P.O. BOX 3100 MIAMI, FLORIDA 33101

July 5, 1974

Mr. John F. O'Leary, Director
Directorate of Licensing
Office of Regulation
U. S. Atomic Energy Commission
Washington, D. C. 20545

Dear Mr. O'Leary:

ABNORMAL OCCURRENCE NO. 251-74-8
JULY 5, 1974
OCCURRENCE DATE: JUNE 27, 1974; JULY 1, 1974; JULY 2, 1974
TURKEY POINT UNIT NO. 4
BORON INJECTION TANK BORON CONCENTRATION
BELOW LIMITING CONDITION FOR OPERATION

A. CONDITION PRIOR TO OCCURRENCE

The reactor was in routine power operation at 98% power.

B. DESCRIPTION OF OCCURRENCE

At 1:00 p.m. on June 27, 1974, the routine boron analysis of the boron injection tank (BIT) contents was completed and the results indicated a boron concentration of 19,300 ppm. This is below the 20,000 ppm lower Technical Specification limit. An additional sample was analyzed and it confirmed the low concentration. At this time a reactor shutdown was commenced and the boron injection tank was lined up with the boric acid storage tank so that the contents of the BIT could be recirculated to bring the boron concentration to a value within the allowable operating limits. However, when recirculation was initiated, flow could not be verified because the flowmeter in the recirculation line was inoperable. Even though flow could not be verified recirculation was still attempted. At approximately 30 minutes from the start of recirculation, a sample was taken which showed the concentration to be 20,100 ppm. Even though this is within the allowable limits, the contents of the BIT continued to be recirculated. One hour after the first sample was taken a second sample showed the concentration to be 20,300 ppm.

COPY SENT REGION II

For three consecutive days, the boron concentration in the boron injection tank remained within allowable limits. However, at 3:30 p.m. on July 1, 1974, a sample taken from the boron injection tank indicated a boron concentration of 19,600 ppm. Another sample was taken and it verified the low concentration. At this time a reactor shutdown was initiated. Even though recirculation flow could not be verified because the flowmeter was still inoperable, the contents of the boron injection tank were recirculated with the contents of the boric acid storage tank. At 3:45 p.m., 15 minutes after the recirculation was initiated, another sample was taken and indicated a boron concentration of 20,000 ppm.

The third occurrence was on July 2, 1974. At 10:30 a.m., the contents of the boron injection tank were again sampled and indicated a boron concentration of 19,400 ppm. Another sample was taken and again verified the low concentration. Once again a reactor shutdown was commenced and the contents of the boron injection tank were recirculated to return the boron concentration to allowable limits. However, 30 minutes after the start of recirculation another sample was taken which indicated a boron concentration of 19,500 ppm. To determine if this was representative of the concentration in the boron injection tank, a sample was also taken from the suction side of the tank which is located at the bottom. This sample indicated a concentration of 21,000 ppm.

Further attempts at recirculating the contents of the boron injection tank via the normal method failed to increase the concentration. At this point it was decided to connect the discharge of the boron injection tank to the boric acid batching tank using temporary connections. With this connection, the BIT contents could be recirculated through the boric acid tanks via the batching tank. Recirculating the contents of the boron injection tank via this method successfully increased the boron concentration. At 7:00 p.m., another sample was taken which indicated a boron concentration of 20,800 ppm.

C. CAUSE OF OCCURRENCE

The investigation to determine the cause of the occurrence has revealed that the dilution is due to insufficient recirculation coupled with minor inleakage. The contents of the boron injection tank could not be sufficiently recirculated because of a blocked or partially blocked recirculation return line to the boric acid storage tank.

D. ANALYSIS OF THE OCCURRENCE

The role of the boron injection tank is to provide a source of negative reactivity to alleviate the consequences of the postulated steam break accident described in the FSAR. The safety analysis is conservative in that credit is only taken for the amount of boron in the boron injection tank itself and no credit is taken for the amount of boron in the safety injection system piping. In addition, the actual rate of boron injection, in the unlikely event of a steam break, would be greater than utilized in the FSAR because actual safety injection flow rates would be higher than those analyzed in the FSAR. These factors coupled with the amount of dilution that occurred indicate that the consequences of a steam line break would have been within the limits presented in the FSAR. Therefore, neither reactor safety nor the health and safety of the public were jeopardized by this occurrence.

E. CORRECTIVE ACTION

The immediate corrective action taken following each occurrence consisted of: 1) initiating an orderly reactor shutdown, and 2) initiating routine recirculation of the contents of the boron injection tank through one of the boric acid storage tanks to return the boron concentration to within allowable limits. However, following each occurrence the boron concentration was returned to within allowable limits prior to reaching cold shutdown and the reactor was returned to normal power operation.

Since the first occurrence, the sampling of the boron injection tank was increased to once per day, which will continue until it has been determined that no further dilution is occurring.

The investigation to determine where the blockage in the recirculation return line to the boric acid storage tank is located is continuing. Until the blockage has been found, the contents of the boron injection tank will be recirculated by lining up the suction of the boron injection tank to one of the boric acid storage tanks and discharging the boron injection tank to the batching tank. The batching tank will then be pumped to the boric acid storage tank.

The permanent corrective action will consist of: 1) replacing the flowmeter in the recirculation line and assuring that any further failure is promptly investigated and corrected, and 2) eliminating the blockage in the recirculation line. As long as the contents of the boron injection tank are sufficiently recirculated, any minor inleakage into the tank will not result in diluting the boron concentration.

In addition we are performing an evaluation of the method by which the boron injection tank is normally recirculated. The results of this evaluation should provide an improved method of sampling the boron injection tank to obtain a more representative sample of the tank contents.

F. FAILURE DATA

This is the first abnormal occurrence at Turkey Point resulting from a blockage in the recirculation line.

Very truly yours,

A. D. Schmidt
Director of Power Resources

DWR/kmw

cc: Mr. Norman C. Moseley
Jack R. Newman, Esquire