record for use in assessing such factors as gross population changes, percentage changes in groups (Copepoda, Cladocera, Rotifera), and the deletion or addition of any species after Browns Ferry Nuclear Plant becomes operational.

(d) Fish Population and Distribution Studies

Objective

Studies are to assess plant impact on movement of fish, relative abundance, creel harvest, species composition, and growth of fish.

Specification

Net sampling will be conducted quarterly at four of the locations shown in Table 4.1-1. All fisheries monitoring will be conducted by the Division of Forestry, Fisheries and Wildlife Development using standard

accepted sampling and evaluation procedures. These procedures are on file with the Fisheries and Waterfowl Resources Branch in Norris, Tennessee.

To determine normal movement in the reservoir, selected species of fish collected by trap nets will be tagged. Gill net catches will also supplement information on species composition, relative abundance, distribution, and movement. Electrofishing will be used to supplement the tagging of species not obtained in sufficient numbers by trap netting. Trap nets also furnish fish for routine growth studies.

Rotenone sampling in selected areas during late August and early September of each year serves as a basis for determining standing stocks, species composition, and reproductive success.

Creel census studies are conducted each month to establish catch per hour and per trip, species and weights of fish taken, and hours fished per trip in each of six areas of the reservoir. Previously recorded data will be the basis for determining the location and magnitude of the sport fishery before operation of the Browns Ferry Nuclear Plant.

Larval fish are also being investigated. Information on species, numbers, and distribution of larval fishes present in four areas of the reservoir during the sampling period before operation begins will be compared with data collected after the plant becomes operational to assess effects of plant operation.

Reporting Requirement

The results will be summarized in semiannual reports of the nonradiological monitoring program.

Bases

The most important interaction of Browns Ferry Nuclear Plant with the environment will be the heat dissipated from the plant in Wheeler Reservoir. The effect of the added heat on fish resources is to be determined.

(e) Entrainment of Fish Eggs and Larvae

Revised

Objective

To quantify the entrainment of fish eggs and larvae in the cooling water system.

Specification

The entrainment of fish eggs and larvae in the cooling water system shall be monitored weekly during the major spawning period of March through July and an estimate made of the total number of fish eggs and larvae entrained.

Monitoring will be performed by the Division of Forestry, Fisheries, and Wildlife Development using standard accepted sampling procedures on file in this division's office, Norris, Tennessee.

Reporting Requirement

The results will be summarized annually in one of the semiannual reports of the nonradiological monitoring programs.

Bases

A significant proportion of the river flow will be routed through the plant for cooling purposes, and during periods when larval fishes are abundant there is the potential for entrainment of large numbers of fishes. The specified study will determine the numbers of fish eggs and larvae entrained in the cooling water system resulting from plant operation and identify the need for possible corrective action.

(f) Fish Impingement on Intake Screens

Objective

To detect and quantify fish impingement upon the intake screens.

Specification

Fish impinged on intake screens shall be estimated three times per week with no longer than three days elapsing between observations. Those fish impinged on one selected screen which has been in operation over the preceeding 24 hours shall be collected during screen washing and classified as: 1) shad and herring, 2) catfish, 3) bass (largemouth, smallmouth and spotted bass), 4) crappie, 5) sunfish, 6) drum and 7) other species. Total daily impingement will be estimated for all screens in operation by applying an appropriate "weighting factor" to the data from the selected screen.

The screen selection and "weighting factor" shall be evaluated bimonthly; the evaluation program shall consist of counting the impinged fish on each of the six screens for two days and differentiation by species and by 25mm length-class intervals. The two day evaluation may be substituted for the regular weekly monitoring.

Reporting Requirements

Five copies of a monthly report to be prepared by TVA's Division of Power Production in coordination with the Division of Power Resource Planning shall be submitted to the USAEC-Division of Reactor Projects within 15 days following the end of each calendar month. The report shall include tabulated impingement data, bimonthly evaluation of screen "weighting factor" when applicable, and summary of any specific studies or investigations which TVA is conducting to evaluate the significance of impingement losses or techniques for reducing significant losses. A copy will be sent to TVA's Division of Forestry, Fisheries, and Wildlife Development for review and assessment. Results of FFWD's review and assessment will be sent to the Division of Enviromental Planning for inclusion in the semiannual operating report.

Bases

Quantification of impinged fish upon the intake screens will provide an assessment of fish losses from normal plant operation and identify the need for possible corrective action.

Radiological Environmental Monitoring

Details of Browns Ferry Nuclear Plant radiological environmental monitoring is given in "Technical Specification and Bases for Browns Ferry Nuclear Plant, Unit 1."

Revised

5.0 ADMINISTRATIVE CONTROLS

Objective

This section describes the administrative and management controls established to provide continuing protection to the environment and to implement the environmental technical specifications. Measures to be specified in this section include the assignment of responsibilities, organizational structure, operating procedures, review and audit functions, and reporting requirements.

Specifications

5.1 Responsibility

5.1.1 The power plant superintendent has responsibility for operating the plant within the limiting conditions for operation (LCO).

5.1.2 The Director, Division of Environmental Planning, is responsible for the environmental monitoring program outside the plant.

5.2 Organization

5.2.1 The organization of TVA management which directly relates to operation of the plant is shown on Figure 5.2-1.

5.2.2 The principal divisions within TVA which are concerned with environmental matters related to nuclear power plant operation are the Division of Power Production (DPP), Division of Forestry, Fisheries, and Wildlife Development (FFWD), Division of Power Resource Planning (DPRP), and the Division of Environmental Planning (DEP). The DPP and DPRP are in the Office of Power. The Office of Power, DEP, and FFWD report to the General Manager. This is depicted in Figure 5.2-2.

5.3 Review and Audit

5.3.1 The Director, DEP, is responsible for review of plant operation related to LCO to insure that plant operation is being conducted within the limits defined in Section 2 of this document.

5.3.2 The DPRP shall conduct a periodic audit of the nonradiological environmental monitoring program as conducted by DEP and DPP at least once per year.

5.3.3 The DPRP and DEP shall review, audit and contribute to the following items: Revised

a. Preparation of the proposed environmental technical specifications.

b. Coordination of environmental technical specification development with the safety technical specifications to avoid conflicts and maintain consistency.

c. Proposed changes to the environmental technical specifications and the evaluated impact of the change.

d. Proposed written procedures, as described in 5.5, and proposed changes thereto which affect the plant's environmental impact.

e. Proposed changes or modifications to plant systems or equipment which could affect the plant's environmental impact and the evaluated impact of the changes.

f. Results of the environmental monitoring programs prior to their submittal in each Semiannual Operating Report. See Sections 5.6.1 and 5.6.2.

g. Investigation of all reported instances of violations of environmental technical specifications. Where investigation indicates, evaluation and formulation of recommendations to prevent recurrence.

Revised

5.4 Action to be Taken if an Environmental LCO is Exceeded

5.4.1 Follow any remedial action permitted by the technical specifications until the condition can be met.

5.4.2 The DPP shall promptly report the violation to the Assistant to the Manager of Power and the Director, DEP.

5.4.3 DEP will then conduct an independent investigation of the incident. DEP will report the results of its investigation to the Manager of Power, the Director, DPP, and the Director, DPRP.

5.4.4 The plant superintendent shall initiate an investigation of reported or suspected incidents involving violation. This investigation shall consist of the circumstances leading to and resulting from the situation together with recommendations to prevent a recurrence. The results shall be submitted to the Manager of Power, the Director, DPP, the Director, DPRP, and the Director, DEP.

5.4.5 The plant superintendent shall notify the Director of the Regional Regulatory Operations Office, Region II of AEC within 24 hours as specified in Section 5.6.3. A written report shall follow within 10 days (see Section 5.6.3(b)).

5.5 Procedures

5.5.1 Detailed written procedures for the in plant nonradiological monitoring program, including check-off lists, where applicable, shall be prepared by DPP and approved by the plant superintendent and adhered to.

5.5.2 Detailed written procedures for the nonradiological monitoring program outside the plant, including check-off lists, where applicable, shall be prepared, approved by Director, DEP, and adhered to.

5.5.3 All procedures described in 5.5.1 and all changes thereto shall be reviewed and approved prior to implementation and periodically thereafter by the plant management. Temporary changes to procedures which do not change the intent of the original procedure may be made, provided such changes are documented and are approved by two of the following plant personnel:

Table 4.1-1

SUMMARY OF NONRADIOLOGICAL MONITORING PROGRAM

BROWNS FERRY NUCLEAR PLANT

Station TRM	Water Samples	Zooplankton, Chlorophyll and Phytoplankton Sampling	Productivity Measurements	Benthic Fauna	Sediment	Fish[a]
Second Creek Embayment Station						X
277.98	X[b]	X	X	X	X	
283.94	X[c]	X	X	X		X
Elk River Embayment Station						X
288.78	X[b]	X	X	X	X	
291.76	X[c]	X	X	X		X
293.70	X[b] Revised	X	X	X	X	X
295.87	X[c]	X	X	X		
299.00						X
301.06		X	X	X		
307.52	X[b]	X	X	X	X	X

X - Indicates at least one quarterly sample collected at the specified station.

a. Fish sampling at a specific station will be by either gill net, trap net, rotenone, or electrofishing. However, depending upon the sampling method the frequency of sampling at each location may be less than quarterly.

b. Analysis - Dissolved oxygen and temperature.

c. Analysis - Dissolved oxygen, temperature BOD_5, COD, pH, alkalinity, specific conductance, Na, SO_4, chlorides, nitrogens (NH_3, NO_2, NO_3, and organic) and solids (dissolved, suspended, and total).

Revised November 1973