

WATTS BAR NUCLEAR PLANT OPERATIONAL STAGE  
NONRADIOLOGICAL FISHERIES MONITORING PROGRAM

Watts Bar Nuclear Plant on Chickamauga Reservoir is presently scheduled for unit one fuel loading in September 1980 with commercial operation by September 1981. Unit two is scheduled for fuel loading in June 1981 and commercial operation in June 1982. The following is a description of the operational stage nonradiological fisheries monitoring plans for Watts Bar Nuclear Plant (WBNP). By March 1980, preoperational fisheries monitoring data (1976-79) will be summarized and reviewed, and any necessary modifications to the operational monitoring plan will be implemented (in consultation with EPA) to better address identified areas of concern. Once implemented, the following plan could be modified with 30 days notice to EPA and accompanied by written justification for changes needed.

The operational fisheries monitoring program will provide comparative empirical data to identify any deviations in the fish communities of Chickamauga Reservoir from the observed preoperational information collected at the Watts Bar site. In addition, potential plant-induced impacts (e.g., entrainment and impingement) will be evaluated in terms of their significance to the Chickamauga fisheries resources.

ADULT FISH MONITORING

Gill and Hoop Net Sampling

Eight each of gill and hoop nets will be fished for four consecutive nights during each bimonthly period. Four of each type net will be set at Station A (TRM 524.5) and Station B (TRM 528.0). These

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will be equally divided between the left and right banks as sampled during preoperational monitoring. Fish will be identified to species and weighed and measured when they are removed from the nets.

Station A is located at the plant site. The right bank netting area is characterized by gently sloping silt substrate with scattered stumps and tree tops. Water velocity is normally high in this area due to Watts Bar Dam hydro-electric discharge. The left bank netting area varies from mainly rock riprap at the upstream portion to rock and coarse sand at the downstream portion. Substrate consists mainly of scattered rocks and submerged stumps. Nets will be set in 3 to 8 meters of water at this station.

Station B is located approximately four miles downstream of the plant site. The right bank slopes gently from 2 to 3 meters with some sudden drops of up to 8 meters. The substrate is sandy with scattered stumps and tree tops. Current velocity is somewhat less than at Station A. Nets will be fished at depths of 3 to 8 meters. The left bank has a sand substrate with numerous tree stumps in the shallow areas and rapidly deepens to approximately 12 meters. The lower portion of this netting area is located below the mouth of Sewee Creek. Nets will be set at a depth of 3 to 12 meters.

#### Electrofishing

A boat-mounted electrofishing unit will also be used in determining the distribution of adult fish in the study area. Once a month, five 100-meter samples will be taken on both the left and right banks

at each station. Samples will all be taken with the boat moving in a downstream direction. All fish collected will be identified to species and enumerated.

#### Impingement

Fish impingement studies will commence when unit one at WBNP becomes operational. Numbers and species of fish impinged on the intake screen for a 24-hour period will be determined once each week. At the beginning of each test period, all screens in use will be cleaned, and 24 hours later each screen will be washed separately to collect impinged fish. Instances of extreme cold icing may preclude operation of some or all screens and thus result in a few missed samples. Impinged fish will be identified to species, sorted into 25 mm length classes, and enumerated. In cases of very high numbers of fish, standard sub-sampling procedures will be followed.

#### Creel Survey

Operational creel survey data for the WBNP vicinity will be conducted. Significant deviations in sport fish harvest from that observed during preoperational monitoring would be assessed in terms of potential impacts resulting from plant operation.

#### Cove Rotenone Sampling

Four to five coves (same locations as used in preoperational monitoring) will be rotenoned annually to compare species lists and standing stocks with those observed during preoperational monitoring. Data collected from cove rotenone samples on Chickamauga Reservoir will be utilized to evaluate potential long-term impacts from WBNP.

## LARVAL FISH MONITORING

Following fuel-loading of unit one at WBNP, studies will be initiated to evaluate potential impacts of operation to larval fish in Chickamauga Reservoir.

### Objectives

Operational monitoring of larval fish at Watts Bar has been designed with the following objectives:

1. To determine the seasonal occurrence, abundance, and distribution of fish eggs and larvae near WBNP.
2. To estimate entrainment of young fish and eggs from Chickamauga Reservoir as a result of the operation of WBNP.
3. To estimate the resulting impact of entrainment losses on the fisheries resource of Chickamauga Reservoir.

### Sampling Methods

One reservoir transect as well as the intake basin at WBNP will be sampled every two weeks during both day and night. This represents a change from the weekly sampling frequency from March through June (biweekly thereafter) as proposed in the USNRC FES (Section 6.3.5 - December 1978). Analysis of preoperational data from 1977 (weekly sampling March-June) determined that sampling on alternate weeks was adequate for estimating transport and abundance of all taxa of ichthyoplankton which occur at WBNP site.

A 0.5 m square beam net (0.5 mm mesh) will be towed upstream relative to the prevailing current at 1.0 m/s boat speed. Sample duration will be 10 minutes, and volume filtered, approximately 150 m<sup>3</sup> per sample.

The net will be raised incrementally during each sample so that all portions of the given stratum are equally sampled. Slight modification of sampling technique may be necessary in the intake basin, i.e., several shorter samples instead of one 10-minute sample.

#### Reservoir Sampling

The preoperational transect (TRM 528) sampled during 1976-79 will be maintained when the plant becomes operational. In order to estimate the numbers of fish eggs and larvae transported past the plant, three stations within the transect will be sampled (at locations approximately 25, 50, and 75 percent of the width of the river). This change in the sampling proposed in the USNRC FES is desired because analysis of horizontal distribution data from five stations at this transect (as sampled in 1976-1977) demonstrated that three stations are adequate to describe abundance and transport of fish larvae past WBNP. Single, oblique, full-stratum (bottom to surface) tows will be made at each of these stations. An additional sample will be taken at the mid-channel station as close to bottom as possible for the duration of the 10-minute tow. This will sample any larval fish which might be closely associated with the substrate.

During preoperational monitoring, samples taken nearest the intake channel have been considered to best represent potential intake densities. During the first year of operational monitoring, a shallow shoreline sample will be taken close to the shore adjacent to the intake. Estimates of larval fish densities in this area will be compared to densities measured in the intake channel to determine if the shoreline

densities are reflected in the intake. If comparable, preoperational data can then be employed to indicate how entrainment would be expected to vary annually.

#### Intake Sampling

Three or more full-stratum samples will be taken in the dredged channel area of the intake basin in order to estimate the numbers, species, and sizes of young fish entrained. This active sampling in the intake is considered more effective than the stationary netting described in the USNRC FES for estimating numbers of postlarval and juvenile fishes which might be entrained.

#### Data Treatment and Analysis

Eggs and fish will be sorted and identified to the lowest possible taxon. Level of identification will depend upon the taxon in question, developmental stage, and condition of the specimen.

Results of laboratory analyses will be converted into densities (numbers/1000 m<sup>3</sup>). Densities will be used to calculate transect abundance or numbers of larvae transported past the plant using hydrological data to be supplied by TVA Data Services Branch. Samples taken within the intake basin will be weighted according to intake demand to estimate the numbers of fish and eggs entrained.

Estimated numbers entrained and numbers transported past the plant transect will be integrated over time to calculate seasonal totals. The ratio of these numbers (when multiplied by 100) will yield the estimated percent of entrainment by WBNP.

LITERATURE CITED

Tennessee Valley Authority. 1978. Preoperational Fisheries Report for the Sequoyah Nuclear Plant. TVA. Chattanooga, Tennessee.

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Station B is located approximately four miles downstream of the plant site. The right bank slopes gently from 2 to 3 meters with some sudden drops of up to 8 meters. The substrate is sandy with scattered stumps and tree tops. Current velocity is somewhat less than at Station A. Nets will be fished at depths of 3 to 8 meters. The left bank has a sand substrate with numerous tree stumps in the shallow areas and rapidly deepens to approximately 12 meters. The lower portion of this netting area is located below the mouth of Sewee Creek. Nets will be set at a depth of 3 to 12 meters.

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