

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

DATE OF DOCUMENT
 Feb. 24, 1972

DATE RECEIVED
 Mar. 2, 1972

NO. 1252
 OTHER:

TO: Mr. Howard D. Zeller

LTR. MEMO: REPORT: OTHER:
 X
 ORIG.: CC: OTHER:
 1
 ACTION NECESSARY CONCURRENCE DATE ANSWERED:
 NO ACTION NECESSARY COMMENT BY:

CLASSIF.: U POST OFFICE REG. NO:

FILE CODE: 50-269 50-270 50-287 (ENVIRO FILE)

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

REFERRED TO	DATE	RECEIVED BY	DA
Dicker w/4 cys for ACTION	3-10-72		

ENCLOSURES:
 Drawing EO-1100-23 entitled Extreme Conditions...
 Drawing EO-1100-24 entitled Average Conditions...
 (1 cy ea encl rec'd)

DISTRIBUTION:
 Reg File Cy (3)
 AEC PDR (3)
 Muller
 Schwencer

REMARKS:
 1 CY LOCAL PDR WALHALLS, S.C.

DO NOT REMOVE
 ACKNOWLEDGED
 1252 DT.

DUKE POWER COMPANY

GENERAL OFFICES

422 SOUTH CHURCH STREET

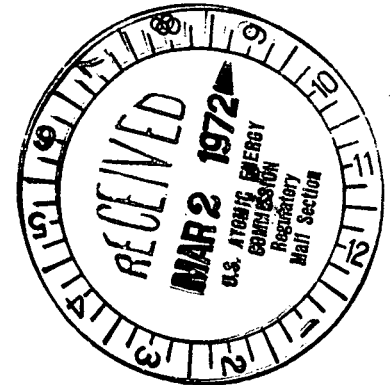
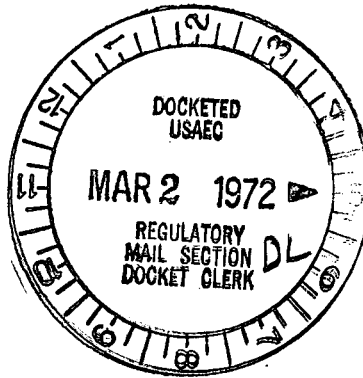
CHARLOTTE, N. C. 28201

P. O. BOX 2178

TELEPHONE: AREA 704
374-401150-269
50-270
50-287

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

Mr Howard D Zeller
Page 2
February 24, 1972

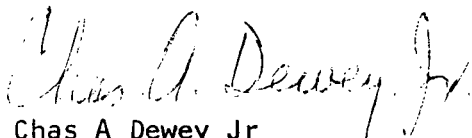
and talent failed to produce better predictive methods. We do not feel that present predictive methods can distinguish between average and extreme meteorological and lake drawdown conditions. Our predictions, however, we believe are conservative since,

- 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,

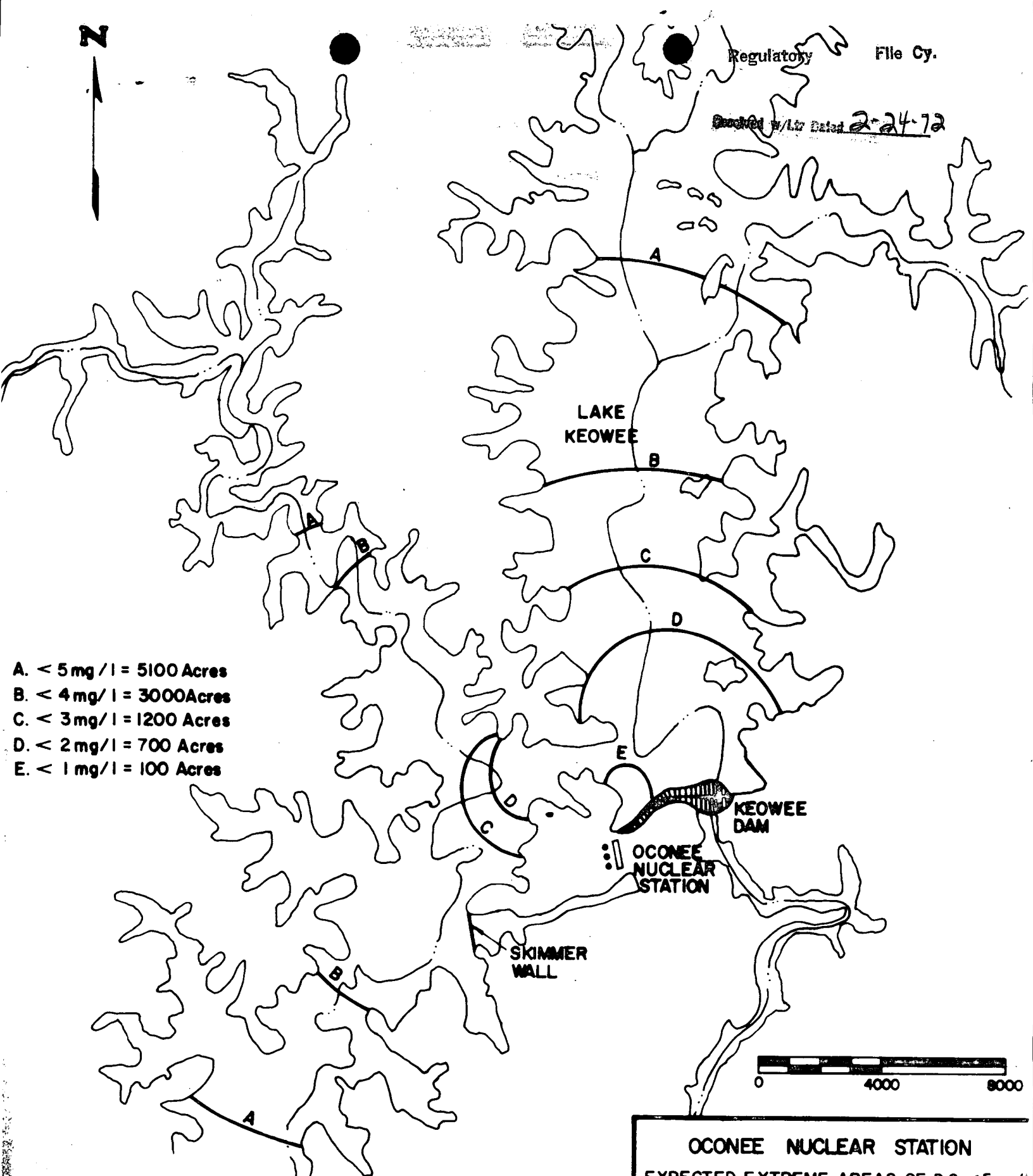


Chas A Dewey Jr
Principal Environmental Engineer

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

Checked w/ Ltr Dated 2-24-72



- 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. < 5mg/l OCCURRING
 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



Regulatory

File Cy.

Received w/lt Dated 2-24-72

LAKE KEOWEE

A

B

C

D

E

KEOWEE DAM

OCONEE NUCLEAR STATION

SKIMMER WALL



- 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