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

JAN 22 1974

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,

Original signed by
Voss A. Moore

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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JAN 22 1974

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cc: Robert H. Marquis
General Counsel
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2 C[illegible]ICAL

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 HEMICAL (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
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

Revised

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