PEACH BOTTOM ATOMIC POWER STATION

MONTHLY REPORT NO. 76

for

OCTOBER 1979

THERMAL AND BIOLOGICAL

MONITORING PROGRAMS

FOR

UNITS NO. 2 AND 3

PHILADELPHIA ELECTRIC COMPANY

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MONTHLY REPORT NO. 76 FOR OCTOBER, 1979
THERMAL AND BIOLOGICAL MONITORING PROGRAMS
PEACH BOTTOM ATOMIC POWER STATION
UNITS NO. 2 & 3

The operation of PBAPS during the month of October, 1979 was well within all applicable thermal criteria. The monthly mean delta T temperature (672 hourly readings) for the state line minus S2 location was .27°F higher than the mean of the preoperational experience. The 5°F delta T above ambient criteria at the state line was not exceeded on an hourly basis due to plant operation.

The daily river flows as measured at Holtwood Hydro-electric Station and the daily generation at PBAPS in thermal megawatts for the reporting period are presented in Table 1. Table 2 summarizes the hourly Conowingo Pond temperatures and Table 3 shows the impact hours above October confidence limits. Figure 1 shows the instrument and survey locations.

Figures 2, 3, 4, and 5 are isotherm plots, which include three (3) horizontal sections of boat surveys made during the October recording period. Boat survey information is tabulated in Table 4. Surveys for this period were started at the north end of Conowingo Pond. The delta T at the state line indicated on the isotherms is calculated by subtracting the Holtwood Dam temperature and the hourly Confidence Limit (applicable to the mid-survey time) from the state line temperature. This delta T can be interpreted as being caused by PBAPS since ambient hourly variations at the state line have been considered.

Although the isotherm plots do not cover the entire reporting period on a daily, hour by hour basis and cannot be used as a continuous indication of temperature variation, they do represent a fair treatment of typical plume characteristics. In addition, they may also be used as an empirical tool in estimating probable plume patterns in advance of certain natural and plant operating conditions.

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TABLE 1

HOLTWOOD DAILY FLOWS(CFS) AND DAILY THERMAL MEGAWATTS- OCT 1979

OBS	YEAR	MONTH	DAY	HW_FLOW	MW_THERM
1	79	10	1	37400	3287
2	79	10	2	53800	3288
3	79	10	3	46400	3290
4	79	10	4	60400	3291
5	79	10	5	76300	3292
6	79	10	6	81800	3284
7	79	10	7	108000	3285
8	79	10	8	114100	3283
9	79	10	9	104900	3271
10	79	10	10	84200	3283
11	79	10	11	70400	3274
12	79	10	12	61000	3172
13	79	10	13	54000	1874
14	79	10	14	47800	2615
15	79	10	15	42800	3147
16	79	10	16	38900	3283
17	79	10	17	35400	3291
18	79	10	18	32400	3286
19	79	10	19	29800	3272
20	79	10	20	27400	3281
21	79	10	21	26000	3285
22	79	10	22	25100	3283
23	79	10	23	22500	3285
24	79	10	24	23600	3279
25	79	10	25	24600	3282
26	79	10	26	24200	3290
27	79	10	27	23700	3288
28	79	10	28	23300	3278
29	79	10	29	23800	3286
30	79	10	30	23400	3274
31	79	10	31	22500	3262

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SUMMARY OF HOURLY CONOWINGO POND WATER TEMPERATURES OCT,1979

VARIABLE	N	MEAN	STANDARD DEVIATION	MINIMUM VALUE	MAXIMUM VALUE
HW_FLOW	744	47416.13	27337.50	22500.00	114100.00
MW_THERM	744	3207.68	271.84	1874.00	3292.00
S2	672	13.52	2.31	10.10	19.70
S2A	672	13.77	2.21	10.30	19.60
S2S	672	13.52	2.31	10.10	19.70
S13	685	13.98	2.29	11.00	19.50
S13A	718	14.56	2.65	11.10	21.30
S13S	718	14.27	2.61	11.00	21.30
S30	736	13.93	2.72	10.20	19.60
S31	11	24.83	0.11	24.70	25.00
S32	737	19.42	2.63	13.90	24.60
D13_2	672	0.42	0.57	-1.50	2.20
D2_2A	672	-0.25	0.17	-0.80	0.20
D13_13A	685	-0.30	0.20	-0.80	0.20
D31_30	11	5.60	0.13	5.40	5.80
D32_30	732	5.48	1.09	2.60	7.80
D31_32	11	1.75	0.10	1.60	1.90
DS13SS2S	672	0.42	0.57	-1.50	2.20

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Definitions are as follows:

N - Number of observations during the month
S - Thermograph Station (e.g., S2 is thermograph Station 2)

(TEMPERATURES ARE IN DEGREES CENTIGRADE)

D - Difference in temperature of the two stations (e.g. D13-2 is the temperature at Station 13 minus the temperature at Station 2, in degrees Centigrade)
HW FLOW - Holtwood Flow in CFS
MW THERM- Total Thermal Output of PBAPS in Megawatts
S13S - Thermograph S13A is substituted when S13 is missing or spurious readings are observed
S2S - Thermograph S2A is substituted when S2 is missing or spurious readings are observed.

TABLE 3

PBAPS IMPACT HOURS ABOVE OCTOBER CONFIDENCE LIMITS

OBS	YEAR	MONTH	DAY	HOUR	S2T	S13T	D13_2	HW_FLOW	MW_THERM	STATUS	CL13_2	EX13_2	IMP13_2
1	73	10	6	21	19.9	21.8	1.9	15300	.	PRE_OP	1.7	0.2	0.36
2	73	10	6	22	20.0	21.7	1.7	15300	.	PRE_OP	1.6	0.1	0.18
3	73	10	25	11	14.5	16.2	1.7	8500	.	PRE_OP	1.6	0.1	0.18
4	73	10	25	13	14.8	16.8	2.0	8500	.	PRE_OP	1.7	0.3	0.54

There were no hourly exceptions in October, 1979.

Definitions:

S = Thermograph
D = Delta T (C°)
Hw Flow = Holtwood Daily River Flow (cfs)
MW Therm = Daily Thermal Generation of PBAPS (megawatts)
CL = Confidence Limit (C°)
EX = Exceptions (C°)
IMP = Impact (F°)

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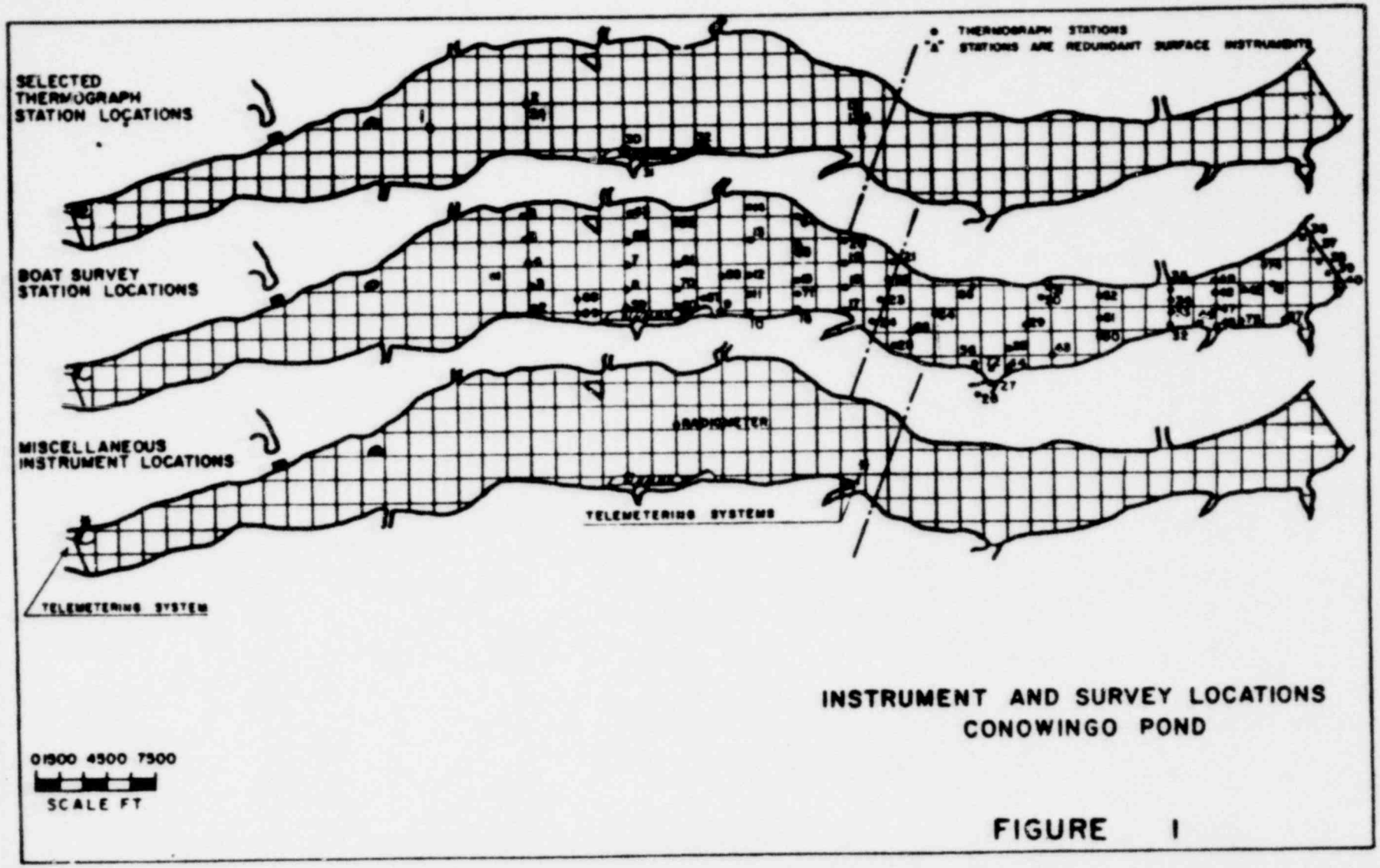
TABLE 4

BOAT SURVEY INFORMATION

SURVEY DATE	10/4/79	10/12/79	10/23/79	10/31/79
TIME:				
Survey Start (EST)	0745	1100	0740	0830
State Line (EST)	0906	1215	1017	1020
Survey Finish (EST)	1045	1400	1210	1130
HYDRAULIC DATA:				
Pond Elevation Start (Ft.)	107.50	106.71	103.77	108.80
Pond Elevation Finish (Ft.)	107.65	81.00	103.24	108.23
Natural Flow (24 hour ave., CFS)	57,900	58,900	23,400	21,100
Conowingo Inflow (24 hrs. ave., CFS)	51,525	59,775	25,350	22,875
Conowingo Dam Draft (24 hr. ave., CFS)	54,900	69,000	24,025	22,350
PBAPS Power Output:				
Unit 2: Thermal (MW)	3291	3172	3285	3262
Electrical (MW)	1063	1024	1068	1060
Unit 3: Thermal (MW)	0	0	0	0
Electrical (MW)	-13	-13	-10	-11
METEOROLOGICAL DATA:				
Time (EST)	0750	1105	0800	0850
Air Temperature (°F)	65	56	68	56
Relative Humidity (%)	75	82	90	60
Precipitation (24 hour total, in)	0	0	0.72	0
Wind Speed (mph)	2	5	10	0-2
Cloud Over	Clear	Full	Overcast	Sunny
Location:	7	7	7	7
Wind Direction	E	NW	SSE	NE
WATER TEMPERATURE (THERMOGRAPH)				
Daily Mean: Sta. #2, °C, (°F)	18.6(65.5)	11.8(53.2)	15.1(59.2)	10.7(51.3)
Mid Survey: Sta. #2, °C, (°F)	18.8(65.8)	12.0(53.6)	15.2(59.4)	10.4(50.7)
WATER TEMPERATURE (SURVEY)				
PBAPS Discharge °C, (°F)	23.3(73.9)	16.2(61.2)	22.2(72.0)	15.4(59.7)
Intake °C, (°F)	18.9(66.0)	11.6(52.9)	15.2(59.4)	11.3(52.3)
Δ T °C, (°F)	4.4(7.9)	4.6(8.3)	7.0(12.6)	4.1(7.4)
Pond Surface Max. °C, (°F)	23.5(74.3)	16.3(61.3)	22.1(71.8)	15.9(60.6)
Min. °C, (°F)	18.9(66.0)	11.6(52.9)	14.5(58.1)	10.3(50.5)
Pond Bottom Max. °C, (°F)	23.3(73.9)	15.7(60.3)	22.1(71.8)	15.2(59.4)
Min. °C, (°F)	18.7(65.7)	11.5(52.7)	13.8(56.8)	10.2(50.4)
No. of C.W. Pumps Operating	4	4	4	4
No. of Cooling Towers Operating	2	3	2	2

POOR ORIGINAL



INSTRUMENT AND SURVEY LOCATIONS
CONOWINGO POND

FIGURE 1

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POOR ORIGINAL

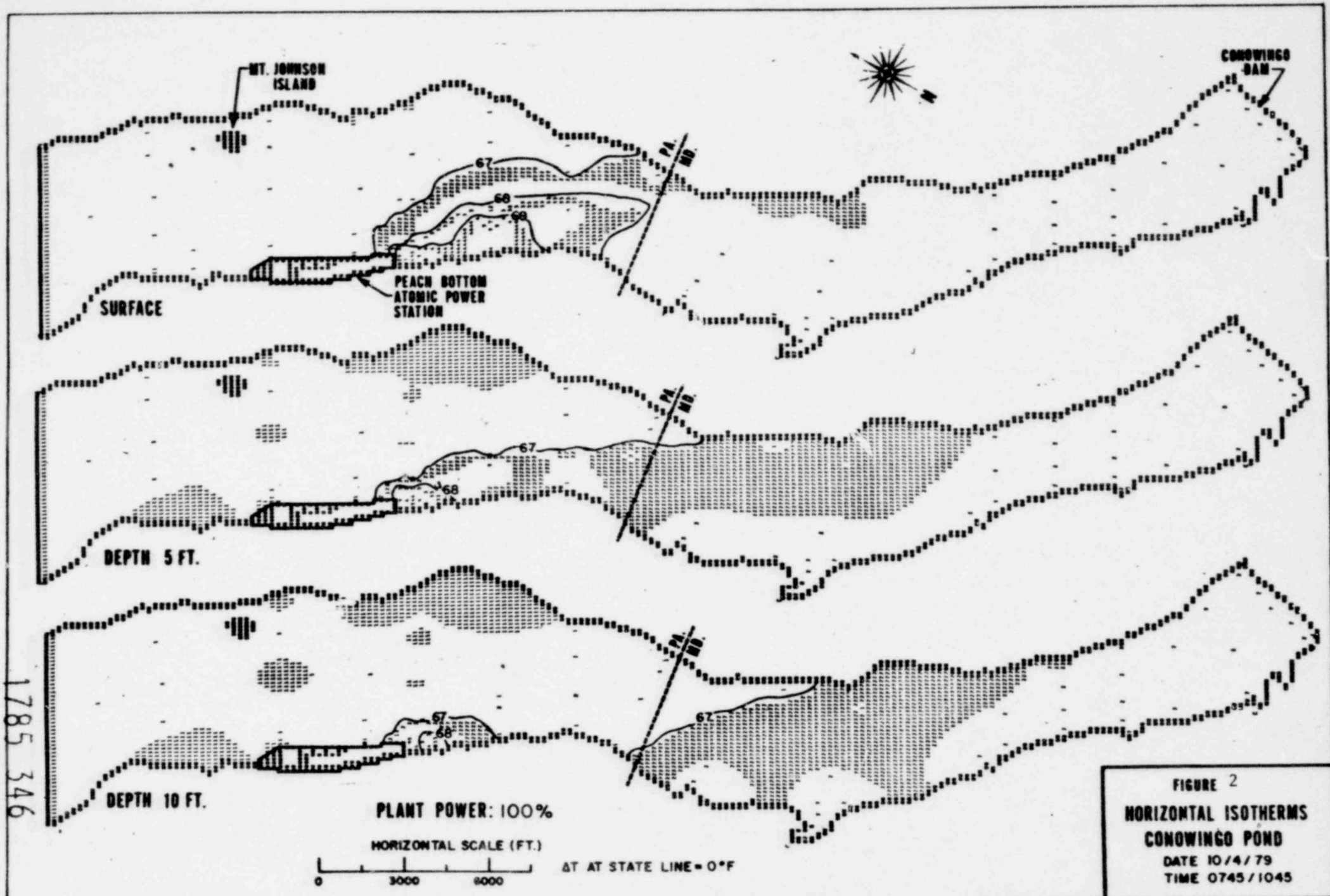

FIGURE 2

HORIZONTAL ISOTHERMS
CONOWINGO POND
DATE 10/4/79
TIME 0745/1045

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POOR ORIGINAL

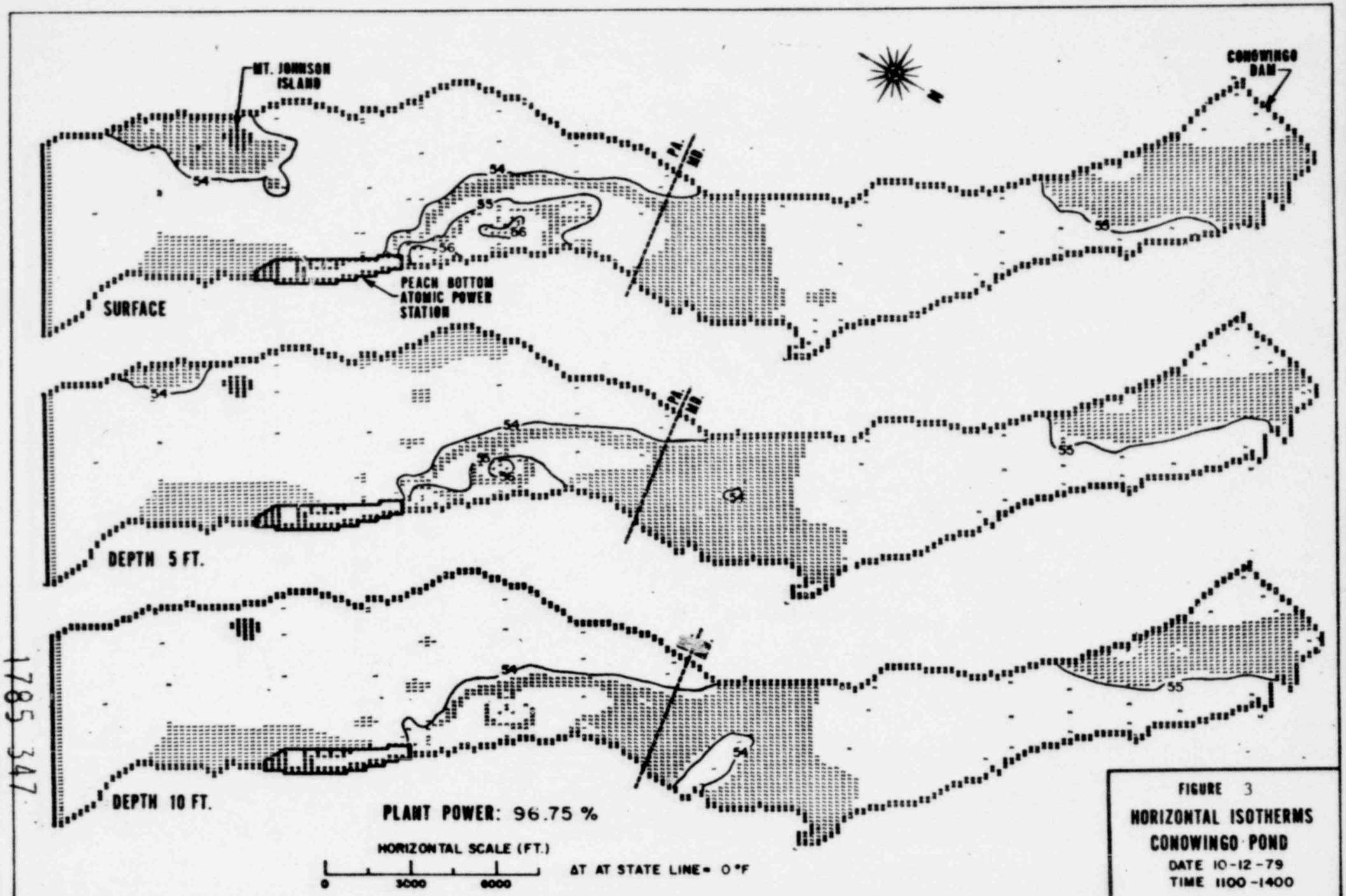

FIGURE 3
HORIZONTAL ISOTHERMS
CONOWINGO POND
DATE 10-12-79
TIME 1100-1400

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POOR ORIGINAL

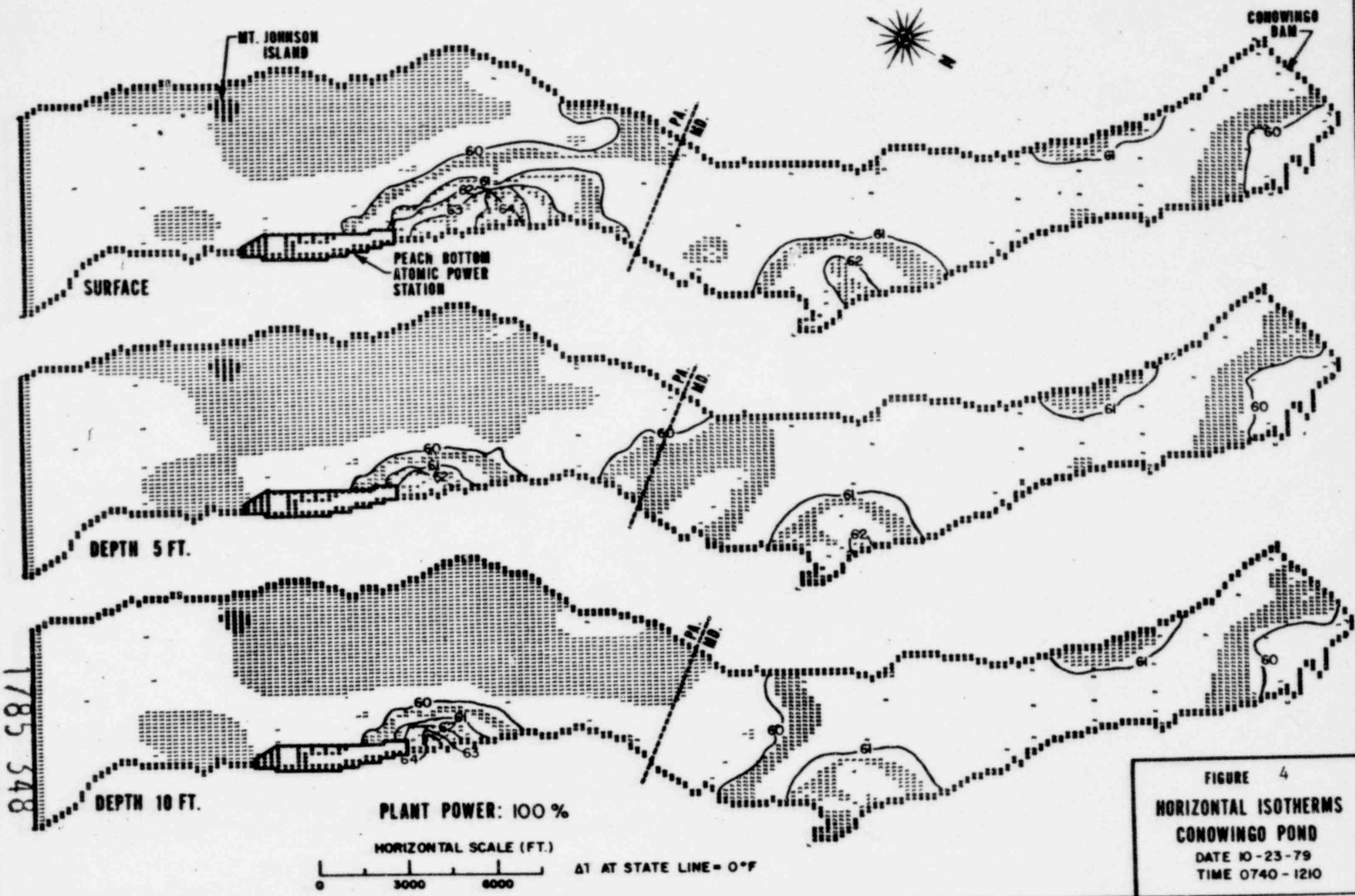

FIGURE 4

HORIZONTAL ISOTHERMS
CONOWINGO POND
DATE 10-23-79
TIME 0740 - 1210

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POOR ORIGINAL

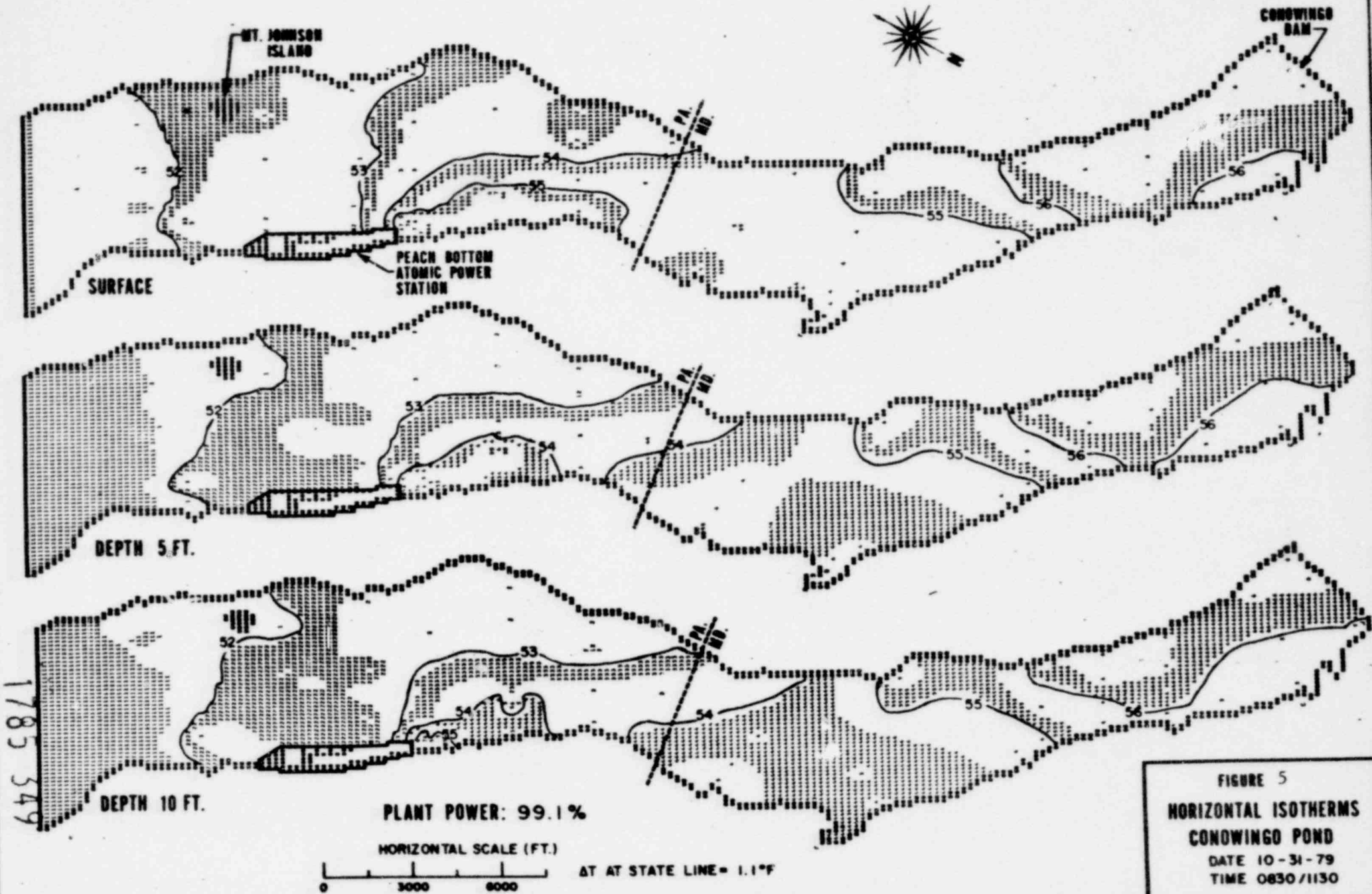

FIGURE 5

HORIZONTAL ISOTHERMS
CONOWINGO POND

DATE 10-31-79
TIME 0830/1130

1983 549