Tennessee Valley Authority, Post Office Box 2000, Soddy-Daisy, Tennessee 37379-2000

January 20, 2005

Mr. Ed Polk, P.E., Manager Permit Section
State of Tennessee
Department of Environment and Conservation
Division of Water Pollution Control
Enforcement & Compliance Section
6th Floor, L&C Annex
401 Church Street
Nashville, Tennessee 37243-1534

Dear Mr. Polk:

TENNESSEE VALLEY AUTHORITY (TVA) - SEQUOYAH NUCLEAR PLANT (SQN) - NPDES PERMIT NO. TN0026450 - PHASE II 316(b) RULE FOR EXISTING FACILITIES - PROPOSAL FOR INFORMATION COLLECTION

Pursuant to 40 CFR § 125.95(b)(1) of the Phase II rule for Cooling Water Intake Structures at Existing Facilities, TVA is submitting for your review this Proposal for Information Collection (PIC) for SQN. The rule, published in the Federal Register on July 9, 2004, requires the PIC to be submitted prior to start of information collection activities, but allows facilities to initiate such activities prior to receiving comment from the permitting agency. See 69 Fed. Reg. 41575, p. 41687, (July 9, 2004). The preamble to the rule encourages the Director of the permitting agency to provide comments expeditiously (i.e., within 60 days) so that the permit applicant can make responsive modifications to its information gathering activities. See 69 Fed. Reg. 41575, p. 41635, (July 9, 2004). Your expeditious review of the PIC is particularly important in view of an impending January 24, 2005 start date for impingement monitoring at SQN.

TVA plans to collect weekly impingement mortality samples for a minimum period of one year. A longer monitoring period may be utilized after assessing time constraints imposed by the rule for submitting the Comprehensive Demonstration Study (CDS), and after evaluating the costs of collecting additional data versus the greater uncertainties introduced by the absence of such data.

The following sections address the requirements for the PIC as spelled out in the Phase II rule. Several of the items below refer to components of the CDS that are due at a future date. The preamble to the Phase II rule recognizes that collection and analysis of

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information is an iterative process and plans for information gathering may change as information is gathered and new data needs are identified. Accordingly, TVA will periodically review the PIC in light of new information as it becomes available and provide updates as necessary.

§125.95(b)(1)(i): A description of the proposed and/or implemented technologies, operational measures, and/or restoration measures to be evaluated in the [Comprehensive Demonstration] Study [to be provided later]:

TVA will assess the current impingement levels at SQN and determine the appropriate baseline in order to evaluate the status of compliance with EPA's national performance standards. The performance standards are for impingement mortality (IM), a reduction of 80-95% from the calculation baseline. Comparison of the current impingement mortality to the calculation baseline will provide an indication of the effectiveness of the following technologies and intake features already in use at SQN:

- Submerged plant intake Condenser Circulating Water (CCW)
- Concrete skimmer wall at inlet to CCW intake channel (at approximate Tennessee River Mile 484.8)
- Underwater dam at approximate Tennessee River Mile 483.8 to withdraw cold water, and
- Other site-specific characteristics that may reduce IM.

TVA will conduct preliminary evaluations of the following technologies for SQN as appropriate for compliance with the rule (impingement mortality only). It may be determined that the applicable standards are already being met at SQN which would impact the technologies to be evaluated.

Impingement Standard Measures

- Restoration or protection
- Replacement or modification of existing traveling screens
- Operational modifications (e.g., intake screen operational changes)
- Barrier nets or structures
- Fish handling and return systems
- Fish avoidance technology (e.g., louvers, sound, light, etc.)

§125.95(b)(1)(ii): A list and description of any historical studies characterizing impingement mortality and entrainment and/or the physical and biological conditions in the vicinity of the cooling water intake structures and their relevance to this [Comprehensive Demonstration] Study. ... :

The following reports describe historical levels of impingement occurring at SQN.

Baxter, D. S. and L. K. Kay. 2002. Effects of Impingement on the Aquatic Populations in Chickamuaga Reservoir. Tennessee Valley Authority, River System Operations and Environment, Aquatic Biology Lab, Norris, Tennessee 10 pp.

Tennessee Valley Authority. 1987. Aquatic environmental conditions in Chickamauga Reservoir during operation of Sequoyah Nuclear Plant, sixth annual report (1986). Knoxville, Tennessee: Division of Air and Water Resources. TVA/ONRED/WRF-87/7.

§125.95(b)(1)(ii): ... If you propose to use existing data, you must demonstrate the extent to which the data are representative of current conditions and that the data were collected using appropriate quality assurance/quality control procedures;

TVA will be evaluating data collected in accordance with this PIC and comparing the results with previously collected data to ascertain if historic data are still representative of current levels of impingement. TVA is assessing historic data and records to verify that data were collected in accordance with a valid Quality Assurance Procedure for impingement mortality; it is believed that is the case. Additional information may be provided later, as appropriate, in support of using historic data.

§125.95(b)(1)(iii): A summary of any past or ongoing consultations with appropriate Federal, State, and Tribal fish and wildlife agencies that are relevant to this [Comprehensive Demonstration] Study and a copy of written comments received as a result of such consultations

None known.

§125.95(b)(1)(iv): A sampling plan for any new field studies you propose to conduct in order to ensure that you have sufficient data to develop a scientifically valid estimate of impingement mortality and entrainment at your site. The sampling plan must document all methods and quality assurance/quality control procedures for sampling and data analysis. Proposed methods must be appropriate for a quantitative survey including consideration of methods used in other studies performed in the source water body. The sampling plan must include a description of the study area including the area of influence of the cooling water intake structure(s), and provide a taxonomic identification of the sampled biological assemblages (including all life stages of fish and shellfish).

Plant Description

SQN is located on the west shore of Chickamauga Reservoir at Tennessee River Mile (TRM) 484.5. The two identical units (Pressurized Water Reactor) are each rated at 3,455 megawatts thermal (MWt). Two natural draft cooling towers enable SQN to operate in any of three modes: open, helper, or closed mode. In open mode operation with both units at maximum power, total water demand is 2502 cfs. CCW is drawn from Chickamauga Reservoir into the intake channel through an opening approximately 550 feet in length and 10 feet in height located at the bottom of the skimmer wall. The skimmer wall is situated near the river channel enabling SQN to withdraw cooler water from the lower stratum. From the intake channel, water passes through six, 14 feet wide traveling screens to the intake pumps. Mesh openings on the screens are 3/8 inch.

Physical Data

1. Condenser Circulating Water (CCW) Pumping Station
   The CCW intake pumping station, located at the end of the intake channel, houses the CCW pumps, traveling screens, and screen wash pumps. For each unit, three CCW pumps pump condenser circulating water through the condensers. Each pump

has a capacity of 187,000 gpm at a design head of 30 feet. Each pump is installed in a separate suction well with entering water strained by trash racks and a traveling screen. Three CCW pumps can operate in parallel for each unit. However, if one pump is out of service, the two remaining pumps will deliver sufficient flow for full-load operation but with a higher turbine backpressure. Differential pressure across each traveling screen is monitored. When a preset differential pressure of water is reached across the screen, the screen wash pump is started. When a preset pressure is established at the screen wash nozzles, the screen motors are automatically started and the screens are washed until the pump is manually stopped.

2. Essential Raw Cooling Water (ERCW) Pumping Station
   The maximum velocity (adjusted for mesh) is below the 0.50 fps; therefore the ERCW pumping station meets the IM standard and no IM monitoring is planned for this intake.

3. Intake Channel
   The intake channel extends approximately 1,800 feet from the skimmer wall to the CCW pumping station.

4. Skimmer Wall
   A 550 foot long concrete skimmer wall which extends approximately 34 feet below the minimum water surface is positioned across the entrance of the intake channel. Water depth varies based on reservoir elevations: the bottom of the skimmer wall is 641 feet msl, the riverbed elevation is 631 feet msl, and the minimum pool elevation is 675 feet msl.

Impingement Sampling Methods

Samples will be collected according to TVA's Quality Assurance Procedure (NR OPS-FO-0BR-23.11) for Impingement Counts (TVA 1983a or later). A copy of this procedure is enclosed. Weekly counts of fish impinged during a 24-hour period on the CCW intake traveling screens at SQN will be collected beginning January 24, 2005 and continue for at least one year. Prior to conducting the sampling, Operations personnel will be notified in time to ensure that all available traveling screens for units in operation are washed 24-hours prior to the scheduled sampling event. These washings, occurring 24-hours in advance of the sampling, will be conducted concurrently if possible. At the time of the scheduled sample collection, available screens will be rotated and back-washed individually or in groups. During periods of heavy debris load, it may become necessary for Operations personnel to wash more frequently than once per 24-hours; if this proves to be true, daily counts of fish impinged will be adjusted to account for the actual time between screen backwash operations.

After each available screen (or groups of available screens) is washed, all fish (and debris) will be removed from the collection baskets. The baskets installed to collect the fish and debris may be pressure washed with relatively small amounts of potable water or raw water (approximately 50 gallons). The wash water from the baskets will drain to the CCW trash sluice to Outfall 116 and is expected to have no discernable impact. The zone of influence for impingement monitoring is being defined in front of and at the intake structure.

Fish will be sorted by species in 25-mm total length (TL) groups, then counted, weighed and recorded. Any fish that cannot be positively field-identified will be preserved in 10% formalin and taken to the TVA Aquatic Biology Laboratory in Norris, Tennessee, for identification or verification.

At times when it is determined that a complete count of all fish impinged during the sample cannot be made during the working day with the available field personnel, the crew leader may elect to subsample as described below:

- All fish of a species over 300-mm TL will be sorted into size classes, weighed and recorded.
- Only size classes containing large numbers of individuals will be subsampled by mixing them and scooping approximately 2.5 kg as a subsample from the pile.
- Fish from the subsample will then be separated into length classes and the number and weight for each size class recorded.
- All remaining fish from which the subsample was taken are then weighed and that total weight recorded.

Moribund/Dead Fish

Fish collected from a 24-hour screen wash will usually all be dead when processed. Incidental numbers of fish which appear to have been dead for more than 24-hours will not be included in the sample. Determinations of previously dead fish will be made using Best Professional Judgment based on observations of condition of fish. Also, during winter, species of fish such as shad occasionally suffer die-offs and could be impinged after death or in a moribund state. In that case, field personnel would document that due to ambient temperatures, either all, or a portion of impinged species of fish were due to cold-shock and would not have been impinged otherwise. Additionally, if species of fish were observed dying in the reservoir from cold-shock, this would be documented and presented in the records and report to indicate cold-shock as the primary cause of unusually high impingement of this species.

Records and Recordkeeping

Data collection forms will be completed with the counts and weights of species. These forms will include the date, time, facility name and location of the sample (i.e., at intake screen backwash), and the person collecting data.

For quality control and assurance, voucher specimens will be sent to the TVA Aquatic Biology Laboratory for verification. Completed data forms will be submitted to the project leader for technical review and signoff. Once the data have been verified and the project leader has signed the forms, copies of all forms will be provided to Site Environmental. Site Environmental may replace the draft form with the signed official record. Records will be maintained on site per requirements of TVA's Environmental Records Management Process (currently 10 years). Data will then be entered by a TVA Resource Stewardship employee into the TVA Dazzler database (or equivalent) for subsequent analysis and reporting. In addition, during the sample year, a minimum of two sampling audits will be conducted to ensure proper standard procedures are followed.

A list of species identified from historical impingement monitoring at SQN is in Table 1 below.

Table 1. List of species impinged on the intake screen at Sequoyah Nuclear Plant in ten samples collected between December 18, 2001 and February 25, 2002.

	Family	Common Name	Scientific Name
Fish			
	Clupeidae		
		Alewife	*Alosa pseudoherengus*
		Gizzard shad	*Dorosoma cepedianum*
		Threadfin shad	*Dorosoma petenense*
	Cyprinidae		
		Bluntnose minnow	*Pimephales notatus*
	Ictaluridae		
		Channel catfish	*Ictalurus punctatus*
		Flathead catfish	*Pylodictis olivaris*
	Poeciliidae		
		Mosquitofish	*Gambusia affinis*
	Percichthyidae		
		Striped bass	*Morone saxatilis*
	Centrarchidae		
		Redbreast sunfish	*Lepomis auritus*
		Bluegill	*Lepomis macrochirus*
		Redear sunfish	*Lepomis microlophus*
		Largemouth bass	*Micropterus salmoides*
		White crappie	*Pomoxis annularis*
	Percidae		
		Logperch	*Percina caprodes*
	Sciaenidae		
		Freshwater drum	*Aplodinotus grunniens*
Mussels			
		Zebra mussels	*Dreissena polymorpha*

Extrapolation of Impingement, Losses to Equivalent Adult and Production Foregone.
To facilitate the implementation of and compliance with EPA's regulations for Section 316(b) of the Clean Water Act (Federal Register Vol. 69, No. 131; July 9, 2004), impingement losses of juvenile and adult stages of fish will be evaluated by extrapolating the losses to equivalent reductions of adult fish, or of biomass production available to predators. EPRI (formerly the Electric Power Research Institute) has identified two models for extrapolating losses of juvenile and adult stages at intake structures to numbers or production of older fish. Equivalent Adult (EA) models quantify impingement losses in terms of the number of fish that would have survived to a given future age. Production Foregone (PF) models are applied to forage fish species and quantify the loss from impingement in terms of potential available forage for consumption by

predators. Requirements of the models are site-specific data on the distribution and abundance of fish populations vulnerable to impingement. TVA will be using these models to determine the "biological liability" of the intake structure.

TVA sincerely appreciates your expeditious review of this PIC so that your comments may be appropriately incorporated into the impingement sampling methods.

If you need additional information, or would like to schedule a meeting to discuss this document please contact me at (423) 843-6700.

Sincerely,

Stephanie A. Howard

Stephanie A. Howard
Principal Environmental Engineer
Signatory Authority for
J. Randy Douet
Site Vice President
Sequoyah Nuclear Plant

Enclosure
cc (Enclosure):
Chattanooga Environmental Assistance Center
Division of Water Pollution Control
State Office Building, Suite 550
540 McCallie Avenue
Chattanooga, Tennessee 37402-2013

U.S. Nuclear Regulatory Commission
ATTN: Document Control Desk
Washington, D.C. 20555

Copy No. 3

TENNESSEE VALLEY AUTHORITY
NATURAL RESOURCE OPERATIONS
FIELD OPERATIONS

QUALITY ASSURANCE PROCEDURE

No. NR OPS-FO-BR-23.11 Rev. 0

Title: TREINGEMENT COUNTS

	Revision: R0	R1	R2	R3	R4
	Date: 1/31/83				
Prepared by:	C. N. Alexander				
Prepared by:	R. Williams				
Recommended by: Supv., BR, FO	B. J. Grimstead				
Technical Reviewer: FAEB, A&WR	D. A. Tomljanovich				
Concurred by: QAC, FO	J. W. Griffin				
Approved by: Manager, FO EAST	R. T. Jones				
Approved by: Manager, FO WEST	G. L. Sherer 2/18/83				
Concurred by: Chief, FAEB, A&WR	B. B. Carroll				
Concurred by: Chief, OSR	Donald F. Warren Acting Manager				

TVA 30325 (NROPS-8-81)

Title: IMPINGEMENT COUNTS	No. WR OPS-FO-PR-23 11	Rev. 0

1.0 OBJECTIVE

To prescribe the standard method used by Field Operations (FO) for determining the number of fish impinged on traveling screens in the intakes of TVA steam-electric plants. A schematic diagram of a typical intake system is shown in attachment 1. The method involves periodically washing the screens, with any fish impinged being identified, counted, weighed, and measured. These data are provided to the Division of Air and Water Resources, which prepares reports on plant impingement rates for EPA review.

2.0 SCOPE

This procedure applies to impingement counts at all steam-electric plants, with minor variations necessary to accommodate individual plant design features. The unit supervisor must tailor the procedures for the plant to be sampled. Impingement rates can be estimated through extrapolation of impingement counts provided a large number of counts are taken over a period of time sufficient to reflect short-term variations in numbers of fish impinged.

3.0 REFERENCES

None

4.0 ABBREVIATIONS AND DEFINITIONS

4.1 DSH--Data Services Branch

4.2 FO--Field Operations

4.3 TL--Total length

5.0 RESPONSIBILITIES

5.1 The Supervisor, Biological Resources, is responsible for coordinating with client organizations and assigning specific projects to unit supervisors.

5.2 The unit supervisor is responsible for developing a workplan defining the sampling program, overall scheduling of the work, and the technical adequacy of the work. The unit supervisor selects the crew leader.

5.3 The crew leader is responsible for supervising fieldwork, daily coordination of activities with plant personnel, assuring that all applicable procedures are followed, reviewing data for accuracy and completeness, and reporting problems to the unit supervisor.

5.4 FO employees involved in impingement counts are responsible for performing work in accordance with this procedure and all other applicable procedures, keeping proper records, and reporting problems to the crew leader.

5.5 The plant manager or shift engineer is responsible for assuring that all screens are simultaneously washed 24 hours prior to the impingement count.

6.0 PROCEDURE/REQUIREMENTS

6.1 Equipment And Supplies

6.1.1 Platform scale, 800-g capacity, 1-g increments

6.1.2 Hanging scale, 10-kg capacity, 2-g increments

6.1.3 Fish sorting table with 25-mm increments marked

6.1.4 Two hand tubs

6.1.5 Four wash tubs, number 4

6.1.6 Two dip nets

6.1.7 Formalin (2 L)

6.1.8 One-gallon sample jars and labels (stick-on outside labels and waterproof internal labels)

6.1.9 Subsample scoop

6.2 Preparation

6.2.1 Prior to the count the plant manager or shift engineer shall be notified of the impending count; adequate time shall be given such that all screens are simultaneously washed 24 hours prior to the count.

6.2.2 Before leaving for the field, check to see that all equipment is packed and operating properly. The number of fish expected will determine the size of the field crew and the quantities of each of the items listed in section 6.1.

6.2.3 Enter preliminary information for each screen on Impingement Data Forms (form TVA 20006, attachments 2 and 3) such as plant identification and name, test date, screen number, and screen identification.

6.2.4 Upon arrival at the plant the crew leader shall make necessary contacts with plant security and then with the shift engineer to coordinate screen washings.

6.2.5 The crew leader shall discuss screen wash procedures and wash sequence with the pump station operator.

6.3 Procedure

6.3.1 Standard procedure shall be for screens which have been operational during the previous 24 hours to be either rotated individually or in groups (usually in pairs but not more than three screens except when excessive pressure differential develops across the screens and they must all be washed simultaneously). Screens shall be washed as directed below.

6.3.1.1 Proceed to catch basket.

6.3.1.2 Signal operator to initiate washing of the first screen. Wash the screen for one complete rotation or turn (usually about 10 minutes).

6.3.1.3 Remove fish from basket and close gate. Record time of washing on front of the data form.

6.3.1.4 Signal operator to wash second screen.

6.3.1.5 Place fish from first screen on sorting table and begin processing.

6.3.1.6 When second screen is washed, remove fish from basket, close gate, record time of washing, and signal operator to wash third screen.

6.3.1.7 Continue sequence until all screens are washed.

6.4 Field Processing

6.4.1 Sort each species into 25-mm total length (TL) classes. Record the common name (if not already entered on form) and the number in each length class by species on the front of the data form (attachment 2).

6.4.2 Measure the weight of all fish in each length class using a platform scale, weighing to the nearest g. Record the total weight, in g, on the front of the data form. The minimum weight of any length class shall be 1 g. Do not enter "trace."

6.4.3 When it has been determined that a complete count of all impinged fish cannot be made during the working day with the available manpower, the crew leader may elect to subsample as directed below.

6.4.3.1 Remove all individuals of a species over 300-mm TL, separate into appropriate size classes, and record on the front side of the data form the total number and weight (in g) of fish for each size class.

6.4.3.2 Subsample all remaining individuals of the species or conduct a direct count of one or more of the remaining size classes before subsampling. For example, if there are a large number of 51- to 75-mm (3-inch) and 76- to 100-mm (4-inch) threadfin shad, but only a few 101- to 125-mm (5-inch) and 126- to 150-mm (6-inch) threadfin shad, process all of the larger fish and record the data on the front side of the data form. Subsample the remaining threadfin as directed below.

6.4.3.3 Record all subsampling data on the back of the data form (attachment 3).

6.4.3.4 Place the fish to be subsampled on the sorting table. If the fish have been size classed, mix them sufficiently to create a random distribution.

6.4.3.5 Scoop approximately 2.5 kg of fish out of the pile.

6.4.3.6 Separate the fish in this subsample into 25-mm length classes and record the number and total weight for each size class.

6.4.3.7 Weigh the remaining fish from which the subsample was taken and record the weight(s) in the cells labeled "Remaining Sample Weights" on the back of the data form. Often the remaining fish will fill several hand tubs. In such a case, enter individual weights of each hand tub full (minus the tub weight) in the cells rather than adding them together and entering the total of all tubs; each weight must not exceed five digits.

6.4.4 Separate all fish that cannot be field identified, place them in gallon jars. Add 10 percent formalin in to preserve the fish and take them to the Fisheries Laboratory in Norris for identification or verification.

6.4.5 Label each jar (inside and outside) with method of collection (impingement), locality (plant, State, county), date, and crew members.

6.4.6 After the impingement count is completed, deposit the impinged fish in a sanitary landfill or dispose of them with the screen wash water.

6.4.7 Check out of the plant.

6.5 Quality Control

6.5.1 All fish of questionable identity shall be preserved and taken or sent to the Fisheries Laboratory in Norris for identification.

6.6 Recording Data

6.6.1 The crew leader shall complete, sign, and date the data forms, including the date and time the screens were last washed (information obtained from plant personnel).

6.7 Packing and Shipping Samples

6.7.1 Pack the sample jars in shipping boxes provided by the Fisheries Laboratory in Norris, Tennessee.

6.7.2 Prepare a Transport Invoice (form 23015, attachment 4) and ship the boxes (including copy of field forms) through a TVA Office Service Warehouse to the Fisheries Laboratory, Norris, Tennessee.

6.7.3 Time and place arrangements should be made by phone with Fisheries Laboratory personnel for receiving samples.

7.0 RECORDS

7.1 Completed data forms are submitted to the unit supervisor for technical review and signoff.

7.2 The original forms are sent to DSB for data processing.

7.3 After data processing is complete, DSB sends the forms to Mapping Services Branch for microfilming. The microfilm (two copies) and the forms are returned to DSB for verification.

7.4 The microfilm is permanently stored by DSB and, after microfilm verification, the forms are retained by DSB for one year and then destroyed.

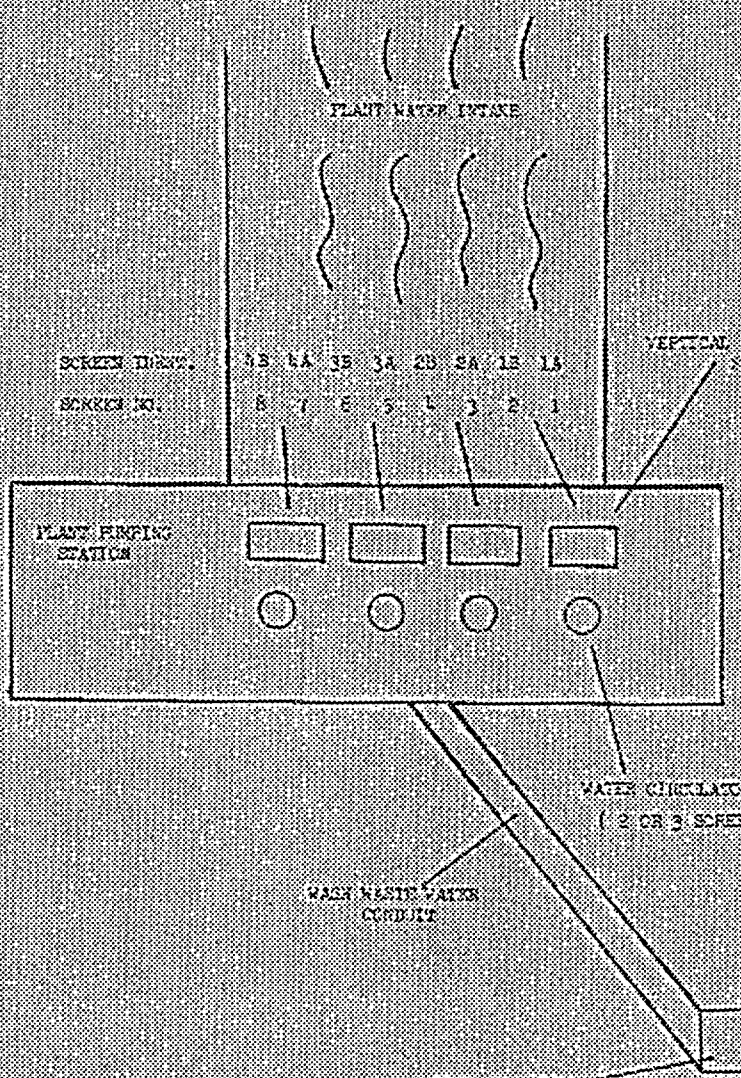
Title: IMPINGEMENT COUNTS	NR OPS-EQ- No. NR-33.11	Rev. 0

ATTACHMENTS

1. Schematic Diagram of a Typical Steam-Electric Intake System
2. Impingement Data Form (form TVA 20006)
3. Transplex Invoice

ATTACHMENT 1

SCHEMATIC DIAGRAM OF A TYPICAL STEAM-ELECTRIC INTAKE SYSTEM



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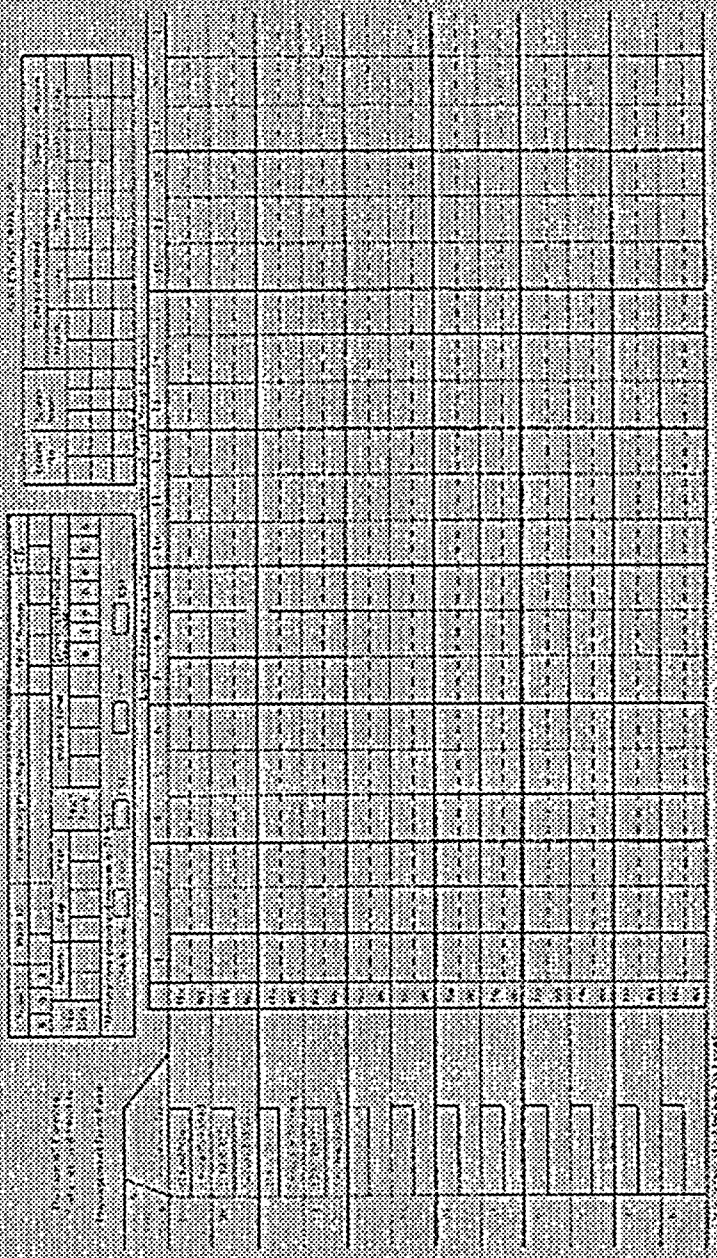
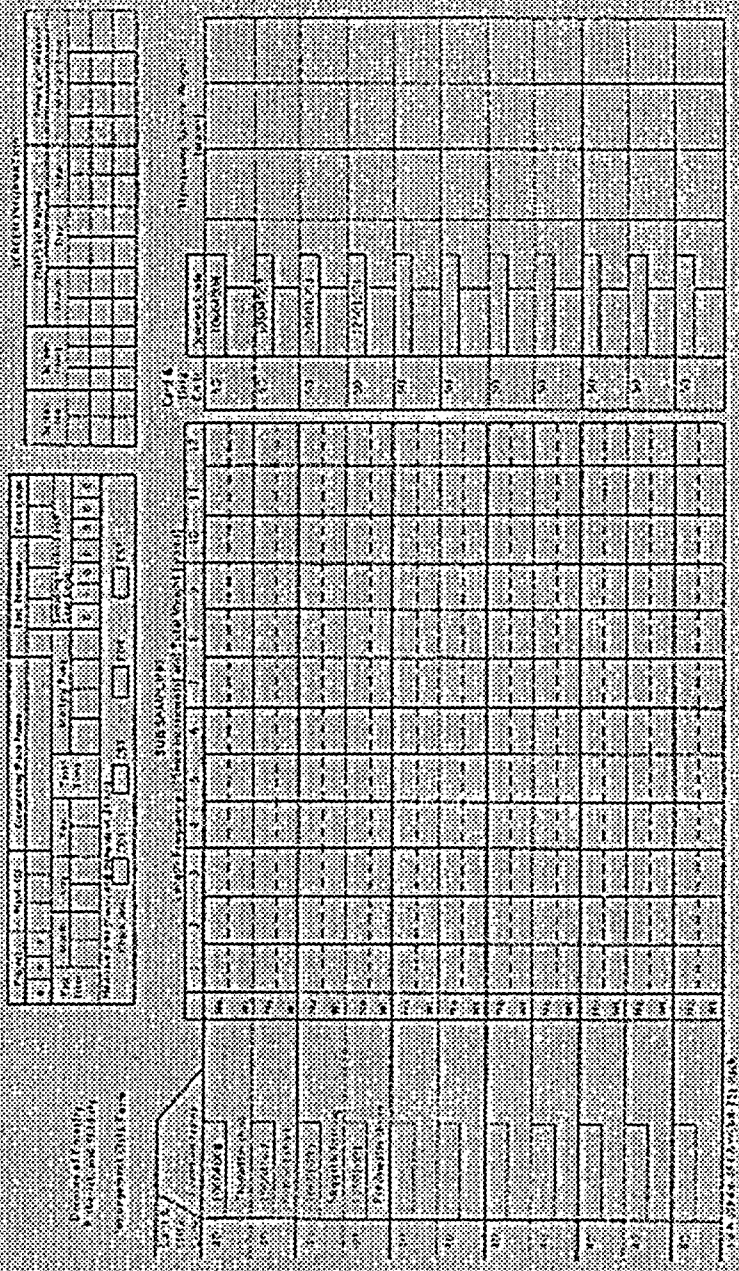
ATTACHMENT 2

IMPINGEMENT DATA FORM (FORM TVA 20006, FRONT)



ATTACHMENT 2 (CONTINUED)

IMPINGEMENT DATA FORM (FORM TVA 20006, BACK)



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ATTACHMENT 3

TRANSPORT INVOICE

TRANSPORT INVOICE

SITE _____ LOADED BY (NAME) _____

_____

RECEIVED BY _____

DATE	CONTAINER NO.	SAMPLE JARS		BACK FLUSH	FILTER POUCH		TAR PADS	
		Sent	Rec'd		Sent	Rec'd	Sent	Rec'd