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Carolina Power & Light Company Raleigh, North Carolina 27602 J. A. Jones	10-23-73	10-25-73	x			

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PLANT NAME: Robinson Unit # 2

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CP&L
Carolina Power & Light Company

Regulatory File Cy.

October 23, 1973

Mr. John F. O'Leary
Directorate of Licensing
Office of Regulation
U. S. Atomic Energy Commission
Washington, D. C. 20545

RE: DOCKET NO. 50-261

Dear Mr. O'Leary:

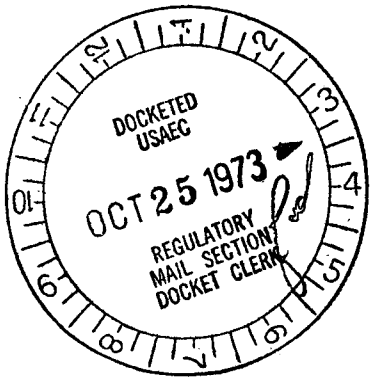
On May 24, 1973, Mr. William H. Regan, Jr., Chief, Environmental Projects Branch 4, transmitted to Carolina Power & Light Company a request that we propose Environmental Technical Specifications for H. B. Robinson Unit No. 2. We are enclosing three signed originals and 47 additional copies of the proposed Environmental Technical Specifications. It is our understanding that when issued by the Commission these Environmental Technical Specifications will become Appendix B of the Facility Operating License. As requested, the Company has proposed radiological release limits in the Environmental Technical Specifications. When the Environmental Technical Specifications are approved by the Commission, the Company will review appropriate changes to the Technical Specifications, Appendix A to resolve any conflicting or duplicating specifications concerning radiological releases.

We would be glad to discuss our proposed Environmental Technical Specifications with the members of your staff.

Yours very truly,

J. A. Jones
Executive Vice President

JAJ/apl
Attachment



336 Fayetteville Street • P. O. Box 1551 • Raleigh, N. C. 27602

7809

PROPOSED ENVIRONMENTAL TECHNICAL SPECIFICATIONS

1.0 DEFINITIONS

Environmental Technical Specifications - Refers to all of the information concerning any limitations, conditions and requirements imposed on the applicant which are considered necessary for the protection of the environment. There are four types of Environmental Technical Specifications: Environmental Protection Conditions, Monitoring Requirements, Environmental Surveillance and Special Studies, and Administrative Controls.

Environmental Protection Condition or Limit - Refers to the numerical limitation placed on a given parameter in Section 2.0. Also referred to as a "limit."

Cooling Water System - Collectively, the cooling impoundment, canal, dam and the condensers which are employed to condense the exhaust steam from Unit No. 2 and dissipate this heat to the environment.

Condenser Inlet Temperature - Temperature of water in Robinson Impoundment at the inlet to the Unit No. 2 condensers.

Condenser Outlet Temperature - Temperature of the circulating water leaving the Unit No. 2 condensers.

ΔT Across Condenser - Difference in temperature between Unit No. 2 condenser inlet and outlet temperature.

Discharge Temperature - Temperature of the water leaving the impoundment and entering Black Creek as measured at the SC 23 bridge crossing.

Drawdown - The change in Robinson Impoundment elevation due to discharge or evaporation.

Discharge Structure - The tainter gates and the low level release valves at the main dam.

Seal Well - The structure at the beginning of the discharge canal where the water from the condensers enters the canal.

Residual Chlorine - The sum of free and combined chlorine remaining in the water after the biological and chemical demand is satisfied.

National Power Emergency - Any event causing authorized federal officials to require CP&L to supply power within or without their distribution area.

Liquid Plant Effluent - The circulating water leaving the seal well.

1.0 DEFINITIONS (Cont'd)

Regional Emergency - Any of the following occurrences within the States of North and South Carolina:

1) A catastrophic natural disaster such as flood, tornado, hurricane, etc.

2) Other emergencies declared by municipal, county, state or federal officials requiring an uninterrupted source of power.

3) Anytime the health, safety, or welfare of the public may be endangered by the inability of Carolina Power & Light to supply electricity.

Reactor Emergency - An unanticipated equipment malfunction that requires immediate remedial action to avoid endangering the public health or welfare.

Abnormal Environmental Occurrence - An event resulting in an environmental protection limit being exceeded.

Normal Power Operation - Operation of the plant between 2% and 100% of rated thermal power in a non-emergency situation, using normal operating procedures.

2.0 ENVIRONMENTAL PROTECTION LIMIT	3.0 MONITORING REQUIREMENT
Specification:	
General: During a national power emergency, regional emergency, reactor emergency, or at any time when the health, safety, or welfare of the public may be endangered by the inability of Carolina Power & Light Company to supply electricity, the operating limits provided in these environmental technical specifications shall be inapplicable. During such emergencies, however, the operating limits shall not be exceeded except as is necessitated by the emergency	
2.1 Thermal	3.1 Thermal
2.1.1 Maximum ΔT Across Condenser	3.1.1 Maximum ΔT Across Condenser
Objective: The purpose of this requirement is to limit the thermal stress on the ecosystem in the impoundment due to temperature rise through the condenser.	Monitoring Requirement: The temperature at the condenser inlet and outlet is monitored hourly. An instantaneous reading is recorded by computer once each hour. In the event the monitoring system is out of order for more than 36 hours, these temperatures will be determined manually on a 5-day per week basis until the system is returned to service.
Specification: The maximum temperature rise across the condenser shall not exceed 28°F.	
Bases: This limit should be sufficient to protect aquatic life in the impoundment. Operating experience has shown that rapid changes in temperature are not expected and that the proposed monitoring should be adequate.	
2.1.2 Maximum Discharge Temperature	3.1.2 Maximum Discharge Temperature
Objective: The objective of this requirement is to protect the aquatic biota in Black Creek due to the thermal discharge of H. B. Robinson Unit No. 2.	Monitoring Requirement: The temperature at the impoundment outlet is monitored hourly. The data is telemetered to the plant control room and an instantaneous reading is recorded once each hour. In the event the monitoring system is out or order for more than 36 hours, these temperatures will be determined manually on a 5-day per week basis until the system is returned to service.
Specification: The temperature of the impoundment discharge shall not exceed 90°F.	

2.0 ENVIRONMENTAL PROTECTION LIMIT	3.0 MONITORING REQUIREMENT
2.1.2 Maximum Discharge Temperature (Cont'd) Bases: This limit meets the requirement of the South Carolina Pollution Control Authority and should ensure that there will be no adverse effect on Black Creek biota below Robinson Impoundment.	

2.0 ENVIRONMENTAL PROTECTION LIMIT

2.2 Hydraulic

2.2.1 Intake Velocity

Objective: The purpose of this specification is to minimize the impingment of aquatic organisms on the intake structure trash screens.

Specification: The approach velocity at the circulating water intake structure shall not exceed 1.5 foot per second.

Bases: The design of the intake structure includes single speed circulating pumps and a skimmer wall that extends 18 feet below the surface. The maximum water level fluctuation in the impoundment is approximately 1.5 feet; therefore, approach velocity should remain constant and not require more frequent monitoring. This approach velocity of 1.5 fps should not result in excessive impingement of large numbers of fish.

3.0 MONITORING REQUIREMENT

3.2 Hydraulic

3.2.1 Intake Velocity

Monitoring Requirement: The approach velocity shall be measured once each year at a point six feet in front of the intake structure.

2.0 ENVIRONMENTAL PROTECTION LIMIT

2.3 Chemical

Objective: The purpose of these specifications is to insure that chemical releases from the H. B. Robinson Unit No. 2 will not reach levels that are toxic to aquatic organisms in the Robinson Impoundment or Black Creek.

2.3.1 Chlorine

If the need for chlorination arises, each of the two condensers will be chlorinated alternately for not more than two 30-minute periods per day. Residual chlorine shall not exceed 0.5 ppm.

Bases: These specifications and monitoring programs will ensure that chemical concentrations in Robinson Impoundment will not reach levels that are harmful to aquatic organisms.

2.3.2 Corrosion Inhibitors

The concentrations in the plant effluent of hexavalent chromium and other corrosion inhibitors shall not exceed the maximum levels recommended for drinking water by the U. S. Public Health Service.

Bases: These specifications and monitoring programs will ensure that chemical concentrations in Robinson Impoundment will not reach levels that are harmful to aquatic organisms.

2.3.3 Hydrogen Ion

The pH in the seal well shall not differ from the pH of the impoundment by more than one pH unit.

Bases: These specifications and monitoring programs will ensure that chemical concentrations in Robinson Impoundment will not reach levels that are harmful to aquatic organisms.

3.0 MONITORING REQUIREMENT

3.3 Chemical

3.3.1 Chlorine

Monitoring Requirement: Both free and combined residual chlorine will be monitored daily in the discharge canal during the period of chlorination.

3.3.2 Corrosion Inhibitors

Monitoring Requirement: Monitoring for the presence of corrosion inhibitors will be performed on each release to the circulating water system from systems subject to contamination with corrosion inhibitors.

3.3.3 Hydrogen Ion

Monitoring Requirement: pH at the intake structure and in the seal well will be determined once per day on a 5-day per week basis.

2.0 ENVIRONMENTAL PROTECTION CONDITION

2.4 Radioactive Discharges

A. Liquid Effluents

Applicability

Applies to the controlled release of radioactive liquids from the facility.

Objective:

To define the limits and conditions for the release of radioactive liquid effluents to the environs to assure that any radioactive releases are as low as practicable and within the limits of 10 CFR Part 20 for instantaneous release rates.

Specification

1. The radioactivity release concentration in liquid effluents from the discharge canal shall not exceed the values specified in 10 CFR Part 20, Appendix B, Table II, Column 2, for unrestricted areas.

2. The release rate of radioactive liquid effluents, excluding tritium and noble gases, shall not exceed 5 curies during any calendar quarter.

3. During release of radioactive wastes, the following conditions shall be met:

a. The effluent control monitor shall be set to alarm and automatically close the waste discharge valve prior to exceeding the limits specified in 2.4.A.1 above.

3.0 MONITORING REQUIREMENT

3.4 Radioactive Discharges

A. Liquid Effluents

Applicability

Applies to the periodic test requirements and sampling and monitoring methods used for liquid effluents.

Objective:

To ensure that radioactive liquid releases from the facility are maintained with the limits specified by Specification 2.4.A.

Specification

1. Facility records shall be maintained of the radioactive concentrations and volume before dilution of each batch of liquid effluent released, and of the average dilution flow and length of time over which each discharge occurred.

2. Prior to release of each batch of liquid effluent, a sample shall be taken from that batch and analyzed for gross radioactivity (B.γ) and tritium to demonstrate compliance with 2.4.A using the circulating water flow rate at the time of discharge.

3. A weekly proportional composite sample, including an aliquot of each batch released during the week, shall be analyzed for Ba-La-140 and I-131.

2.0 ENVIRONMENTAL PROTECTION CONDITION

2.4.A Liquid Effluents (Cont'd)

b. Liquid waste activity and flow rate shall be continuously monitored during release. If this requirement cannot be met, the continued release of effluent shall be permitted only during the succeeding 48 hours provided that during this 48-hour period, two independent samples of each tank shall be analyzed and two station personnel shall independently check the valving prior to discharge.

4. The equipment installed in the liquid radioactive waste system shall be maintained and shall be operated to process all liquid radwastes prior to their discharge when it appears that the projected accumulative discharge, excluding tritium and noble gases, will exceed 1.25 curies during any calendar quarter.

5. The maximum activity to be contained in one liquid radwaste tank that can be discharged directly to the environs, excluding tritium and noble gases, shall not exceed 10 curies. (Condensate or monitor tank)

6. When the release rate of radioactive effluents, excluding tritium and noble gases, exceeds 2.5 curies during any calendar quarter, the licensee shall notify the Directorate of Licensing, within 30 days, identifying the causes and describing the proposed program of action to reduce such releases.

7. Steam generator blowdown radioactivity shall be continuously monitored. Whenever the monitor is inoperable for more than 36 hours, grab samples shall be taken and analyzed daily on a 5-day-per week basis.

3.0 MONITORING REQUIREMENTS

3.4.A Liquid Effluents (Cont'd)

4. A monthly proportional composite liquid waste sample, including an aliquot of each batch released during the month, shall be analyzed for the principal gamma emitting fission and activation products as well as gross alpha, beta and gamma radioactivity.

5. At least one representative liquid waste batch per month shall be analyzed for dissolved fission and activated gases.

6. At least quarterly, a composite proportional sample, including an aliquot of each batch released during the quarter, shall be analyzed for Sr-89 and Sr-90.

7. The liquid effluent radiation monitor shall be calibrated at least quarterly by means of a check source and at each refueling outage with a known radioactive source. Each monitor as described shall also have an instrument channel test monthly and a sensor check daily, excluding days of no discharge. Sensor shall not be inoperati for a period exceeding 48 hours during discharge.

8. The status and performance of automatic isolation valves and discharge tank selection valves shall be checked and logged and results of individual liquid waste samples shall be recorded.

Bases

The monitoring requirements provide assurance that liquid radioactive wastes are properly controlled and monitored during any release of radioactive liquids.

2.0 ENVIRONMENTAL PROTECTION CONDITION

2.4.A Liquid Effluents (Cont'd)

Bases

Specification 2.4.A.1 requires the licensee to limit the instantaneous release concentration of radioactive materials in liquid effluents from the station to levels specified in 10 CFR Part 20, Appendix B, Table II, Column 2, for unrestricted areas.

This specification provides assurance that no member of the general public can be exposed to liquids containing radioactive materials in excess of limits considered permissible under the Commission's Rules and Regulations.

Specification 2.4.A.2 establishes an upper limit for the release of radioactive liquid effluents, excluding tritium and noble gases, of 5 curies during any calendar quarter. The intent of this specification is to permit the licensee the flexibility of operation to assure that the public is provided a dependable source of power under unusual operating conditions which may temporarily result in releases higher than the levels normally achievable. Releases of up to 5 curies during any calendar quarter will result in concentrations of radioactive material in liquid effluents at small percentages of the limits specified in 10 CFR Part 20.

Specification 2.4.A.2 requires that suitable equipment to control and monitor the releases of radioactive materials in the liquid effluents are operating during any period these releases are taking place.

3.0 MONITORING REQUIREMENT

3.4.A Liquid Effluents (Cont'd)

2.0 ENVIRONMENTAL PROTECTION CONDITION	3.0 MONITORING REQUIREMENT
2.4.A Liquid Effluents (Cont'd)	3.4.A Liquid Effluents (Cont'd)
Specification 2.4.A.4 requires that the licensee shall maintain and operate the equipment installed in the radwaste system to reduce the release of radioactive materials in liquid effluents to as low as practicable consistent with the requirements of 10 CFR Part 50.36a. In order to keep releases of radioactive materials as low as practicable, the specification requires, as a minimum, operation of equipment whenever the release exceeds 1.25 curies per quarter.	
Specification 2.4.A.5 limits the amount of radioactivity that may be inadvertently released to the environment to an amount which is as low as practicable consistent with the requirements of 10 CFR Part 50.36a.	
In addition to limiting conditions for operation listed under Specification 3.8.A.2, the reporting requirements of Specification 3.8.A.6 delineate that the licensee shall identify the cause whenever the release of radioactive effluents, excluding tritium and noble gases, exceeds 2.5 curies during any calendar quarter and describe the proposed program of action to reduce such releases. This report must be filed within 30 days following the calendar quarter in which the 2.5 curie release occurred.	
Specification 2.4.A.7 requires the monitoring of the steam generator blowdown, which may be a major source of activity released to the environment, to assure operational attention to excessive releases from this source.	

2.0 ENVIRONMENTAL PROTECTION CONDITION

2.4.B Airborne Effluents

Objective

To define the limits and conditions for the release of radioactive gaseous effluents to the environs to assure that any radioactive releases are as low as practicable and within the limits of 10 CFR Part 20 for instantaneous release rates.

Specification

1. The release rate of gases and tritium except for halogens and particulates with half-lives longer than eight days, shall not exceed:

$$\sum \frac{Qi}{(mpc)i} \leq 5.0 \times 10^4 \ (M^3/sec)$$

where Qi is the annual release rate in curies per second of radioisotopes i from the plant and MPC_i is defined for radioisotope i in Column I, Table II of Appendix B to 10 CFR Part 20.

2. The release rates of I-131 and particulates with half-lives greater than eight days released to the environs as part of airborne effluents shall not exceed:

$$\sum \frac{Qi}{5 \times 10^4} \leq \frac{MPC}{700}$$

3. The release rate of gross gaseous activity from the plant shall not exceed 0.0024 curies/second when averaged over any calendar quarter.

4. When the release rate exceeds 0.015 curies/second for a period of greater than 48 hours the

3.0 MONITORING REQUIREMENT

3.4.B Airborne Effluents

Objective

To ensure the radioactive gaseous releases from the facility are maintained within the limits specified by Specification 2.4.B.

Specification

1. The gross B,γ and particulate activity of all gaseous wastes released to the environment shall be monitored and recorded.

2. Prior to release of gaseous wastes from a gas decay tank, the contents of the tank shall be sampled and analyzed to determine compliance with 2.4.B.1 and 2.

3. Prior to purging the containment, the containment atmosphere shall be sampled and analyzed to determine compliance with 2.4.B.1 and 2.

4. The release rate of tritium in the gaseous effluents shall be determined on the basis of a representative sample collected and analyzed for tritium at least quarterl

5. Facility records of iodine and particulate releases with half-lives greater than eight days shall be maintained on the basis of all filter cartridges counted. These filters shall be analyzed weekly when the iodine or particulate release rate is no greater than the (quarterly average) release rate given in 2.4.B.3 above, otherwise the cartridges shall be removed and analyzed daily until a steady release level has been established. These filters shall be analyzed for I-131 (charcoal), gross radioactivity (B,γ) and Ba-La-140 and I-131 (particulate).

2.0 ENVIRONMENTAL PROTECTION CONDITION	3.0 MONITORING REQUIREMENT
2.4.B Airborne Effluents (Cont'd)	3.4.B Airborne Effluents (Cont'd)
licensee shall notify the Director, Directorate of Licensing, in writing within 10 days.	6. One of the weekly charcoal filters shall be analyzed for I-133 and I-135 at least quarterly.
5. During release of gaseous wastes from the waste gas decay tanks to the plant vent, the following conditions shall be met:	7. One of the weekly particulate filters shall be analyzed for gross alpha radioactivity at least quarterly A composite of a month's filters shall be analyzed for Sr-89 and Sr-90 at least quarterly and principal gamma emitting nuclides monthly.
a. The gross B.γ activity monitor, the iodine activity monitor and particulate activity monitor shall be operating.	8. The plant vent gaseous effluent monitor shall be tested prior to any release of radioactive gas from a decay tank and shall be calibrated at refueling intervals. The calibration procedure shall consist of exposing the detector to a referenced calibration source in a controlled reproducible geometry.
b. At lease one auxiliary building exhaust fan shall be in operation.	
c. Isolation devices capable of limiting gaseous release rates from the main stack to within the values specified in 2.4.B.1 above shall be operating.	
Bases	9. During power operation, the condenser air ejection discharge shall be continuously monitored for gross radiogas activity. Whenever this monitor is inoperable, gas discharges from the air ejector shall be routed to the plant vent for monitoring.
Specification 2.4.B.1 provides a method to be used in summing the airborne effluents from the main stack and vents which will assure that the release rate does not exceed 10 CFR Part 20 for unrestricted areas. The constants are determined by the annual average site meterorology and an exposure dose of 500 mrem per year to the whole body.	10. Records shall be maintained and reports of the sampling and analysis results shall be submitted in accordance with Section 5 of these Specifications. Estimates of the error associated with each reported value should be included.
Specification 2.4.B.2 provides a method to be used in summing airborne halogens and particulates with half-lives greater than eight days released from the stack and vents to assure that the release rate does not exceed 10 CFR Part 20, Appendix B, Table II, Column 1, for unrestricted areas. The constants are determined by the annual average site meterorology and an exposure dose of 500 mrem per year to the whole body or any organ, and include	Bases The surveillance requirements given under Specification 3.4.B provide assurance that gaseous wastes are properly controlled and monitored during any release of radioactive materials in the gaseous effluents.

2.0 ENVIRONMENTAL PROTECTION CONDITION	3.0 MONITORING REQUIREMENT
2.4.B Airborne Effluents (Cont'd)	3.4.B Airborne Effluents (Cont'd)
a factor of 700 to account for reconcentration. Specification 2.4.B.3 establishes an upper limit for the continuous release of gaseous activity from the plant for the interim period. Specification 2.4.B.5 is in accordance with Design Criterion 64.	These surveillance requirements provide the data for the licensee and the Commission to evaluate the station's performance relative to radioactive gaseous wastes released to the environment.

4.0 ENVIRONMENTAL SURVEILLANCE

4.1 Ecological Surveillance

Objective

The program will examine the key physical, chemical and biological components and their major interactions in the Robinson Impoundment ecosystem in order to satisfy the commitments made in the H. B. Robinson Steam Electric Plant Unit 2 Environmental Report for a two year environmental study.

Specifications

Carolina Power & Light Company will initiate an environmental monitoring program of the Robinson Impoundment in order to assess the impact of the operation of H. B. Robinson Unit No. 2 on biotic and abiotic components of the ecosystem.

Results will be compiled quarterly. Such reports will be available for review by various agencies including the Directorate of Licensing and will be submitted to the AEC, as specified in Section 5.4.

If it is concluded on the basis of these reports that the program is providing inadequate and/or inconclusive data, modifications will be implemented to correct for such deficiencies. If, however, it

is concluded on the basis of these reports that no major adverse impact has resulted or is likely to result from the continued operation of the H. B. Robinson Unit No. 2 and that the degree of impact is not expected to change, the intensity of the study program may be modified where indicated.

Specific studies will include the monitoring of water temperatures and dissolved oxygen; the monitoring of various chemical parameters; the monitoring of important biotic components such as phytoplankton, zooplankton, chlorophyll, primary productivity, benthos and fishes; and the monitoring of fish impingement on the intake screens (Table 4.1-1).

A map of the Robinson Impoundment showing sampling transects and points is presented in Figure 4.1-1. Five transects will be established and are identified as A, B, C, D and E. Along each transect three sampling stations (1, 2 and 3) are identified, with sampling stations 1 and 3 located approximately one-quarter of the way across the impoundment from their respective shores, and sampling station 2 located at the transect middle. In addition, four point stations, identified as F, G, H and I, will be established.

Bases

The physical and chemical (abiotic) factors in the ecosystem will be monitored because they have a direct effect on organisms within

energy (trophic) levels of the food chain. The interaction of these abiotic factors (and other biological components) with the biotic community determines the structure, stability and function of the entire ecosystem.

The ecological surveillance program is described in Sections 4.1.1 to 4.1.2.

4.1.1 Abiotic

4.1.1.1 Thermal Influence

Objective

Water temperatures will be monitored in order to report thermal conditions in the cooling impoundment and any effects the thermal discharge may have on the aquatic ecosystem.

Specifications

At each transect station and at point stations F and G, water temperatures will be recorded monthly at three foot intervals.

Bases

Temperature variations in aquatic ecosystems may produce characteristic circulation and stratification patterns which directly

influence aquatic life. In addition, an increase in water temperature generally decreases the amount of free oxygen which can be dissolved in water while increasing the metabolic rates of organisms within the biotic communities.

4.1.1.2 Dissolved Oxygen

Objectives

Dissolved oxygen will be monitored in order to establish the availability of free oxygen to organisms within the ecosystem.

Specifications

At each transect station and at station points F and G, dissolved oxygen readings will be recorded monthly at three foot intervals.

Reporting Requirement

Should the average dissolved oxygen concentration at any sampling station fall below 4.0 mg/liter, the AEC/DOL will be notified by telephone as specified in Section 5.4.

Bases

Dissolved oxygen levels are affected by water temperatures. Monitoring of dissolved oxygen concentrations in the Robinson Impoundment

will determine if free oxygen is available to the biotic communities of the impoundment ecosystem.

4.1.1.4 Water Chemistry

Objectives

Monitoring of chemical parameters will insure that chemical discharges into the Robinson Impoundment directly due to the operation of H. B. Robinson Unit No. 2 will be controlled and diluted so as to be non-toxic to the biotic communities of the impoundment.

Specifications

At transect A - station 2, transect E - station 3 and point station G, one (1) gallon surface and bottom water samples will be collected. At point stations H and I one (1) gallon samples will be taken from the surface only. Sampling is to be performed monthly.

The chemical parameters which will be analyzed are identified in Table 4.1-2.

Reporting Requirements

Should chemical concentrations in the Robinson Impoundment exceed levels which are toxic to the biotic communities as a result of plant discharges, the AEC/DOL will be notified by telephone.

as specified in Section 5.4.

Bases

In order for the maintenance of biotic communities a variety of macronutrients and micronutrients are necessary. Shifts in the amounts of the concentrations of these chemical components directly affect the nitrogen cycle, the phosphorous cycle and the physiological-biochemical metabolic process of the primary producers and other organisms of the ecosystem.

4.1.2 Biotic

4.1.2.1 General Ecological Survey

Objectives

The program will be conducted to determine the effects of plant operation on the plankton, benthic and fish communities of the Robinson Impoundment.

Specifications

Phytoplankton samples will be taken quarterly at transect A - station 2, transect E - station 3 and point station G at the surface and from various depths, determined by light penetration. In addition, in

these areas, zooplankton will be collected. Population composition, numbers, species diversity and spatial and temporal abundance will be analyzed.

Chlorophyll concentrations will be calculated monthly from samples taken at transect A - station 2, transect E - station 3 and point station G. Samples are to be collected at the surface and from one or more depths, determined by light penetration.

Primary productivity will be estimated quarterly by measuring the photosynthetic rate of phytoplankton.

These stations have been established near the intake area, near the area of discharge into the impoundment, and in an area above the discharge where thermal influence is not as significant. In this way possible effects of entrainment may be observed and reported.

At five sampling stations benthos samples will be taken quarterly for identification and calculation of species diversity.

Fishes will be collected on a quarterly basis in four areas in the impoundment and in one area on Black Creek above the impoundment and one area below the impoundment by one or more of the following methods: gill nets, trammel nets, wire baskets or seines (Figure 4.1-2). Rotenone sampling will be performed annually in selected coves with the cooperation of the South Carolina Wildlife and Marine Resources Department. Age-growth relationship and relative abundance of the major sport fishes will be determined.

Reproduction and stomach analysis of three indicator species (bluegill, largemouth bass and brown bullhead), representative of the fish present in the impoundment, will be studied.

Bases

Phytoplankton, as primary producers, form the first trophic level in the food web of aquatic ecosystems. Zooplankton are primary consumers. Because of this, any significant shifts in the plankton communities directly alter the basis of the food web and affect other biotic communities on the higher trophic levels (i.e. fishes). By monitoring these "indicator communities" the stability of the ecosystem can be noted to insure that the entire biotic community is not being adversely affected by plant operation.

Benthic organisms represent an important source of food for the fish community and are indicators of water quality near the bottom of the impoundment.

The study should determine any effects of plant operations on species composition, relative abundance and growth of major fish species.

4.1.2.2 Fish Impingement and Entrainment of Fish Eggs and Larvae

Objectives

The collection of fish impinged on the traveling intake screens will allow for the identification of species, number, size, and age.

Specifications

On a monthly basis fish impinged on the traveling intake screens will be collected over a 48-hour period, thus allowing diurnal and seasonal comparisons of numbers of fish impinged. Fish collected on the screens will be identified to species when possible, counted and sorted by length groups. Total weights for each group will be recorded.

The entrainment of fish eggs and larvae in the cooling water system will be monitored monthly during the major spawning period of April through July by suspending an egg net in the discharge canal adjacent to the plant. Estimates will then be made of the total number of fish eggs and larvae entrained.

Reporting Requirements

Should the impingement on the screens of largemouth bass (principal game fish in Impoundment) exceed 10 per day or should the number of

other fish impinged on the screens exceed 2500 per day, the AEC/DOL will be notified by telephone as specified in Section 5.4.

Bases

The impingement of fish on the intake screen and entrainment of eggs and larvae in the cooling water system may cause a loss to the fishery in the Robinson Impoundment. The study will determine the mortality of fish impinged on the traveling intake screens and the number of eggs and larvae entrained in the cooling water system resulting from the operation of the plant.

TABLE 4.1-1

FIELD SAMPLING SCHEDULE AND SAMPLING LOCATIONS

	A			B			C			D			E			F	G	H	I	Y[b]	Z[c]
	1	2	3	1	2	3	1	2	3	1	2	3	1	2	3						
Abiotic																					
Water Temperature (Monthly)																					
Surface	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	-	-
Every 3 Feet to Bottom	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	-	-	-	-
Dissolved Oxygen (Monthly)																					
Surface	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	-	-
Every 3 Feet to Bottom	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	-	-	-	-
Water Chemistry (Monthly)[a]																					
Surface and Bottom	-	X	-	-	-	-	-	-	-	-	-	-	-	-	X	-	X	-	-	-	-
Surface Only	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	X	X	-	-
Biotic																					
Phytoplankton (Quarterly)	-	X	-	-	-	-	-	-	-	-	-	-	-	-	X	-	X	-	-	-	-
Zooplankton (Quarterly)	-	X	-	-	-	-	-	-	-	-	-	-	-	-	X	-	X	-	-	-	-
Chlorophyll (Monthly)	-	X	-	-	-	-	-	-	-	-	-	-	-	-	X	-	X	-	-	-	-
Primary Productivity (Quarterly)	-	X	-	-	-	-	-	-	-	-	-	-	-	-	X	-	X	-	-	-	-
Fishery (Quarterly)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	X	-
Impingement (Monthly)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	X
Benthos	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	X	-

[a] A complete listing of chemical parameters is provided in Table 4.1.1.

[b] Sample locations to be varied and identified in Quarterly Reports.

[c] Intake Screens

TABLE 4.1-2

CHEMICAL PARAMETERS TO BE MONITORED

Total solids	Total dissolved ortho-phosphate	Total zinc
Total volatile solids	Sulphates	Dissolved zinc
Total suspended solids	Total alkalinity ($CaCO_3$)	Total sodium
Ammonia (As N)	Total silica	Total aluminum
COD	Total chlorides	Total mercury
Kjeldahl nitrogen	Total chromium (hexavalent)	Total calcium
Nitrate (As N)	Total copper	Total magnesium
Ortho-phosphate (As P)	Dissolved copper	Total manganese
Total phosphate (As P)	Total iron	Dissolved nickel
Total dissolved phosphate	Total lead	

FIGURE 4.1-1

LAKE ROBINSON TRANSECTS AND SAMPLE POINTS

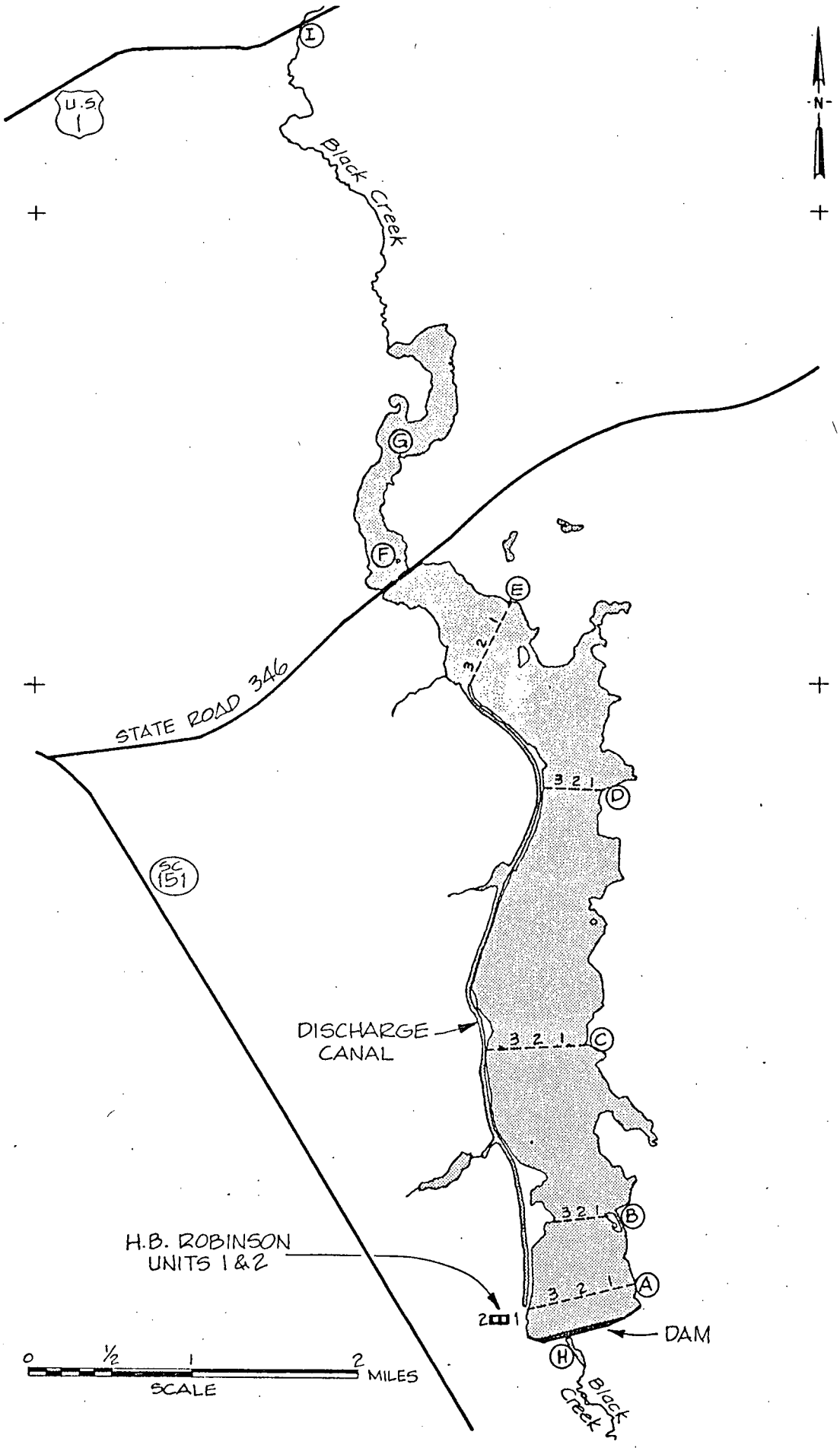
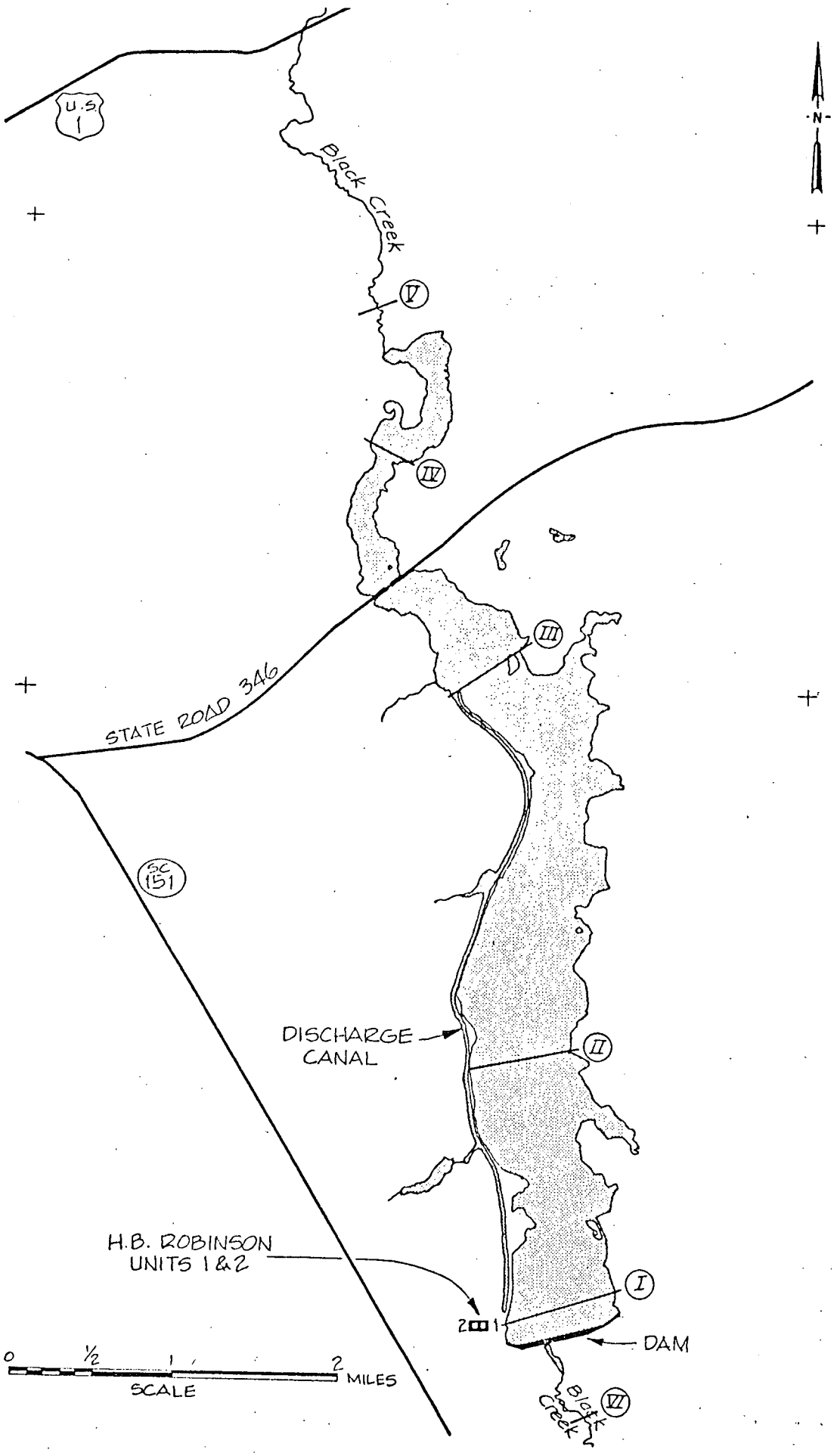


FIGURE 4.1-2

ROBINSON IMPOUNDMENT
FISH SAMPLING STATIONS



4.2 Radiological Surveillance

OBJECTIVE: To provide an evaluation of the environmental impact of operating releases of radioactive materials.

SPECIFICATION: The radiological surveillance program is described in Sections 4.2.1 to 4.2.12, and summarized in Tables 4.2-1 & 4.2-2.

4.2.1 External Radiation Measurement

The external radiation levels are measured by TLD monitors at selected locations at or near the plant site. These monitors are collected at a monthly frequency.

4.2.2 Air Sampling

Continuous air monitoring is to be done at 6 locations at or near the plant site. In addition to filters for removing airborne particulates, the air samplers have charcoal filters suited for iodine collection. In the event that a continuous air monitoring station is out of service for a period in excess of one (1) week, grab samples shall be obtained once a week.

4.2.3 Surface Water Sampling

Sampling of Robinson Impoundment, Black Creek, and Prestwood Lake is performed to evaluate impact to the aquatic environment from releases of radioactive materials. All surface water samples are collected on a weekly basis and analyzed for gross beta, gross alpha, and tritium. Monthly composites

of stations below the minimum detection limit by liquid scintillation will be analyzed for tritium by a more sensitive method. Also, either monthly composites or cation exchange resins for each station will be analyzed by gamma spectrometry.

4.2.4 Ground Water Sampling

Ground water samples are collected on a monthly basis and analyzed for gross beta, gross alpha, and tritium. Quarterly composites are analyzed by gamma spectrometry and for Sr^{89}, Sr^{90}.

4.2.5 Soil Sampling

Two soil samples will be collected twice per year. One sample will be taken from the east side of the impoundment and the other on the west side.

4.2.6 Bottom Sediment Sampling

Sediment samples are collected on a quarterly basis at six different locations. Samples are taken to find any build-up of radio-isotopes in the aquatic environment. They will be analyzed for gross beta, Sr^{89} and Sr^{90}, and for gamma emitters.

4.2.7 Fish Sampling

Both free swimmers and bottom feeders are collected quarterly from the impoundment and analyzed for gross beta, Sr^{89}, Sr^{90} and gamma emitters.

4.2.8 Aquatic Vegetation

Samples will be collected quarterly. These samples will be analyzed for gross beta, Sr^{89} - Sr^{90}, and gamma emitters.

4.2.9 Milk samples will be collected monthly from two locations and analyzed for I^{131}, Sr^{89}, Sr^{90}, and by gamma spectrometry.

4.2.10 Feed Crops

Feed crops will be collected from two locations approximately mid-point of the growing season and near harvest time. Samples will be analyzed for gross beta, Sr^{89}, Sr^{90}, and by gamma spectrometry.

4.2.11 Food Crops

Edible portions of food crops will be collected from two locations approximately mid-point of the growing season and near harvest time. Peaches will be included in the food crop samples. Samples will be analyzed for gross beta, Sr^{89}, Sr^{90}, and by gamma spectrometry.

4.2.12 Tobacco

Tobacco will be collected prior to the start of harvest, approximately midpoint of the harvest season, and after it has been "cured." Samples will be analyzed for gross beta, gross alpha, Sr^{89}, Sr^{90}, and by gamma spectrometry.

ENVIRONMENTAL RADIATION SURVEILLANCE TABLE

TABLE 4.2-1

SAMPLE STATION	LOCATION	SAMPLE TYPES	SAMPLING FREQUENCY	REMARKS
01	S. Property Line near const. road	(1) TLD	(1) Monthly	
02	Visitor's Center	(1) Air	(1) Weekly	7 days (continuous
03	S. property line near Visitor's Center	(1) TLD	(1) Monthly	
04	S. property line near RD.S-1623	(1) TLD	(1) Monthly	
05	Plant intake	(1) Surface water (2) Bottom sediment	(1) Weekly (2) Quarterly	
06	At Robinson Unit 1	(1) TLD	(1) Monthly	
07	At Robinson Unit 1	(1) TLD	(1) Monthly	
08	Downstream from discharge canal outfall	(1) Surface water (2) Bottom sediments (3) Aquatic vegetation	(1) Weekly (2) Quarterly (3) Quarterly	
09	Microwave tower	(1) TLD (2) Air	(1) Monthly (2) Weekly	7 days (continuous
10	Picnic Area	(1) TLD	(1) Monthly	
11	Dam (west end)	(1) Air	(1) Weekly	7 days (continuous
12	South property line east of dam	(1) TLD	(1) Monthly	
13	West property line near const. road	(1) TLD	(1) Monthly	
14	Intersection area for RD.S-1623 and RT.151	(1) TLD	(1) Monthly	

TABLE 4.2 -1 (Continued)

SAMPLE STATION	LOCATION	SAMPLE TYPES	SAMPLING FREQUENCY	REMARKS
15	On west property line near RT.151	(1) TLD	(1) Monthly	
16	On west property line near RT.151	(1) TLD	(1) Monthly	
17	East shore of lake across from plant intake	(1) TLD	(1) Monthly	
18	East shore of lake (north of 17)	(1) TLD	(1) Monthly	
19	East shore of lake (north of 18)	(1) TLD (2) Air	(1) Monthly (2) Weekly	7 days (continuous)
20	East shore of lake (north of 19)	(1) TLD	(1) Monthly	
21	Black Creek at US-1 upstream of Robinson Impoundment	(1) Surface water (2) Bottom sediment	(1) Weekly (2) Quarterly	
22	Hartsville	(1) Air (2) TLD	(1) Weekly (2) Monthly	7 days (continuous)
23	Wells near site entrance near Unit 1	(1) Ground water (2) Ground water	(1) Monthly (2) Monthly	
24	In discharge canal at plant	(1) Surface water	(1) Weekly	
25	West of lake (varies)	(1) Soil	(1) Semiannual	
26	East of lake (varies)	(1) Soil	(1) Semiannual	
27	Discharge canal	(1) Bottom sediment	(1) Quarterly	
28	Intersection of Transmission Lines and State Rd.151	(1) TLD	(1) Monthly	
29	Intersection of St.R.200 and St.R.151	(1) TLD	(1) Monthly	

TABLE 4.2-1 (Continued)

SAMPLE STATION	LOCATION	SAMPLE TYPES	SAMPLING FREQUENCY	REMARKS
30	Intersection St.R.200 and St.Rd.53	(1) TLD	(1) Monthly	
31	Kelly Town	(1) TLD	(1) Monthly	
32	Prestwood Lake	(1) Surface water (2) Bottom sediment	(1) Weekly (2) Quarterly	
33	Ditch behind Visitor's Center	(1) Surface water (2) Bottom sediment (3) Aquatic vegetation	(1) Weekly (2) Quarterly (3) Quarterly	
34	State RD.151 at Pine Ridge	(1) Air	(1) Weekly	7 days (Continuous)
35	Black Creek and State Road 1623	(1) Surface water (2) TLD	(1) Weekly (2) Monthly	
36	Well near bridge at north end of lake	(1) Ground water	(1) Monthly	
37	Wells on State Road 1623 below dam	(1) Ground Water (2) Ground water (3) Ground water	(1) Monthly (2) Monthly (3) Monthly	
38	Site varies	(1) Fish a. Free swimmers b. Bottom feeders	(1) Quarterly	
39	On St.R.102 near St.R.13	(1) Milk	(1) Monthly	
40	On St.R.28 near St.R.403	(1) Milk	(1) Monthly	
41	Site varies	(1) Feed crops	(1) Twice, during growing season	
42	Site varies	(1) Feed crops	(1) Twice, during growing season	
43	Site varies	(1) Tobacco	(1) Three times during growing season	
44	Site varies	(1) Food crops	(1) Twice during growing season	
45	Site varies	(1) Food crops	(1) Twice during growing season	

* Loss of samples due to vandalism, equipment outage and other anomalies will occur. However, sample recovery should equal or exceed 90 percent.

ANALYSIS OF SAMPLES

TABLE 4.2-2

I. External Radiation Measurement

A. Twenty-two sampling locations with dosimeters at each location

B. Analyses: Change and read monthly

II. Air Samples

A. Continuous 7-day samples, filter and activated charcoal filter changed weekly

B. Analyses:

1. Filter

a. Gross alpha

b. Gross beta

c. Gamma spectrum analysis, Sr, Sr^{90} (a monthly composite of each station)

2. Charcoal filter

a. I^{131}

III. Surface Water

A. Weekly samples taken at seven sites

B. Analyses:

1. Gross beta

2. Gross alpha

3. Tritium

a. Weekly liquid scintillation

b. For stations reporting less than the minimum detection limit of tritium by liquid scintillation, the monthly composite for that station will be analyzed for tritium by a method more sensitive than liquid scintillation

4. Either monthly composites or cation exchange resins for each station will be analyzed by gamma spectrometry.

5. Monthly composites for Sr^{89}, Sr^{90}.

IV. Ground Water

A. Monthly samples taken at 6 locations

B. Analyses:

1. Gross beta
2. Gross alpha
3. Tritium

C. Quarterly composites for each station

D. Analyses:

1. Sr^{89} - Sr^{90}
2. Gamma spectrometry

V. Soil

A. Semiannual samples on east and west side of Robinson Impoundment

B. Analyses:

1. Gamma spectrometry
2. Gross beta
3. Sr^{89} - Sr^{90}

VI. Bottom Sediment

A. Quarterly samples taken at six locations

B. Analyses

1. Gamma spectrometry
2. Sr^{89} - Sr^{90}
3. Gross beta

VII. Fish

A. Quarterly Sampling

B. This sample shall be separated into free swimmers and bottom feeders

C. Analyses:

1. Flesh
   a. Gamma spectrometry
   b. Sr^{89} - Sr^{90}
   c. Gross beta
2. Bone
   a. Sr^{89} - Sr^{90}

VIII. Aquatic Vegetation

A. A quarterly sample will be collected at two stations

B. Analyses:

1. Gamma spectrometry
2. Sr^{89} - Sr^{90}
3. Gross beta

IX. Milk

A. Monthly samples will be collected at two sites

5.0 ADMINISTRATIVE CONTROLS

Objective

This section describes the administrative controls and procedures necessary to implement the Environmental Technical Specifications.

5.1 ORGANIZATION AND REVIEW

The Plant Manager is directly responsible for the safe operation of the facility. In all matters pertaining to the operation of the plant and to the environmental technical specifications, the Plant Manager is directly responsible to the Manager of Nuclear Generation. The Radiation Control Unit of the Nuclear Generation Section is responsible to the Manager of Nuclear Generation and functions in a staff capacity to assist in the proper implementation of the Environmental Technical Specifications.

Organizational units for the review and audit of plant operations and the technical specifications shall be the Plant Nuclear Safety Committee and the Company Nuclear Safety Committee as described in Section 6.1.4 of the Technical Specifications, Appendix A to the facility operating license.

Review and audit functions are defined as follows:

a. Results of environmental monitoring programs.

b. Proposed changes to the Environmental Technical Specifications and the evaluated impact of the change.

c. Changes or modifications to plant system or equipment which as determined by the Plant Manager would have a significant adverse effect on the environment and the evaluated impact of the change.

d. Proposed written procedures, as described in Section 5.3 and proposed changes thereto which affect the plant's environmental impact.

e. Investigation of all reported instances where an environmental protection limit is exceeded or the occurrence of an unusual event associated with operation of the plant which involves a significant environmental impact.

5.2 ACTION TO BE TAKEN IF A PROTECTION LIMIT IS EXCEEDED

5.2.1 In the event an environmental protection limit is exceeded, the occurrence shall be reported immediately to the Manager of Nuclear Generation and promptly reviewed by the Plant Nuclear Safety Committee.

5.2.2 As specified in Section 5.4.2, a separate report for each occurrence shall be reviewed by the Plant Nuclear Safety Committee. This report shall include an evaluation of the cause of the occurrence, a record of the corrective action taken, and recommendations for appropriate action to prevent or reduce the probability of a reoccurrence.

5.2.3 Copies of all such reports shall be submitted to the Manager of Nuclear Generation and the Chairman of the Company Nuclear Safety Committee for review and approval of any recommendations.

5.2.4 The Vice President of the Bulk Power Supply Department shall report the circumstances of any occurrence where an environmental protection limit is exceeded to the AEC as specified in Section 5.4.2.

5.3 OPERATING PROCEDURES

5.3.1 Written procedures shall be prepared and approved as specified in Section 5.3.2 for operation in carrying out the environmental monitoring program.

5.3.2 Procedures described in Section 5.3.1 above, and changes thereto, shall be reviewed as specified in Section 5.1 and approved by the Plant Manager prior to implementation. Temporary changes to procedures which do not change the intent of the original procedure may be made, provided such changes are approved by two members of the plant management staff. Such changes shall be documented, subsequently reviewed by the Plant Nuclear Safety Committee and approved by the Plant Manager.

5.4 PLANT REPORTING REQUIREMENTS

5.4.1 Routine Reports

A semiannual Environmental Monitoring Report covering the

previous six months operation shall be submitted within 60 days after January 1, and July 1 of each year. The first such period shall begin with the semiannual period following that in which the Environmental Technical Specifications are issued. These reports shall include the following:

a. Summary records of monitoring requirements surveys and samples.

b. Analysis of environmental data.

c. A summary of the quantities of radioactive effluents released from the plant, as outlined in AEC Regulatory Guide 1.21.

d. Records of changes as described in Section 5.4.2.c (1) and (2).

5.4.2 Non-Routine Reports

a. Nonradiological Reports

In the event an environmental protection limit is exceeded a written report shall be made within 10 days to the Director of the Region II Regulatory Operations Office (cc to the Director of Licensing).

The written report shall (a) describe, analyze and

evaluate the occurrence, including extent and magnitude of the impact, (b) describe the cause of the occurrence and (c) indicate the corrective action (including any significant changes made in procedures) taken to preclude repetition of the occurrence and to prevent similar occurrences involving similar components or systems.

b. Radiological Reports

Notification of violations of any Environmental Technical Specification; including any unplanned release of radioactive materials from the site shall be reported in the same manner as described in Section 5.4.2.a. (Non-radiological Reports). The limiting conditions for radioactive discharges are described in Section 2.4. The radiological environmental monitoring is described in Section 4.2.

c. Miscellaneous Reports

(1) When a change to the plant design, to the plant operation, or to the procedures described in Section 5.3 is planned which would have a significant adverse effect on the environment as determined by the Plant Manager or which involves a significant environmental matter or question not previously reviewed and evaluated by the AEC, a report on the change shall be submitted to the AEC for information prior to implementation. The report shall include description and evaluation of the impact of the change.

(2) Request for changes in Environmental Technical Specifications shall be submitted to the Deputy Director of Reactor Projects, Directorate of Licensing, USAEC, for prior review and authorization. The request shall include an evaluation of the impact of the change.

5.5 RECORDS RETENTION

5.5.1 Records and logs relative to the following areas shall be retained for the life of the plant:

a. Records and drawing changes reflecting plant design modifications made to systems and equipment as described in Section 5.4.2.c(1).

b. Records of required environmental surveillance data.

c. Records to demonstrate compliance with the environmental protection limits in Section 5.2

5.5.2 All other records and logs relating to the Environmental Technical Specifications shall be retained for five years.