

TENNESSEE VALLEY AUTHORITY

MEMORANDUM FOR THE DIRECTOR

Mr. Sanford W. Harvey, Director  
Enforcement Division  
U.S. Environmental Protection Agency  
Region IV  
345 Courtland Street, NE.  
Atlanta Georgia 30308

Dear Mr. Harvey:

SEQUOYAH NUCLEAR PLANT - NPDES PERMIT NO. TN0024450 - OPERATION FISHERIES  
MONITORING PROGRAM

A TVA letter to Mr. Charles H. Kaplan dated March 13, 1979, transmitted information concerning our operational monitoring program for fisheries at Sequoyah Nuclear Plant in support of our NPDES permit application. As a result of additional information obtained since originally proposing this program, we have decided to revise the monitoring program to enable us to develop an improved data base and to reduce monitoring program expenses. Two reports entitled, "Amended Fish Entrainment Operational Monitoring Plan for Sequoyah Nuclear Plant" and "Rationale for the Proposed Changes in the Fish Entrainment Operational Monitoring Plan for Sequoyah Nuclear Plant" are enclosed describing these changes and the reasons for them.

If you have any questions concerning our monitoring program, please let me know.

Sincerely,



Mohamed T. El-Ashry, Ph.D.  
Director of Environmental Quality

Enclosures

cc: See list on page 2

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Mr. Sanford W. Harvev

cc (Enclosures):

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RATIONALE FOR THE PROPOSED CHANGES IN THE FISH  
ENTRAINMENT OPERATIONAL MONITORING PLAN FOR  
SEQUOYAH NUCLEAR PLANT

Three specific areas of change to the fish entrainment sampling plan for operational monitoring at the Sequoyah Nuclear Plant are being addressed. First, biweekly sampling is being proposed in lieu of weekly. Second, CCW (condenser cooling water) intake sampling is being modified from a plan which called for samples to be taken in the intake embayment to one which calls for samples to be taken adjacent to the mouth of the intake channel skimmer wall. The third change calls for sampling which will better accommodate the discharge diffuser design and also give a better overall representation of the specific cross-sectional area of each transect.

Biweekly versus Weekly Sampling

The original plan called for weekly sampling during the first year of operation and biweekly during all subsequent years. When the draft study plan was developed, it was assumed that a considerable number of shifts between cooling modes would occur during the first year of plant operation. It therefore was decided that a weekly sampling frequency would increase the probability of sampling during all three modes of operation.

Subsequent information has indicated that very few changes in cooling modes will take place during any year of operation. Based on this new information, a plan of biweekly sampling will provide a sufficient number of observations for estimating entrainment under the different operating modes. Furthermore, since neither helper nor closed mode operation will be needed until two-unit operation begins (March 1981), only open mode will occur in this first year of operation (1980). Since CCW intake volume is virtually the same for open and helper mode operation, entrainment effects of

the two should be the same.

Based on our experience at other locations in the Tennessee Valley indications are that biweekly and weekly sampling schedules yield comparable results both in terms of taxa collected and estimates of abundance. Biweekly sampling should thus be fully adequate to determine the seasonal occurrence and abundance of larval fish in the vicinity of the Sequoyah Nuclear Plant.

#### Intake Channel Sampling

The original plan for the CCW intake channel sampling called for sampling within the intake embayment in both the dredged channel portion and the shallow shoal areas on each side of the embayment.

Sampling within the intake embayment at Sequoyah Nuclear Plant poses three problems. First, the embayment has large shallow areas which may serve as localized spawning habitat. Fish eggs and larvae produced in these localized areas of the intake embayment can seriously compromise estimates of ichthyoplankton losses from the reservoir proper. Such errors would tend to inflate entrainment estimates and lead to erroneous impact assessments.

Furthermore, during closed mode operation of the plant, water from the cooling towers is recirculated through the intake embayment back to the plant. This water will be at temperatures higher than ambient reservoir water and could induce advanced spawning by some species of fish. Such spawning, out of phase with the reservoir populations, would also lead to erroneous impact assessments since percent entrainment is based upon larval densities from both the reservoir proper and the intake.

The third factor stems from the fact that during closed mode operation the water in the dredged portion of the intake channel is mostly recirculated water with only a small fraction of the total CCW being actually

withdrawn from the reservoir proper.

In view of these facts, it is proposed that the CCW intake samples be taken adjacent to the reservoir side of the skimmer wall. Oblique tows parallel to the opening of the skimmer wall would effectively sample waters drawn from the reservoir by the CCW intake. This sampling approach minimizes many of the problems discussed above and yet adequately samples waters being removed from the reservoir.

#### Reservoir Transect Sampling

The original sampling plan called for a single midchannel station at each transect with three strata sampled (i.e., surface, middle, and bottom waters). The current plan recommends two midchannel stations at each transect with two strata sampled (surface to mid-depth and mid-depth to bottom). Sampling two open water stations will give horizontal distribution information not possible with a single midchannel station. Two vertical strata are sufficient to identify basic vertical distribution patterns. The design of the diffuser pipes (two parallel pipes, one long and one short, extending approximately all the way across the channel and halfway across, respectively) provides additional justification for two midchannel stations, since a single station would not adequately sample the area under the varying modes of discharge operation.

The need for sampling balance between transects further supports the plan of two channel stations at each transect. The original sampling plan called for shoreline and midchannel sampling at each transect. Under the revised plan, only the shoreline with significant overbank area will be sampled, except at the plant site where both banks will be sampled. The shore without appreciable overbank is not expected to be significantly different from midchannel areas, and consequently should not be sampled except at the plant

site.

LFG:CTS:VRC  
3/8/80

Prepared by Lee Graser and Carl Swor

AMENDED FISH ENTRAINMENT OPERATIONAL MONITORING PLAN  
FOR SEQUOYAH NUCLEAR PLANT

Ichthyoplankton sampling will be conducted on a biweekly basis during the spring and summer months (march-August) near Sequoyah Nuclear Plant. Objectives of these studies will include:

1. To estimate entrainment losses of young fish and eggs from Chickamauga Reservoir as a result of the operation of Sequoyah Nuclear Plant.
2. To determine if entrainment losses result in measurably reduced abundance of fish and eggs downstream of Sequoyah Nuclear Plant.
3. To determine if losses which may occur are replaced by production downstream of the plant.
4. To estimate the impact of entrainment losses on the fish populations of Chickamauga Reservoir.

Entrainment data will be collected from the plant CCW intake at the mouth of the skimmer wall where the waterflow is representative of the water being withdrawn from the reservoir.

Reservoir data will be collected at three transects near the plant. These transects are located adjacent to the intake at TRM 484.8, just downstream of the discharge mixing zone at TRM 482.7, and approximately three miles downstream from the diffusers at TRM 479.4. Methods of data collection will be similar for each transect. Full stratum samples will be taken near one shoreline on the overbank area at the lower two transects, and near both shorelines at the plant transect. The midchannel area at each transect will be sampled by taking stratified samples, i.e., equally sampling shallow

and deep waters at each of two stations in the channel area. A total of approximately 600 samples are expected to be collected each year.

After analysis of the initial data, adjustments to the sampling technique and/or stations may be implemented to improve the quality of the monitoring program.

Samples will be individually preserved in 10 percent Formalin and transported to the laboratory where ichthyoplankton are sorted, identified to the lowest possible taxon (Hogue et al. 1976), counted, and measured (larvae only) to the nearest mm total length.

LFG:CTS:VRC  
3/7/80

Prepared by Lee Graser and Carl Swor