TENNESSEE VALLEY AUTHORITY
KNOXVILLE, TENNESSEE 37902

MAR 27 1985

Mr. John Marlar
U.S. Environmental Protection
Agency, Region IV
Water Management Division
345 Courtland Street, NE.
Atlanta, Georgia 30365

Dear Mr. Marlar:

Enclosed is a revised Notification of Noncompliance (NON) for Sequoyah Nuclear Plant (NPDES Permit No. TN0026450, DSN 101) for January 1985. The January 31 noncompliance event, which was the date the cooling towers were removed from service, was inadvertently omitted on the original NON. The figures submitted with the previous NON remain unchanged and are not being submitted.

If you have questions, please call Madonna Martin at FTS 856-6695 in Knoxville, Tennessee.

Sincerely,

Martin Rivers

Martin E. Rivers, Director
Environmental Quality

Enclosure
cc (Enclosure):
Mr. Harold R. Denton, Director
Office of Nuclear Reactor Regulation
U.S. Nuclear Regulatory Commission
Washington, D.C. 20555
Attention: Document Control Clerk

Mr. D. Elmo Lunn, Director
Tennessee Department of Public Health
Division of Water Management
150 Ninth Avenue, North--TERRA Building
Nashville, Tennessee 37203

Mr. James P. O'Reilly, Director
Office of Inspection and Enforcement
U.S. Nuclear Regulatory Commission
Region II - Suite 2900
101 Marietta Street, NW.
Atlanta, Georgia 30303

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MAR 27 1985

Mr. John Marlar

cc: Tennessee Division of Water
Management
Environmental Health Services
2501 Milne Street
Chattanooga, Tennessee 37406

NOTIFICATION OF NONCOMPLIANCE WITH EFFLUENT LIMITATIONS - NPDES PERMIT NO. TN0026450 - SEQUOYAH NUCLEAR PLANT (SQN)

Description of the discharge--Discharge No. 101 - Diffuser discharge gate. During January the temperature rise limit (5.4°F or 3.0°C) and rate of temperature change limit (±3.6°F or ±2.0°C) were exceeded. Since there were several occurrences, these are detailed in the next section.

Cause and period of the noncompliance--Unprecedented cold temperatures during January 1985 created a large demand on the TVA power system. In January, SQN operated at full two-unit load for the first time during severe cold weather. Lack of rainfall in November through January caused low flow conditions and reservoir storage below normal levels. Hydro plants were scheduled to peak during periods of high demand and hold back flow during the morning hours. Figure 1 shows the major plant features and the location of instream temperature monitors.

Five separate noncompliances with the temperature rise limit occurred on January 7, 11, 18, and 31. Problems associated with malfunctioning equipment (cooling tower lift pumps) were responsible for four of the noncompliances. Computed compliance model results were not valid from January 20-31 when a diffuser gate was closed, causing bad input to the model. Backup instream temperature monitors showed no further temperature rise noncompliances during January 20-31. However, there were times when the rate of temperature change limit was exceeded in the instream temperature monitor data during that period. These occurrences were due to cooling tower lift pump problems which caused large changes in the pond temperature before discharge. The plant was on full closed mode (two-tower operation) between January 20-31. The following paragraphs detail the events, starting on January 7, which led to the thermal noncompliances at SQN. Plant operating loads, cooling tower use, and air temperatures are shown in Figure 2. Figure 3 shows the temperature rise and river flow data. Figure 4 shows rate of temperature change data and discharge pond temperatures.

The first noncompliance occurred on January 7, at 0545 CST. The maximum temperature rise (delta T) was 5.6 degrees F. Temperature rises exceeded the thermal limit for 2 hours. SQN was operating at full power. River flow, scheduled for hydro peaking operation, fell to 14,700 cubic feet per second (cfs) at 0645 CST. River flows increased immediately after the limit was exceeded. One cooling tower was placed in service at 2030 CST, anticipating further high temperature rises during the next morning's low-flow period.

The scheduling model used to determine the effects of river flow on the thermal limits at SQN showed partial cooling tower operation was needed to meet the thermal limits. The plant has experienced problems with the cooling tower lift pumps and plant operators were concerned about and reluctant to use partial cooling tower operation because of extremely cold weather. Last year partial usage lead to severe icing damage which cost approximately one half million dollars to repair. For these reasons, full tower operations were not commenced immediately resulting in the noncompliance.

The second noncompliance occurred on January 11 at 0030 CST. The maximum temperature rise was 5.6 degrees F. Temperature rises were above the limit for 1.5 hours. River flow at SQN was as low as 14,300 cfs during this period. A third noncompliance occurred at 0445 CST, reached a maximum of 5.7 degrees F and lasted 1.0 hour. River flow had increased for a period of two hours but then decreased to 21,900 cfs causing the added temperature rise problems. SQN was operating one tower, open/helper mode, anticipating low-flow induced temperature rise problems. The cooling tower placed in operation on January 10 at 2300 CST was started too late to prevent these noncompliances.

The fourth noncompliance occurred on January 18 starting at 1615 CST. The maximum temperature rise was 5.6 degrees F. Total duration above 5.4 degrees F was one hour. SQN operated at full two-unit operation with one cooling tower in service (helper mode). River flow dropped to 7,700 cfs and was not enough flow for operation of only one tower. The second tower was placed in service at 1800 (helper mode).

The fifth noncompliance occurred on January 31 starting at 1315 CST, during the transition from closed mode (beginning at 1020 CST) to helper mode (1225 CST) to open mode (1428). The maximum temperature rise was 6.4°F. Total duration above 5.4°F was 2.25 hours. The cooling towers were taken out of service in order to assess icing damage.

On January 20, SQN went to full closed mode operation to prevent further icing which was first observed early that morning. While on closed mode, a diffuser gate was closed routing all flow through one diffuser leg. The computed compliance model had been previously changed to use only two diffuser leg operation. The computed discharge flow is based on the difference between elevation in the diffuser pond and the river. The closed diffuser gate caused the model to receive false diffuser flowrate information and produced invalid results. This continued through January 31 at 1020 CST when the diffuser gate was opened during transition to open mode operation. Backup temperature monitors in the river from January 20-31 (figure 3), show temperature rises below the limit during the closed mode operation. Procedures at the plant will be changed to leave both diffuser gates open during all plant operations. Discharge flow measurements will also be calibrated under low flow and closed mode operation.

During January 20-31, there were times when the river monitored data were outside the rate of temperature change limit. Figure 4 shows this data along with the discharge pond temperatures. Measured values exceeding the limit coincide with large changes in discharge pond temperature. The plant had problems with the cooling tower lift pumps during most of closed mode operation. When a lift pump failed, the heated water it was pumping had to be discharged into the diffuser discharge pond. All exceedances of the rate of temperature change limits were an hour or less. A list of these occurrences is shown in Table 1 which provides starting times, maximum values, and durations. Lift pump maintenance will be improved to provide better operation during cooling tower use.

Steps taken to reduce, eliminate, and prevent recurrence of the noncomplying discharge--TVA is currently assessing cooling tower damage and procedures to be followed when cooling tower icing is expected. During periods of possible icing, full cooling (as opposed to partial) tower operation will be implemented when the scheduling model indicates that the thermal limits cannot be met in open mode. Plant procedures will be changed to keep diffuser gates open during all plant operation. The computer model for verification of compliance with the thermal limits will be calibrated for closed mode operation. Cooling tower lift pumps will be repaired, and maintained and tested on a periodic basis to be ready for future cooling tower operation.