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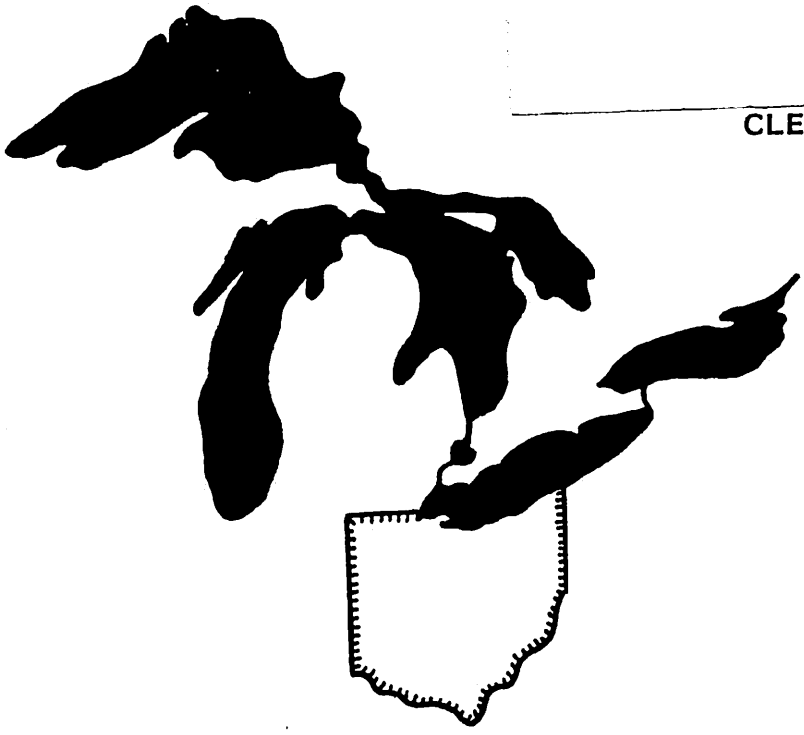

CLEAR TECHNICAL REPORT NO. 297

A Bathymetric Survey of O'Shaughnessy Reservoir

Prepared by

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Prepared for

The City of Columbus, Ohio

THE OHIO STATE UNIVERSITY
CENTER FOR LAKE ERIE AREA RESEARCH
COLUMBUS, OHIO

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By

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INTRODUCTION

O'Shaughnessy Reservoir is located on the Scioto River 16 miles north of Columbus, and operated as a water-supply reservoir for the city. The dam, completed in the fall of 1925, is a concrete masonry structure of the gravity overflow type 1,750 feet long. The spillway crest is at elevation 845 feet above sea level and is 68 feet above the rock formation. The surface area of the impounded water at elevation 845 is 829 acres. In May 1945, flashboards were added bringing the surface elevation to 848.0 feet. The average width of the reservoir is 0.19 miles and the length is 7.3 miles. The watershed is predominantly agricultural, covering 987 square miles in parts of Union, Delaware, Marion, Crawford, Hardin, Auglaize and Logan Counties.

Prior to the addition of flashboards in 1945, detailed sedimentation surveys had been completed in 1934 and 1942. The addition of the flashboards increased the capacity by approximately 2,450 acre-feet and about compensated for that lost to sedimentation up to that date. Sedimentation surveys were also conducted in 1951 and 1964.

At the request of Richard C. Lorenz of the City of Columbus Water Research Laboratory, a bathymetric survey along 5 transects or sections of the reservoir was completed on 25 and 26 November 1985.

Methods

The survey was conducted from a 12-ft. aluminum rowboat with a small outboard motor by Richard C. Lorenz, Noel R. McGill, and Dr. Jeffrey M. Reutter on 25 and 26 November 1985. Sections 5, 18, 33, 43 and 56 were surveyed. The stakes marking the shoreline ends of the sections from previous surveys could not be located. Consequently, following careful inspection of previous records and maps and a visual inspection of the present shoreline, the location of the 5 transects in question was estimated. Mr. Lorenz marked either end of each section by driving a 2-ft. metal rod into the ground, posting a painted stake, and referencing the position to permanent landmarks.

A 1/8 inch metal cable, marked at 50-ft. intervals, was stretched between the stakes on each section. Floats were attached to the cable at 100-ft. intervals to hold the cable at the surface to assure an accurate measurement of the distance across the reservoir. A Raytheon Recording Fathometer with a 12-volt battery was then used to obtain a visual depiction of the bottom as the boat ran the length of the section at a constant speed. Distances from west to east at 100-ft. intervals were recorded on the printout. A calibrated sounding line and a 6-ft sounding rod were then used at a maximum of 50-ft. intervals to accurately verify depths along each section.

RESULTS AND DISCUSSION

Tables 1-5 contain the results of the depth measurements on each section. These data are corrected to a pool elevation of 848.0 feet. This required a reduction in depth of 0.1 feet on Section 5, 0.1 feet on Section 18, 0.3 feet on Section 33, 0.5 feet on Section 43, and 0.6 feet on Section 56. The increasing size of the correction factor as time passed was caused by extremely heavy rains during our operation on 26 November.

Figures 1-5 show the actual fathometer trace along each transect with actual sounded depth measurements added. With the exception of Sections 43 and 56, these data points were also plotted on the original section cross-sections and returned to Mr. Lorenz.

Data recorded for Sections 43 and 56 and presented in Tables 4 and 5 and Figures 4 and 5 indicate a high possibility that our estimates of the sections' locations were in error. Based on our measurement of the sections' lengths at 1,119 feet and 643 feet, respectively, and the various depth measurements, it appears that the sections we surveyed were probably somewhere between the original Sections 43-44 and 55-56. As a result, these data were not plotted on the original cross-sections for Sections 43 and 56.

TABLE 1
DEPTHS* AT SPECIFIED DISTANCES FROM THE
WEST SHORELINE OF SECTION 5 AT O'SHAUGHNESSY RESERVOIR
25 NOVEMBER 1985

Distance (Ft) From West Shore	Depth (Ft.)	Bottom Elevation
25	2.9	845.1
50	6.4	841.6
75	9.8	838.2
100	12.8	835.2
150	16.8	831.2
200	20.5	827.5
250	26.8	821.2
300	46.4	801.6
350	48.6	799.4
400	48.7	799.3
450	48.2	799.8
500	47.9	800.1
550	47.8	800.2
600	43.8	804.2
650	42.3	805.7
700	39.0	809.0
750	32.9	815.1
800	28.2	819.8
850	24.1	823.9
900	20.8	827.2
950	18.7	829.3
1000	16.8	831.2
1050	16.6	831.4
1100	16.0	832.0
1110	15.6	832.4
1120	14.9	833.1
1130	14.1	833.9
1150	12.0	836.0
1190	5.3	842.7
1200	4.1	843.9
1210	3.5	844.5
1220	2.8	845.2
1230	1.9	846.1
1249 East Shoreline		

* Corrected to a reservoir elevation of 848.0 feet.

TABLE 2
DEPTHS* AT SPECIFIED DISTANCES FROM THE
WEST SHORELINE OF SECTION 18 AT O'SHAUGHNESSY RESERVOIR
26 NOVEMBER 1985

Distance (Ft) From West Shore	Depth (Ft.)	Bottom Elevation
12	1.7	846.3
25	4.4	843.6
50	7.5	840.5
75	10.1	837.9
100	13.9	834.1
150	25.2	822.8
200	31.4	816.6
250	34.6	813.4
300	34.6	813.4
350	36.7	811.3
400	38.1	809.9
450	38.6	809.4
500	39.0	809.0
550	38.6	809.4
600	36.8	811.2
650	30.1	817.9
700	23.7	824.3
750	19.3	828.7
800	17.3	830.7
850	16.1	831.9
900	15.1	832.9
950	14.0	834.0
1000	11.4	836.6
1050	7.8	840.2
1100	4.7	843.3
1125	3.4	844.6
1150	0.8	847.2
1155 East Shoreline		

*Corrected to a reservoir elevation of 848.0 feet.

TABLE 3
DEPTHS* AT SPECIFIED DISTANCES FROM THE
WEST SHORELINE OF SECTION 33 AT O'SHAUGHNESSY RESERVOIR
26 NOVEMBER 1985

Distance (Ft) From West Shore	Depth (Ft.)	Bottom Elevation
12	0.9	847.1
25	2.3	845.7
50	5.0	843.0
75	7.1	840.9
100	11.7	836.3
150	16.2	831.8
200	18.0	830.0
250	19.5	828.5
300	21.4	826.6
350	23.2	824.8
400	23.8	824.2
450	23.9	824.1
500	23.8	824.2
550	23.3	824.7
600	22.4	825.6
650	21.1	826.9
700	19.7	828.3
750	19.0	829.0
800	18.2	829.8
850	17.0	831.0
900	15.1	832.9
950	13.2	834.8
1000	11.9	836.1
1050	10.1	837.9
1100	7.1	840.9
1150	1.7	846.3
1170	0.5	847.5
1177 East Shoreline		

* Corrected for a reservoir elevation of 848.0 feet.

TABLE 4
DEPTHS* AT SPECIFIED DISTANCES FROM THE
WEST SHORELINE OF SECTION 43 AT O'SHAUGHNESSY RESERVOIR
26 NOVEMBER 1985

Distance (Ft) From West Shore	Depth (Ft.)	Bottom Elevation
10	1.1	846.9
25	3.0	845.0
50	4.2	843.8
75	5.1	842.9
100	5.8	842.2
150	6.6	841.4
200	7.1	840.9
250	7.4	840.6
300	7.6	840.4
350	7.8	840.2
400	8.0	840.0
450	8.4	839.6
500	8.6	839.4
550	9.0	839.0
600	9.5	838.5
650	9.9	838.1
700	10.5	837.5
750	11.3	836.7
800	12.3	835.7
850	13.0	835.0
900	13.4	834.6
950	14.0	834.0
1000	14.0	834.0
1050	14.0	834.0
1060	13.8	834.2
1070	13.6	834.4
1075	13.4	834.6
1080	13.0	835.0
1090	7.9	840.1
1100	4.0	844.0
1110	1.2	846.8
1119 East Shoreline		

* Corrected for a reservoir elevation of 848.0 feet.

TABLE 5
DEPTHS* AT SPECIFIED DISTANCES FROM THE
WEST SHORELINE OF SECTION 56 AT O'SHAUGHNESSY RESERVOIR
26 NOVEMBER 1985

Distance (Ft) From West Shore	Depth (Ft.)	Bottom Elevation
10	2.7	845.3
12	3.1	844.9
25	5.9	842.1
50	6.0	842.0
75	6.0	842.0
100	6.1	841.9
150	6.1	841.9
200	6.2	841.8
250	6.2	841.8
300	6.4	841.6
350	7.1	840.9
400	8.4	839.6
450	9.1	838.9
500	9.3	838.7
550	9.1	838.9
600	7.6	840.4
610	6.5	841.5
620	4.4	843.6
630	2.4	845.6
640	0.4	847.6
643 East Shoreline		

* Corrected for a reservoir elevation of 848.0 feet.

Figure 1. Fathometer trace of Transect 5 at O'Shaughnessy Reservoir on 25 November 1985 with depths corrected to a surface elevation of 848.0 feet shown by a dotted line.

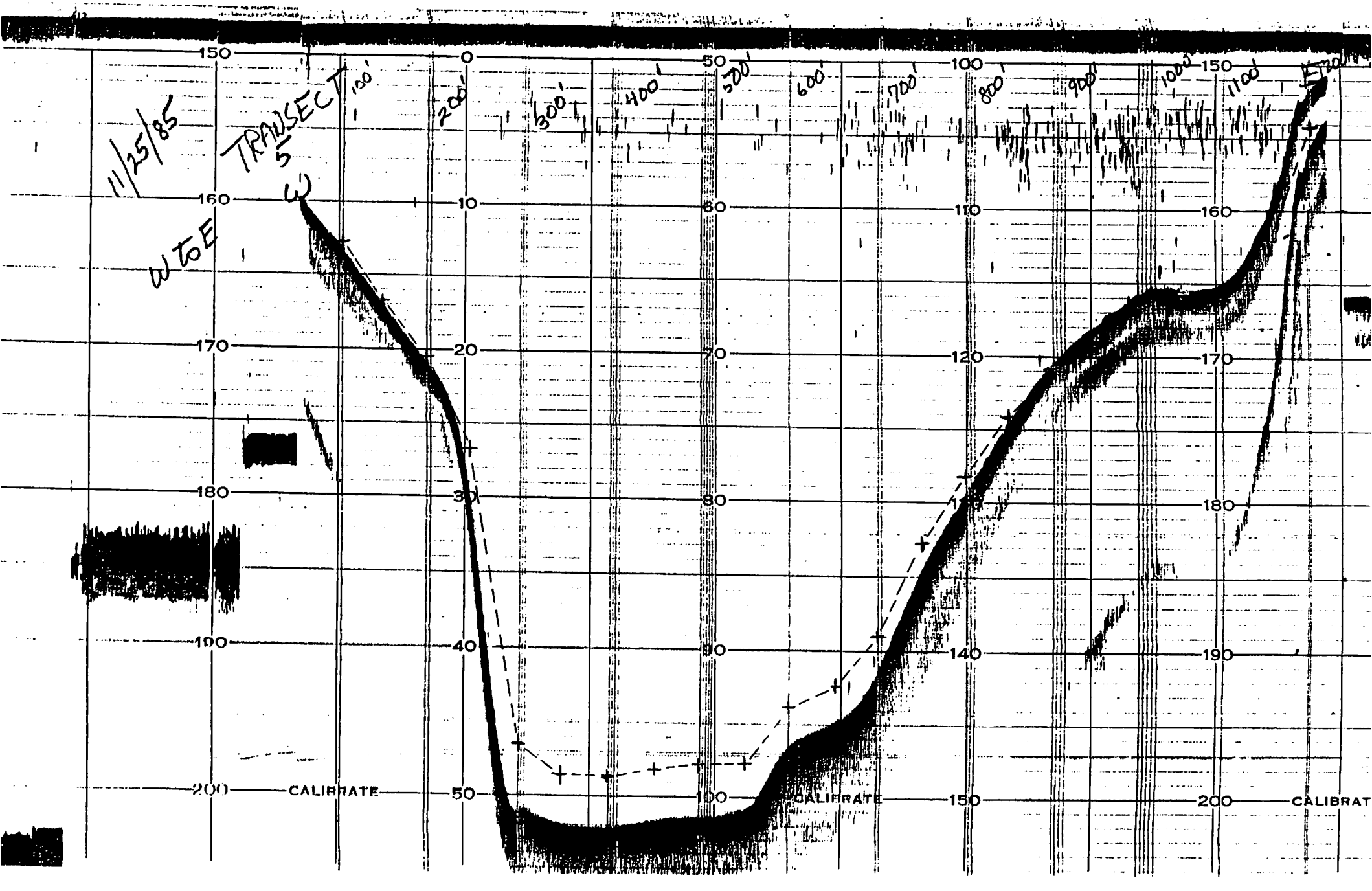

Figure 2. Fathometer trace of Transect 18 at O'Shaughnessy Reservoir on 26 November 1985 with depths corrected to a surface elevation of 848.0 feet shown by a dotted line.

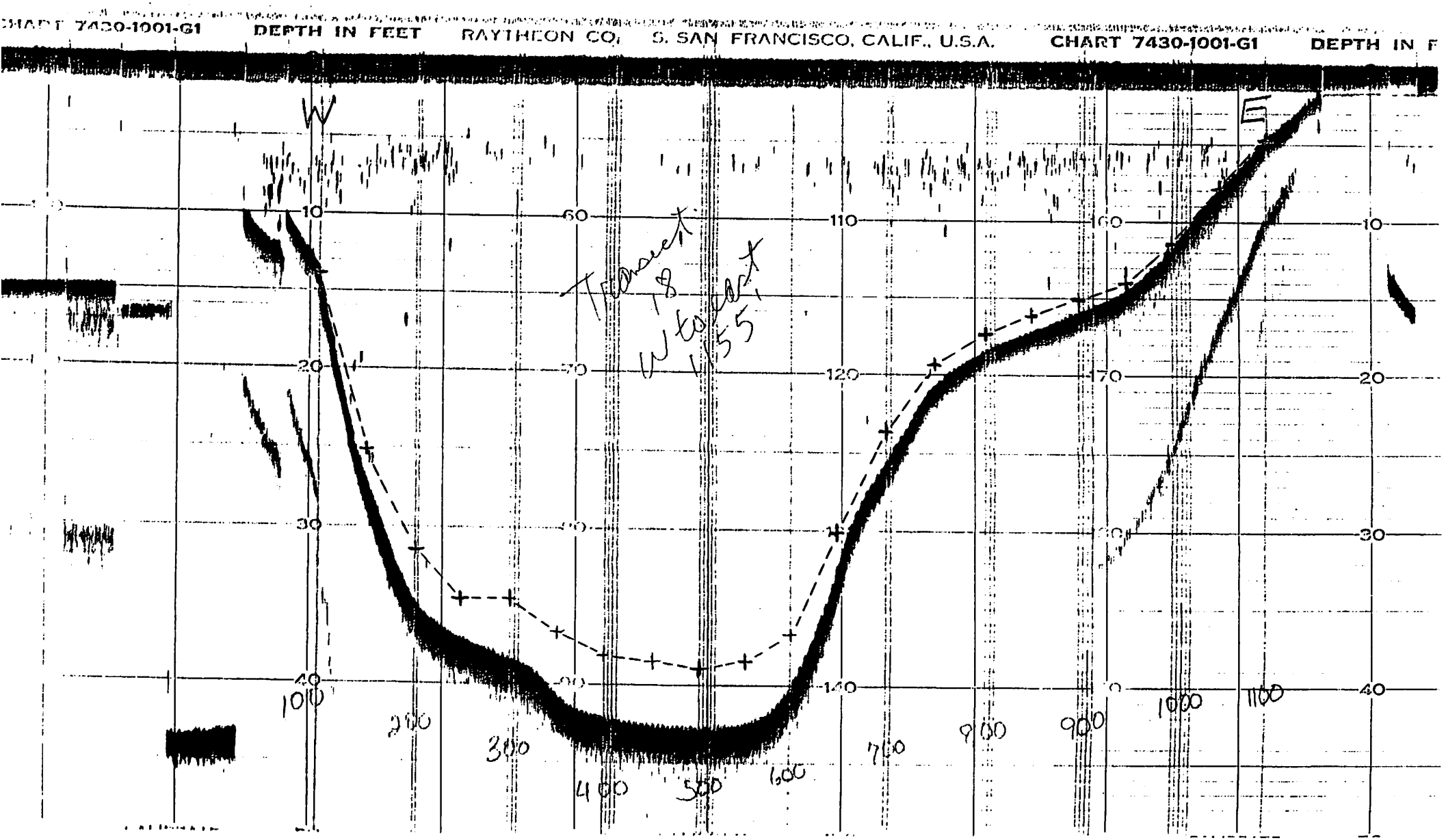

Figure 3. Fathometer trace of Transect 33 at O'Shaughnessy Reservoir on 26 November 1985 with depths corrected to a surface elevation of 848.0 feet shown by a dotted line.

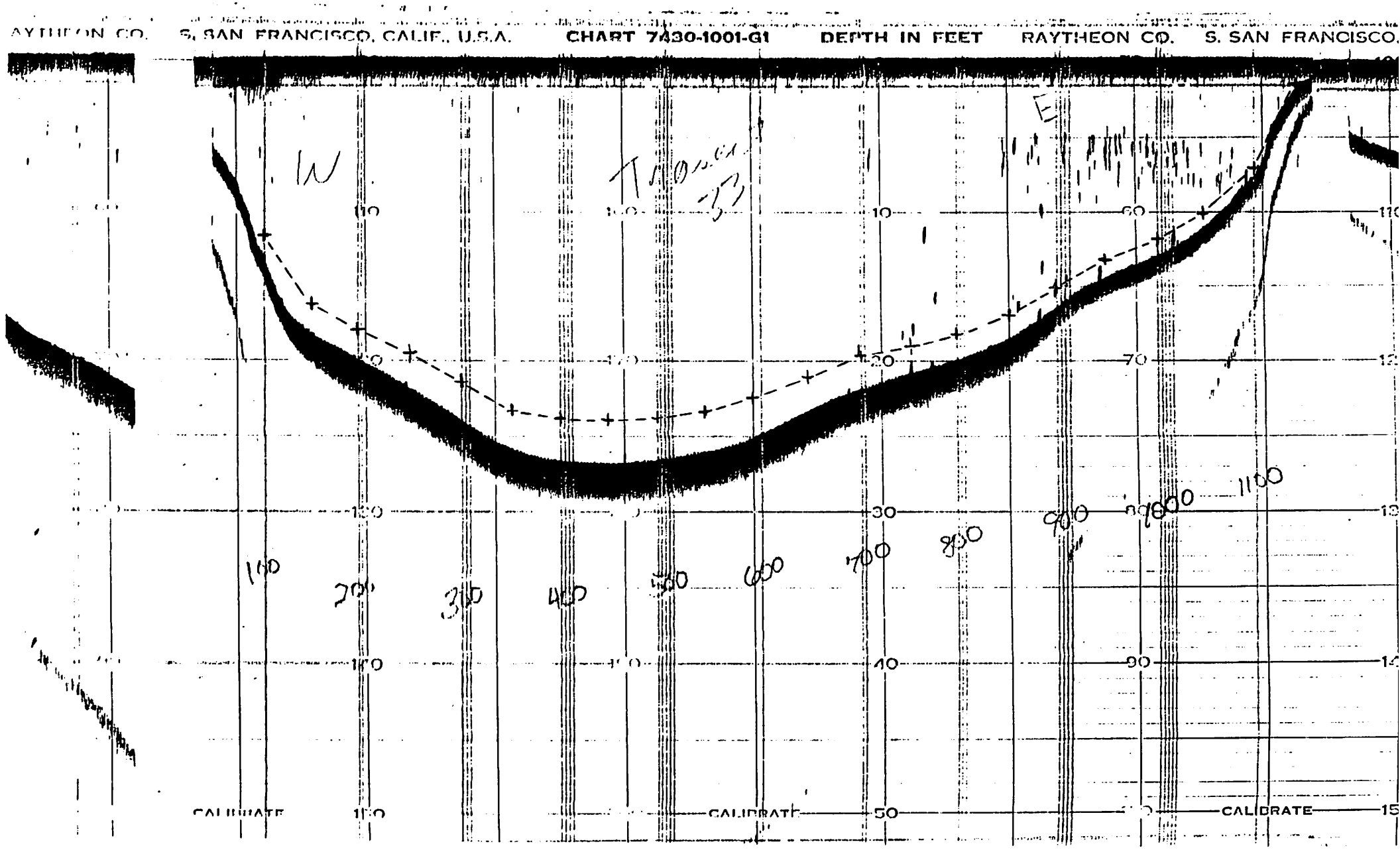

Figure 4. Fathometer trace of Transect 43 at O'Shaughnessy Reservoir on 26 November 1985 with depths corrected to a surface elevation of 848.0 feet shown by a dotted line.

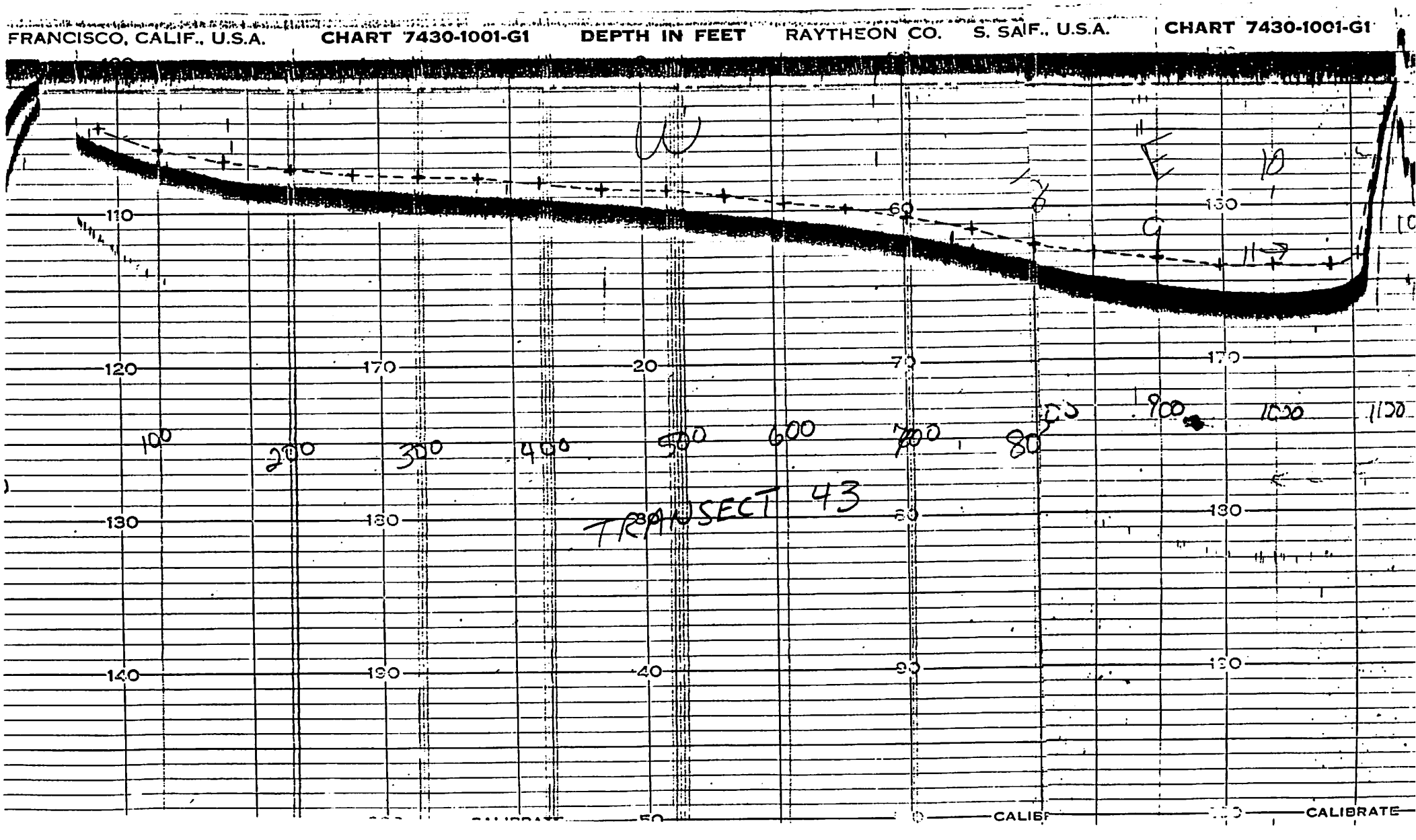

Figure 5. Fathometer trace of Transect 56 at O'Shaughnessy Reservoir on 26 November 1985 with depths corrected to a surface elevation of 848.0 feet shown by a dotted line.

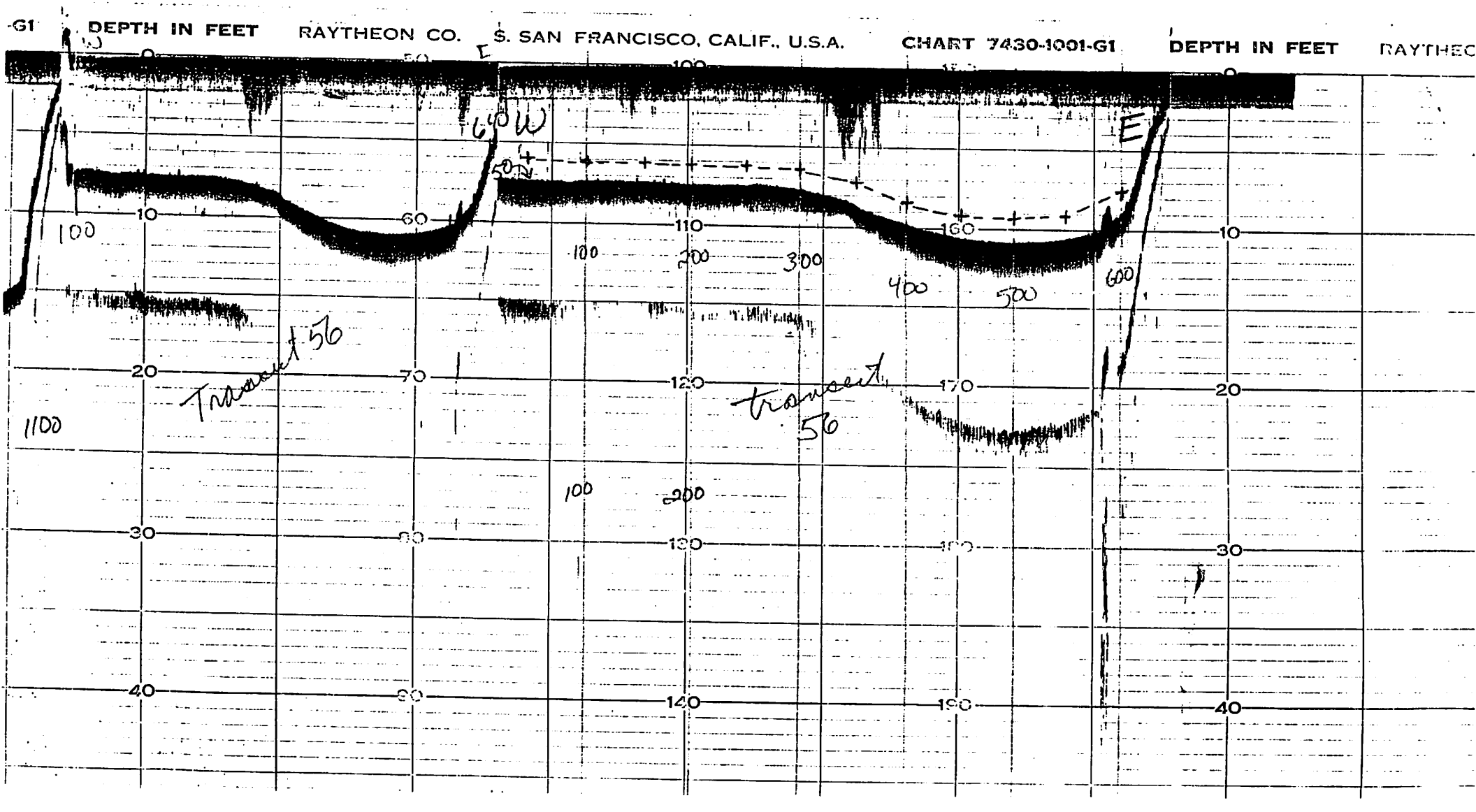

Figure 5. Fathometer trace of Transect 56 at O'Shaughnessy Reservoir on 26 November 1985 with depths corrected to a surface elevation of 848.0 feet shown by a dotted line.