

1.3.1 WATER QUALITY

Specification:

- A. Synoptic water quality surveys at nine (9) sampling stations on Lake Keowee, four (4) stations on Lake Hartwell, and a station on the Keowee River between the lakes shall be conducted. Sampling locations are shown on Fig. 1.3-1 and Fig. 1.3-2, and required sampling parameters are listed in Table 1.0-1.

Temperature and dissolved oxygen measurements shall be made at 0.3, 1.5, 5.0, 6.5, 8.0, 10.0 meters and thereafter every 2.5 meters to one meter off the bottom for lake samples. BOD measurements on Lake Keowee shall be taken at 0.3 meters, 3.0 meters and bottom depths. BOD measurements on Lake Hartwell shall be made on samples which are a composite of water from 0.3 meters, mid-depth and bottom depths. All other specified parameters shall be measured at a minimum of three depths for each lake sampling station. At sampling station 605 (Figure 1.3-2), the Keowee River shall be sampled from 0.3 meters.

Dissolved oxygen will also be measured weekly from May through November at three locations: (1) the Oconee discharge, (2) the lake surface (0.3 meter depth) the Keowee intake structure, and (3) the Keowee tailrace during hydroelectric plant operation.

- B. Water temperature recording stations shall be established at stations 502, 503, and 504. Temperature shall be monitored in a multi-point vertical profile, accurate to 0.5°C . Sensors shall be placed at a depth of 0.3 meters below the surface, on the bottom, and at a minimum of six (6) intervals to describe the temperature profile.

A fourth temperature recording station shall be established to monitor the waters discharged from Lake Keowee through the Keowee Hydro Plant.

Bases:

Water quality measurements will be used to: (1) establish base line data, (2) determine effects from Oconee Nuclear Station on the water quality and, (3) provide supporting data for the benthos, plankton, periphyton, and fish sampling programs.

1.3.4 PHYTOPLANKTON - ZOOPLANKTON RECEIVING WATER STUDY

Objective: The species composition and numbers of organisms per unit volume obtained by sampling at stations affected by the discharge plume will be compared to similar data collected at control stations.

Specification: Bimonthly sampling (6 times/yr.) shall be done at Stations 500, 503, 505, 506, 509.5 (intake structure), 508 (discharge cove), and 508.5 (approximately midway between 508 and 504). The latter two stations shall be geographically fixed points used to examine for cooling water effects.

Both whole water samples and samples concentrated using a plankton net will be collected. The sampling at stations affected by the discharge shall consist of samples taken at water depths, both affected and not affected by the plume. At the control stations, samples will also be taken at these corresponding depths.

Basis: Stations 500 and 506 will serve as controls. Stations 503, 505, discharge stations as stated, and at the intake serve to detect plant operation effects. The discharge plume stations and depths sampled will be selected to determine (1) effects due to condenser passage on the species composition and concentration of organisms in the area affected by the plume, and (2) possible recovery and reincorporation effects at points along the discharge plume. Both determinations can be used to express the net system effects.

Sampling at depths affected by the plume and at depths below the plume is an attempt to detect any change in species composition or number of organisms at the greater depths that may result from the inability of condenser entrained organisms to maintain themselves in the plume. This selection of sampling depths in the plume and below the plume will be based on all, or any combination, of the following methods: temperature, dissolved oxygen, chlorophyll "a", irradiance, or transmissometry profiles.

1.3.5 BENTHOS

Specification

The benthic macroinvertebrate populations of Lakes Keowee and Hartwell shall be sampled four (4) times per year. Sampling stations shall be located on the lake side of the skimmer wall (502), in the vicinity of the discharge (discharge canal and 504), at control stations on Lake Keowee (501 and 506), and in Lake Hartwell below Keowee Dam (604 and 606). Quantitative samples shall be taken with a modified Peterson grab. Qualitative samples (e.g., sweep netting) shall be done along the shore nearest each of the stations listed above.

Benthic organisms collected shall be identified to the genus level where practicable. Diversity indices shall be calculated as well as data on the standing crop of benthic organisms, such as number per square meter and/or grams per square meter.

Bases

Benthic organisms are valuable as indicators of water quality near the bottom of a lake or river. Their relative immobility and several-month life spans are qualities which help make them "continuous monitors" whose survival may be limited by extreme conditions even when average conditions are favorable. They cannot avoid adverse conditions and are slow to repopulate an area, so that detrimental effects are not easily erased. Benthic organisms may also be an important source of food for fish.

Inasmuch as the distribution and abundance of benthic organisms are greatly dependent upon the bottom type available to them, the bottom type at each sampling station will be classified and reported.

The benthic samples taken by the techniques proposed above should be representative of both deep and shallow areas of Lake Keowee and of the several habitats presented by the Keowee River below the dam.

1.6 PLUME MAPPING FOR TEMPERATURE AND DISSOLVED OXYGEN

Objective: To provide temperature and dissolved oxygen data for defining the discharge plume and for checking the accuracy of predictions of plume characteristics.

Specification: At least four times per year, special sampling studies shall be made to identify and characterize the cooling water discharge plume with respect to dissolved oxygen and temperature. Data shall be collected from a minimum of 30 sampling points, following a sampling pattern designed to achieve coverage of the plume.

Three of the surveys shall be conducted during periods when the following conditions are expected:

- 1) Maximum condenser cooling water discharge temperature
- 2) Maximum acreage of discharge plume
- 3) Minimum condenser cooling water dissolved oxygen concentration.

Bases: The mapping program will define the temperature and dissolved oxygen gradients in the plume, especially in the region near the discharge where momentum and mixing are the prevalent processes influencing the plume's horizontal and vertical dimensions.

This mapping program will effectively complement the surveillance program defined in Section 1.3.