FROM:
Duke Power Company
Charlotte, N.C. 28201
Chas A. Dewey, Jr.

DATE OF DOCUMENT: Feb. 24, 1972
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TO:
Mr. Howard D. Zeller

ORIG.: 1 | CC: | OTHER:

ACTION NECESSARY ☐ | CONCURRENCE ☐ | DATE ANSWERED:
NO ACTION NECESSARY ☐ | COMMENT ☐ | BY:

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DESCRIPTION: (Must Be Unclassified)
Ltr re our 1-7-72 ltr...furnishing info on dissolved oxygen concentrations in Lake Keowee....& trans the following:

ENCLOSURES:
Drawing EO-1100-23 entitled Extreme Conditions...
Drawing EO-1100-24 entitled Average Conditions...

(1 cy ea encl rec'd)

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Dicker w/4 cys for ACTION	3-10-72		
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REMARKS:
1 CY LOCAL PDR WALHALLS, S.C.

U. S. ATOMIC ENERGY COMMISSION MAIL CONTROL FORM FORM AEC-32 (8-60)

☆ U. S. Government Printing Office: 1968 — 296 — 614

Regulatory File Copy.

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DUKE POWER COMPANY

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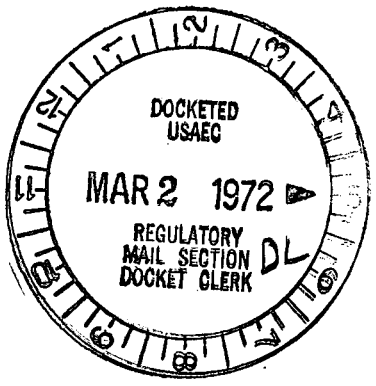
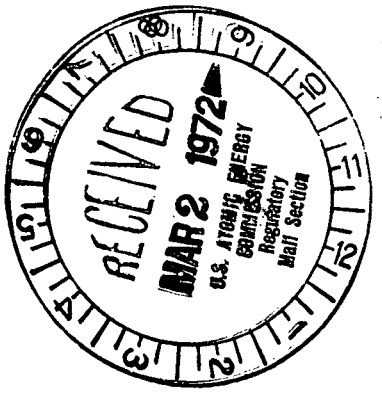




February 24, 1972

Mr Howard D Zeller
Chief, Permit Branch
Environmental Protection Agency
1421 Peachtree Street, NE
Atlanta, Georgia 30309

Re: January 7, 1972, letter to B B Parker

Dear Mr Zeller:

The effect of Oconee Nuclear Station on the dissolved oxygen concentrations in Lake Keowee is expected to be as follows:

Extreme Conditions (Drawing EO-1100-23)
Enclosed drawing EO-1100-23 shows the predicted distribution of dissolved oxygen (DO) concentrations in Lake Keowee as projected from the extreme data of record on Lake Norman - Marshall Steam Station data. During summer, when Oconee is discharging water containing less than 0.5 mg/l, approximately 100 acres will have a concentration of less than 1 mg/l to an average depth of 4 ft and a maximum depth of 40 ft (immediately adjacent to the discharge structure). 700 acres will have less than 2 mg/l DO and the average depth of the 2.0 mg/l boundary will be about 1 ft. 1200 acres are expected to have concentrations less than 3 mg/l and the average depth will be 2 ft. 3000 acres will have less than 4 mg/l and throughout most of the area the reduced concentrations will extend down into the region in which the naturally occurring concentrations are less than 4 mg/l. 5100 acres will have less than 5 mg/l DO and again this influence extends down into the region of where naturally occurring concentrations are less than 5 mg/l.

Average Conditions (Drawing EO-1100-24)
This drawing presents isopleths of DO and areas which represent the average (expected) conditions during the worst month of the year in Lake Keowee due to the influence of Oconee Nuclear Station. The area with concentrations less than 1 mg/l is 100 acres with average depth of 4 ft; concentrations less than 2 mg/l will prevail over 700 acres to average depth of 2 ft; 3 mg/l, 1200 acres, 4 ft; 4 mg/l, 2100 acres, 7 ft. 3000 acres are expected to have less than 5 mg/l and this will extend down into the zone of the lake where natural concentrations are less than 5 mg/l.

The DO-Area values predicted for Oconee-Lake Keowee are based on actual surveys on Lake Norman in the areas affected by Marshall Steam Station. The Lake Norman data were then extrapolated to Oconee-Lake Keowee by a ratio of Oconee's cooling water flow rates to those existing at Marshall during tests to produce the predicted results shown on the enclosed drawings. Expenditure of considerable time

and talent failed to produce better predictive methods. We do not feel that present predictive methods can distinguish between average and extreme meteorological and lake drawdown conditions. Our predictions, however, we believe are conservative since,

1) Oconee discharges into a more open lake than Marshall and mixing will be greater thus dilution by higher DO water will occur

2) All predictions are based on plume center-line measurements and DO values would be higher in other parts of the plume, increasing to natural values at plume boundaries.

As you know, lakes naturally stratify in this area and the average depth of water in Lake Norman, outside the influence of Marshall Station, which contains 5 mg/l or more dissolved oxygen is about 25 ft.

It is expected that Oconee's discharge temperature will normally be greater than Lake Keowee's surface temperature, so an interflow situation is not expected to occur.

Very truly yours,

Chas A. Dewey Jr.

Chas A Dewey Jr
Principal Environmental Engineer

CADjr/bw

cc Mr R C DeYoung
✔ Atomic Energy Commission
Washington, D C 20545

cc Mr J R McWherter
Oak Ridge National Laboratory
P O Box X
Oak Ridge, Tennessee 37830

cc U S Army Corps of Engineers
201 East St Julian Street
Savannah, Georgia 31401

cc Mr Kenneth Tinsley
S C Pollution Control Authority
P O Box 11628
Columbia, S C 29211

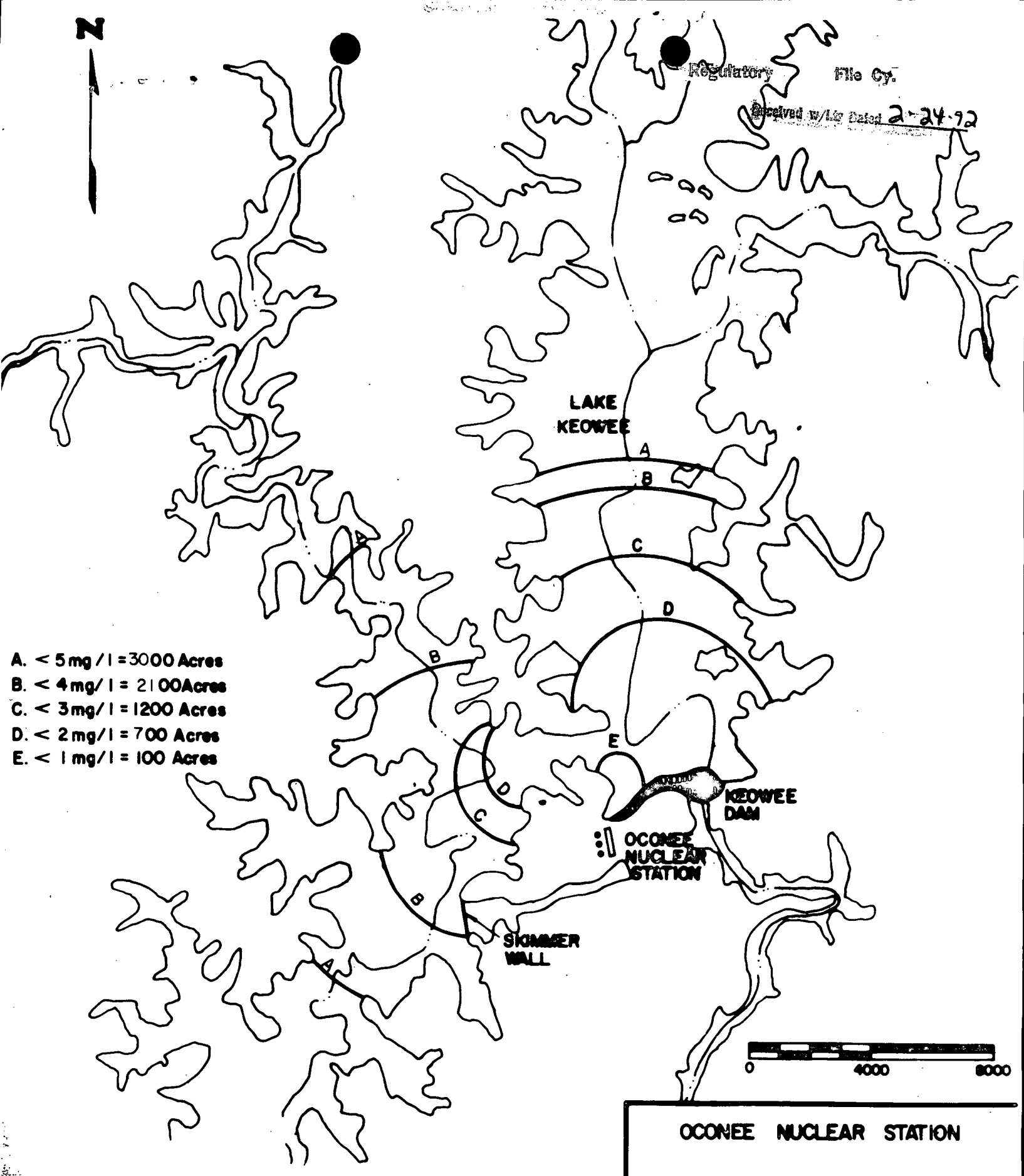
A. < 5 mg/l = 5100 Acres
B. < 4 mg/l = 3000 Acres
C. < 3 mg/l = 1200 Acres
D. < 2 mg/l = 700 Acres
E. < 1 mg/l = 100 Acres

NOTE:

BASED ON LARGEST AREA OF D.O. < 5 mg/l OCCURING SEPT. 1969 IN 1968-1971 INCL. PERIOD OF RECORD.

OCONEE NUCLEAR STATION

EXPECTED EXTREME AREAS OF D.O. < 5mg/l PRODUCED IN LAKE KEOWEE BY OCONEE NUCLEAR STATION



A. < 5 mg/l = 3000 Acres
B. < 4 mg/l = 2100 Acres
C. < 3 mg/l = 1200 Acres
D. < 2 mg/l = 700 Acres
E. < 1 mg/l = 100 Acres

NOTE:
BASED ON AVERAGE AREA OF D.O. <5 mg/l OBSERVED IN LAKE NORMAN AROUND MARSHALL STATION DURING SEPTEMBER 1968-1971 INCL.

OCONEE NUCLEAR STATION

EXPECTED NORMAL AREAS OF D.O. < 5 mg/l PRODUCED IN LAKE KEOWEE BY OCONEE NUCLEAR STATION

2-23-72

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