



UNITED STATES  
NUCLEAR REGULATORY COMMISSION  
REGION II  
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ATLANTA, GEORGIA 30303

February 13, 1976

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THRU: J. T. Sutherland, Chief, Fuel Facility and Materials Safety Branch,  
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EVALUATION OF RESULTS OF OCONEE ENVIRONMENTAL SURVEY PERFORMED BY SOUTH CAROLINA

The South Carolina Department of Health informed Region II on February 5, 1976, that gamma emitting radionuclides had been detected for the first time in a water sample taken on January 29, 1976, from a point near the Clemson raw water intake in Lake Hartwell, which is downstream of Oconee Nuclear Station. On February 6, 1976, the State informed Region II that the same nuclides had been detected for the first time in a January 29, 1976, sample of processed Clemson potable water. Sample results are provided as attachment (1).

On February 9, 1976, the State informed Region II that the above nuclides were detected using an analysis procedure which provided a minimum detection limit of 0.2 picocuries per liter, whereas all previous analyses of samples from these locations had a detection limit of 1.1 picocuries per liter. Since all gamma emitting radionuclides identified in the January 29 drinking water samples were present in concentrations below 1.1 picocuries per liter, the results of the January 29 sample analyses do not indicate an increasing trend. Further, these concentrations are well below South Carolina drinking water standards and should not result in a radiation dose to the public greater than that predicted in the Oconee Final Environmental Impact Statement (FES) or the numerical guides of 10 CFR 50 Appendix I.

The State of South Carolina collects and analyzes monthly water samples from the Keowee River at the Highway 183 bridge about 1/2 mile downstream from the Oconee Nuclear Station under contract with the NRC. Results of analyses of these samples for calendar year 1975 and January, 1976 are provided as attachment (2).

Liquid radioactive waste from the Oconee Station is discharged to the Keowee River via a tailrace canal. The entire dilution flow in this canal, and in the Keowee River in the vicinity of the plant, is comprised of flow through the Keowee Hydroelectric Plant. This flow varies from a leakage flow of 40 cfs to a flow of 20,800 cfs when the hydro is operating. The hydro plant operates approximately 40 hours per month or about 5% of the time. Therefore, it may be assumed that about 95% of the periodic samples taken from the Keowee River by the State were taken under conditions of minimum dilution flow, and the average concentrations of these samples would be higher than the flow proportional annual average concentration in the River.

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The flow proportional annual average concentrations in the Keowee River cannot be determined from the State sample results because river flow at the time of each sampling is unknown. The flow proportional annual average concentration of each isotope identified by the State has been calculated by Region II based on total dilution flow and total amount of each isotope reported released by the licensee during calendar year 1975. These calculated values were well within 10 CFR 20 limits but, with the exception of tritium, all exceeded FES predictions. See attachment (3). Cesium-134 and

Region II inspected Oconee's liquid radwaste control program in December, 1975, for compliance with Technical Specification release limits. No items of noncompliance were identified. Duke Power Company management informed Region II by telephone on February 9, 1976, that radiation doses to members of the general public caused by radioactivity in liquid effluents released from Oconee in 1975 had been calculated using NRC models and were well below their Technical Specification objectives and the numerical guides in 10 CFR 50 Appendix I.

An inspection has been scheduled at Oconee for the week of February 23, 1976, during which the following areas will be inspected.

1. Administrative controls for liquid waste effluent releases and the bases used for determining effluent and dilution flow rates.
2. Review of liquid waste release records to determine if limits have been met.
3. Evaluation of radiochemistry capability for environmental and waste analyses.
4. Review of environmental data including comparison of licensee and State results.

The above evaluation and planned response were discussed with J. Cunningham, Safety and Environmental Programs Branch HQ, on February 12, 1976.

*and George Gove*  
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Radiation Support Section  
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cc: J. Cunningham, IE:HQ

- Attachments:
- (1) Lake Hartwell and Clemson  
potable water sample results
  - (2) Keowee River sample results
  - (3) Calculated annual average concen-  
trations in the Keowee River

Attachment (i)

Results of sample of water taken from Lake Hartwell on January 29, 1976, by the South Carolina Department of Health from a point near the Clemson raw water intake:

iodine-131	0.6 picocuries per liter
cesium-134	0.2 picocuries per liter
cesium-137	0.4 picocuries per liter

Results of sample of water taken from Clemson potable water supply on January 29, 1976, by the South Carolina Department of Health.

iodine-131	0.65 picocuries per liter
cesium-134	0.32 picocuries per liter
cesium-137	0.28 picocuries per liter

## Attachment (2)

## Keowee River Sample Results

	Gross $\beta$	H-3	I-131	Cs-134	Cs-137	Co-58	Co-60
Jan. 1975	12.2	13,123	NDG	NDG	NDG	9	16
Feb.	5.8	4,200	NDG	NDG	NDG	NDG	NDG
Mar.	12.7	3,258	NDG	NDG	1.5	4	4
Apr.	2.8	1,340	NDG	NDG	NDG	NDG	NDG
May	1.6	746	NDG	NDG	NDG	NDG	NDG
June	7.3	15,137	NDG	NDG	10	NDG	NDG
July	44.1	4,433	40.7	3.5	10.6	20.1	2.2
Aug. 14	6.6	10,086	NDG	NDG	4.5	4.4	2.7
Aug. 28	8.6	59,019	60	NDG	3	NDG	NDG
Sep.	15.3	85,219	29	3	7	2	NDG

	Gross $\beta$	H-3	I-131	Cs-134	Cs-137	Co-58	Co-60
Oct. 6	3.5	22,261	NDG	NDG	NDG	NDG	NDG
Oct. 23	2.5	3,062	NDG	NDG	NDG	NDG	NDG
Nov.	2.1	28,640	NDG	NDG	NDG	NDG	4.0
Dec.	2.7	3,080	NDG	NDG	NDG	NDG	NDG
Jan. 15	12.7	7,627	30	3.6	8	2.2	1.4
Jan. 29	UNK	UNK	10.3	15.2	26.4	<0.2	0.3

Notes: (1) All results are picocuries per liter

(2) "NDG" means no detectable gamma when the detection limit was 1.1 picocuries per liter

Attachment (3)

<u>Nuclide</u>	<u>10CFR20 Apx. B, Table II Column 2 MPC</u>	<u>FES Table III-12 Prediction</u>	<u>Calculated Annual Concentration</u>
H-3	$3 \times 10^6$	3000	2400
I-131	$3 \times 10^2$	0.2	0.79
Cs-134	$9 \times 10^3$	0.64	<del>1.1</del> 0.11
Cs-137	$2 \times 10^4$	0.045	0.30
Co-58	$1 \times 10^5$	1.4	1.5
Co-60	$5 \times 10^4$	0.057	0.38

Note: All values in table are annual average concentrations in picocuries per liter.