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422 SOUTH CHURCH STREET, CHARLOTTE, N. C. 28242

Kilo-La Facility
for.

April 16, 1976

WILLIAM O. PARKER, JR.
VICE PRESIDENT
STEAM PRODUCTION

TELEPHONE: AREA 704
373-4083

Mr. Norman C. Moseley, Director
U. S. Nuclear Regulatory Commission
Suite 818
230 Peachtree Street, Northwest
Atlanta, Georgia 30303

RE: Oconee Nuclear Station
Docket Nos. 50-269, -270, -287

Dear Mr. Moseley:

Pursuant to the requirements of Oconee Nuclear Station Technical Specification 6.6.2.2, this report is being submitted describing conditions in which measured levels of radioactivity exceeded the control level by greater than ten times, or by greater than four times but less than ten times. Summarized herein are the results of water samples and an aquatic vegetation sample analysis collected during February, 1976.

On April 9, 1976, tritium concentration analytical results for a composite water sample collected over the month of February, 1976 were reviewed and compared with similar results for the control sample collected over the quarter October 1, 1975 to December 31, 1975. Given below is a summary of the pertinent results of the radioactive concentrations of these samples. As indicated, the measured level of tritium concentration exceeded the control level by greater than ten times.

Sample Location	Type Sample	Tritium Concentration
000.3 Bridge N. of Site on Hwy. 183 Connecting Canal (Control	Surface Water	(1.8 ± 1.3) E-7 µCi/ml
000.7 Bridge S. of Site on Hwy. 183	Surface Water	(2.25 ± 0.23) E-5 µCi/ml

During the month of February, 1976, 300 Curies of tritium were released from the station in liquid effluents. The maximum tailrace concentration of tritium was 3×10^{-3} µCi/ml. The average tailrace concentration of tritium was 2.89×10^{-6} µCi/ml. The station's objective (Technical Specification 3.9) in making effluent releases is to maintain the average concentration of tritium in liquid effluents upon release from the Restricted Area to not more than 5×10^{-6} µCi/ml. Also, Technical Specification 3.9.2 specifies that the

quarterly average concentration of tritium released from the Restricted Area shall not exceed 1×10^{-5} µCi/ml. Therefore, it can be seen that the average tritium concentration for the quarter in liquid effluents is within the objective concentration and well below the specified quarterly average concentration.

Additionally, on April 9, 1976, gross beta activity analytical results for water samples collected during the month of February, 1976 were reviewed. Given below is a summary of the pertinent results of the radioactivity of these samples, showing comparison to control samples.

Sample Location	Date Collected	Type of Sample	Gross Beta µCi/ml
000.3 Bridge North of Site (Control)	2/3/76	Surface	1.85E-9 ± 5.24E-10
000.7 Hwy. 183 Bridge	2/3/76	Surface	2.57E-8 ± 1.15E-9
005.2 Hwy. 27 Bridge	2/3/76	Surface	9.71E-9 ± 7.87E-10
004.1 Seneca (Control)	2/3-2/24/76	Raw	< 8.83E-10
	2/3-2/24/76	Finished	< 8.83E-10
006.1 Clemson	2/3-2/24/76	Raw	6.28E-9 ± 6.79E-10
	2/3-2/24/76	Finished	9.46E-10± 4.87E-10

Gross beta concentrations in the water samples collected are dependent upon the corrosion and fission product concentrations in liquid effluents released from the station. For the month of January, 1976, 1.90 Curies of corrosion and fission products were released from the station in liquid effluents; the maximum tailrace concentration was 3.92×10^{-6} µCi/ml; the average tailrace concentration was 1.66×10^{-8} µCi/ml. For the month of February, 1976, 1.64 Curies of corrosion and fission products were released from the station in liquid effluents; the maximum tailrace concentration was 5.07×10^{-6} µCi/ml; the average tailrace concentration was 1.58×10^{-8} µCi/ml.

As indicated in Technical Specification 3.9, the station's annual objective in making effluent releases is to maintain the average concentration of corrosion and fission products in liquid effluents upon release from the Restricted Area to not more than 2×10^{-8} µCi/ml.

Technical Specification 3.9.3 specifies that the instantaneous concentration of radioactive materials released from the Restricted Area shall not exceed 10CFR20, Appendix B limits, for average annual release rates. For the most restrictive case in which the isotopic concentrations are not know, this limit is 1×10^{-7} µCi/ml. Due to a procedural error in the method for calculating effluent release rates the corrosion and fission product concentrations for January and February, 1976 in liquid effluents exceeded this

limit for instantaneous concentrations. This deficiency has been corrected and will be addressed further in Reportable Occurrence Report RO-269/76-4. Otherwise, it can be seen that the objective average release concentrations for January and February, 1976 were not exceeded.

At Location 000.7, Hwy. 183 Bridge, near the effluent discharge point, the gross beta activity, standardized against the beta energy of Cesium-137, should compare favorably to the average activity released from the station. Similarly, the gross beta activity in samples collected further downstream such as 005.2, Hwy. 27 Bridge, and 006.1, Clemson Water Intake, should decrease with dilution and dispersion. Dilution and dispersion of corrosion and fission products in liquid effluents between Oconee Nuclear Station and the Clemson Water Intake have been calculated using the equation for instantaneous release taken from the U. S. Geological Survey Paper No. 433-B, "Dispersion of Dissolved or Suspended Materials in Flowing Streams" by Robert E. Glover (1964), p.5. This equation accounts for longitudinal dispersion only. Conservatism was used in selecting parameters for substitution in the instantaneous release equation to determine the concentration of effluent at the Clemson Water Intake. These assumptions were (1) the elevation of Lake Hartwell is 654.00 feet and (2) the flow of the Keowee River is 1100 CFS, the yearly average. The resulting "worst-case" calculated corrosion and fission product concentrations at the Clemson Water Intake are as follows:

January 2.97×10^{-8} µCi/ml

February 3.84×10^{-8} µCi/ml

These calculated concentrations are a factor of ten higher than those observed.

Note, also that although the raw water gross beta activity exceeds the control location activity by four times, the finished water gross beta activity at Clemson compares favorably with the control location activity.

On April 12, 1976, semiannual analytical results of an aquatic vegetation sample collected on February 22, 1976 were reviewed. Listed below is a summary of the pertinent results.

Sample Location	Date Collected	Radionuclide Concentrations (pci/gm)	
000.5 1-mile radius of site Lake Keowee (Control	2/17/76	MN-54	< 1. E-01
		CO-58	< 1. E-01
		CO-60	< 2. E-01
		I-131	< 4. E-01
		CS-134	< 1. E-01
		CS-137	< 1. E-01
000.4 Near Liquid Effluent Release Point	2/22/76	MN-54	(6.54 ± 0.66) E 00
		CO-58	(3.84 ± 0.38) E 01
		CO-60	(1.36 ± 0.14) E 01
		I-131	(1.66 ± 0.63) E 00

CS-134	(1.69 ± 0.17)	E 01
CS-137	(2.89 ± 0.29)	E 01
CS-136	3.80 ± 2.38	E-01
AG-110M	5.06 ± 1.23	E-01

The expected buildup of activity in organisms living in station effluents is discussed on pp. 130-133 of the Final Environmental Statement for Oconee Nuclear Station. From the information provided in FES, it is possible to calculate the concentrations one would expect to see in aquatic vegetation samples collected from the vicinity of the liquid effluent release point; the specific information required is:

1. The tailrace concentrations of the radionuclide found in the aquatic vegetation samples, discharged as radioactive waste. (These concentrations are based on effluent discharges for January and February, 1976. The tailrace concentrations are a factor of 10 greater than those presented in Table III-12 of the FES for anticipated annual tailrace concentrations.)

2. The biological accumulation factors for the radionuclides found in the aquatic vegetation samples. (The biological accumulation factors used in the calculation of expected concentrations in aquatic vegetation are those found in Table V-7 of the FES. The biological accumulation factor for Ag-110m is taken from UCRL-50564 Rev. 1, 1972.

The following table summarizes this data and provides a comparison of expected and actual concentrations:

Isotope	H_2O Concen.	Bioaccumulation Factor	Expected Vegetation Concen.	Actual Vegetation Concen.
	µCi/ml		µCi/g wet wt.	µCi/g wet wt.
^{54}Mn	1.92×10^{-10}	35000	6.72	6.59 ± 0.66
^{58}CO	3.23×10^{-9}	2500	8.08	38.4 ± 3.8
^{60}Co	6.08×10^{-10}	2500	1.52	13.6 ± 1.4
^{131}I	5.27×10^{-9}	200	1.05	1.66 ± 0.63
^{134}Cs	2.40×10^{-9}	25000	60	16.9 ± 1.7
^{137}Cs	3.72×10^{-9}	25000	93	28.9 ± 2.9
^{136}Cs	1.25×10^{-10}	25000	3.13	0.38 ± 0.24
^{110m}Ag	1.94×10^{-11}	200	3.88×10^{-3}	0.51 ± 0.13

With aquatic vegetation samples, the calculated or expected concentrations of nuclides, based on effluent releases, are in most cases greater than or nearly equal to those actually determined by laboratory analysis. The

water concentrations used to calculate the concentrations of these radionuclides in aquatic vegetation are average concentrations. The maximum water concentrations are a factor of ten higher so the actual vegetation concentrations for any one sample could be higher also. This may account for instances in which the actual vegetation concentration is greater than the expected calculated value.

The calculated concentrations of radionuclides in aquatic vegetation are based on tailrace concentrations, a factor of ten greater than those presented in Table III-12 of the FES. The tailrace concentrations are high due to the previously mentioned procedural error in the method for calculating effluent release rates. In the future, the concentrations of radionuclides in aquatic vegetation samples should level off or decrease due to corrective actions taken.

Very truly yours,

William O. Parker, Jr.

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