

Environmental Surveillance Report

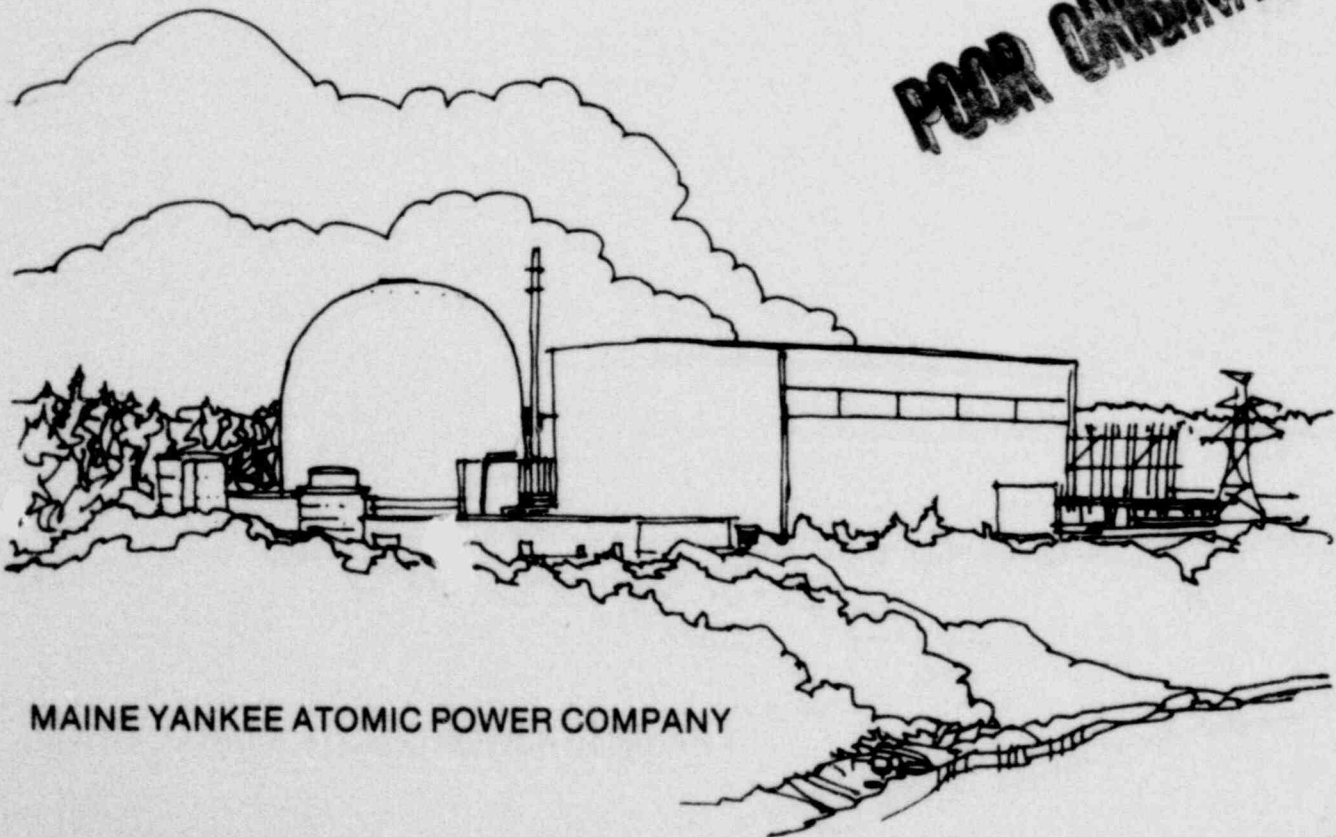
OPERATING LICENSE NO. DPR-36

DOCKET NO. 50-309

No. 12

JULY 1, 1978 through JUNE 30, 1979

POOR ORIGINAL



MAINE YANKEE ATOMIC POWER COMPANY

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MAINE YANKEE ATOMIC POWER COMPANY
ENVIRONMENTAL SURVEILLANCE REPORT

REPORT NO. 12

OPERATING LICENSE NO. DPR-36

DOCKET NO. 50-309

REPORT PERIOD: 1 July 1978 - 30 June 1979

Maine Yankee Atomic Power Company
Edison Drive
Augusta, Maine
04336

September 1979

364242

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Introduction

This is the twelfth report, dating from September 15, 1972, on the status and results of the environmental surveillance and study programs related to the operation of the Maine Yankee Nuclear Generating Station, Wiscasset, Maine. The study programs in this report are designed to determine the major effects of plant operation on the ecology of the Montsweag Bay estuarine system. This report is submitted to the United States Nuclear Regulatory Commission (NRC), Directorate of Licensing, in accordance with Section 1.0 of Appendix B - Technical Specifications to Operating License No. DPR-36, Docket No. 50-309. Results of the environmental radiological surveillance program are reported separately at the end of each calendar year.

In January, 1979 the NRC determined that, based on the study results from 1969 - 1977, the operation of Maine Yankee had no demonstrable adverse impact to the aquatic environment and the scope of the tech spec studies were reduced. This report addresses the remaining 'environmental' technical specifications - the LCO's (1.1 - 1.3), fish impingement (1.4), and water temperature (1.6) monitoring. Also, reports are submitted annually now (report year ending in June) instead of semiannually.

Maine Yankee was shut down for six weeks during the summer of 1978 (14 July to 27 August) for refueling, and from 15 March to 5 June 1979 to comply with the NRC shutdown order concerning the ability of certain plant piping systems to meet seismic design criteria. Extensive reanalyses confirmed that the piping systems do indeed satisfy the seismic design criteria.

EFFLUENT LIMITATIONS

Plant Cooling Water Thermal Limits

Specification 1.1 limits the effluent temperature measured at the diffuser forebay to a daily average of 108°F (42.2°C) and a maximum of 116°F (46.7°C). It also limits the cooling water temperature rise (ΔT) across the condenser to a daily average of 37°F (20.6°C) and a maximum of 46°F (25.6°C). The daily maximum and maximum daily average discharge temperatures and ΔT 's are shown by month in Table 1. Table 1 shows that the discharge temperature and ΔT limitations were not exceeded during this period.

Control of Montsweag Bay Water Temperature

Specification 1.2 limits the surface temperature within the mixing zone to a daily average of 77°F (25°C) and a maximum of 82°F (27.8°C) for not more than one hour during June, July and August and during the remaining months of the year the maximum temperature is limited to 77°F. This limitation is included as a Technical Specification solely as a condition of the Federal Water Pollution Control Act of 1972, as amended. These limitations were not exceeded during this reporting period.

Plant Cooling Water Systems Chemical Discharge Limits

Specification 1.3 simply requires that all chemical releases from the plant to be diluted by the plant cooling water effluent so as to be non-toxic to marine organisms in the estuary. The dilution ratio of cooling water discharge to the chemical release

discharge is on the order of 400:1. Thus chemical releases discharged into the cooling water effluent are highly diluted before entering the marine environment.

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Table 1. Maine Yankee (hourly) maximum and maximum daily average discharge temperature ($^{\circ}\text{F}$) and ΔT ($^{\circ}\text{F}$) January 1978 - June 1979.

1978	Discharge Temperature $^{\circ}\text{F}$		ΔT , $^{\circ}\text{F}$	
	Max.	Max Daily Avg.	Max.	Max Daily Avg.
January	68.1	65.8	34.0	31.5
February	65.5	62.1	34.7	31.5
March	69.1	66.2	39.1	30.3
April	76.7	73.4	32.9	31.9
May	92.8	87.3	31.5	30.7
June	95.0	86.5	32.4	29.2
July	100.3	93.2	31.8	27.0
August	80.8	-	16.2	-
September	90.4	80.0	32.2	24.1
October	87.2	83.2	33.3	31.7
November	89.6	81.6	36.9	32.4
December	74.5	71.4	40.8	35.0
1979				
January	74.3	70.8	43.2	34.0
February	71.4	66.6	41.4	34.0
March	74.8	71.3	39.1	36.9
April	Cold Shutdown			
May	Cold Shutdown			
June	97.3	93.5	31.7	30.6

IMPINGEMENT MONITORING

Introduction

The objective of this continuing study is to determine the numbers of fishes and macroinvertebrates impinged on Maine Yankee's circulating water system traveling screens in order to assess the effects of impingement on the affected aquatic populations of Montsweag Bay. This study began in November 1972.

Cooling water for the plant is drawn from Back River through an intake structure that is parallel to the shoreline at a rate of 27 m³/s. A U-shaped (cross-section) channel, 30-70 m wide, extends 180 m from the intake structure to the main channel of Montsweag Bay. The nearshore zone contiguous to the channel is extremely shallow at low tide. Intake velocities range from 0.2 to 0.8 m/s, depending on tidal stage, and are typically \geq 0.6 m/s near the bottom.

Each of the four 1-cm mesh traveling screens are rotated vertically past a jet water spray (ca. 90 psi) which dislodges debris and impinged organisms into a sluiceway. A prewash system was installed in June 1977 to reduce the stress associated with the screenwash spray. Six nozzles per traveling screen emit a wide-pattern spray (ca. 38 psi) that removes fishes from the screens before they are exposed to screenwash jets. The screenwash water containing debris and organisms empties into a shallow tank (3.6 x 1.2 x 0.7 m), where samples are collected. All animals, except for those collected during sampling, are returned to the bay via a

sluiceway. Under normal operating conditions the traveling screens are washed usually at two-hour intervals to minimize the duration of impingement, or whenever a head across the screens exceeds two inches of water. The screens are washed continuously, however, when large amounts of debris accumulate. Massive amounts of flotsam frequently occur in the bay during the fall under conditions of extreme high tides and strong winds.

Materials and Methods

In accordance with Specification 1.4, estimates of the type, size, and quantity of fish, hard-shelled crabs and lobsters were made daily by plant operators whenever the circulating water pumps were operating.

Impingement samples were collected weekly over a 24-hour period in order to minimize the effects of light and tide. All four traveling screens were rotated and cleaned to establish a starting time for the sampling period, which usually began at 0800 EST. The screenwash was sieved through a 0.6 cm woven mesh bag and all fish and macroinvertebrates collected at the end of the 24-hour period were identified, measured and the total weight of each taxon recorded. A random subsample is taken when necessary to expedite processing. The number of operating circulating water pumps and their valve positions were recorded for each sample.

Results and Discussion

The estimated number of fish and hard-shelled crabs impinged each day and the absolute totals for the weekly 24-hour impingement samples for July 1978 through June 1979 are shown in Table 2. No lobsters have been impinged on the traveling screens since the plant began operation.

The numbers of the principal fishes, two macroinvertebrates, and all fish species combined, impinged in a 24-hour period are shown by sampling date in Table 3. Maine Yankee was shut down for six weeks during the summer of 1978 (14 July to 27 August) for refueling, and from 15 March to 5 June 1979 to comply with the NRC-ordered shutdown because of the possibility that certain piping systems may not meet seismic design criteria (reanalysis proved this to be false). Impingement samples were also not collected during the first three weeks of November because of heavy trash loading on the screens. In 55, 24-hour impingement samples, 5787 fish (total weight 152 kg (336 lb)) of 22 species or species groups were impinged during 1978 and the first half of 1979. Four species -- rainbow smelt (19%), smooth flounder (14%), alewife (11%), and winter flounder (9%) -- and the stickleback group (30%) and the sculpins (7%) collectively made up 90% of the total catch. The four species listed comprised about 60% of the biomass impinged from January 1978 through June 1979.

Total fish impingement rates were highest during January due to the abundance of smooth flounder and rainbow smelt in 1978 and sticklebacks and smooth flounder in 1979 (Tables 3-5). Table 4 is included primarily to show the variability of the monthly sample means.

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For all fish species combined, monthly mean impingement rates ranged from 14.4 fish/hour in January to 0.7 fish/hour in July (Table 5). Monthly mean impingement rates of the principal fishes caught were generally ≤ 1 fish/hour from February to December.

As shown in Table 5, mean fish impingement rates were considerably less than 1977 impingement rates. Length-frequency distributions of fishes impinged remain unchanged from previous years' data.

Impingement of rock crabs (*Cancer irroratus*) and green crabs (*Carcinus maenas*) were lowest during February - March and highest in May (Table 3). The green crab comprised 84% of the total crab catch (761) in the 24-hour samples.

Impingement rates during 1978 were the lowest measured since the monitoring began in late 1972. The low number of fishes impinged at the intake screens depicts the overall decline in the abundance of fish populations in the estuary as evidenced in the estuarine fisheries studies.

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Table 2. Estimated number of fishes (F) and crabs (C) impinged daily at Maine Yankee and actual totals of weekly 24-hour screen samples (*italicized*), July 1978 - June 1979. Daily estimate derived by multiplying the estimated catch in a 2-hour sample by 12. NS = not sampled; * = no circulating water flow.

		1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31		
1978																																		
Jul	F	120	132	108	156	22	2220	432	96	252	84	636	15	NS	228																			
	C	96	144	120	48	25	36	348	60	24	12	204	6		216																			
Aug																																		
Sept	F	* 300	* 48	* 48	* 48	* 48	72	72	* 72	* 300	336	312	25	168	NS	504	72	96	228	118	NS	252	36	360	288	192	159	72	192	840				
	C	96	0	0	0	0	24	72	0	48	60	24	6	60	60	0	24	60	72	12	72	72	12	132	132	120	4	0	0	0	72			
Oct	F	612	900	120	144	*	48	336	240	240	156	144	672	396	300	312	216	70	NS	312	48	12	348	264	52	NS	660	0	84	48	144			
	C	36	120	4	72		24	72	60	60	60	19	0	60	60	60	84	25	NS	48	12	0	120	120	3	NS	24	24	0	24	24			
Nov	F	516	360	432	372	312	336	276	348	336	144	216	360	108	300	84	180	132	300	252	192	NS	300	216	0	48	216	96	85	492				
	C	24	24	24	12	12	0	0	0	0	0	108	0	36	84	36	36	0	24	36	72	0	36	216	0	36	168	36	0	24				
Dec	F	468	3648	1656	564	720	122	912	516	408	432	480	372	60	204	600	228	144	468	516	76	NS	816	1200	468	588	708	269	900	1056	1944	372		
	C	0	24	108	0	0	0	36	36	36	48	60	0	14	12	0	0	12	48	0	0	12	48	96	60	0	8	0	0	0	0			
1979																																		
Jan	F	816	924	452	NS	300	60	336	312	408	428	NS	120	158	564	456	108	730	NS	164	300	384	168	732	116	372	876	396	240	228	276	28		
	C	60	72	0	0	24	0	12	24	0	0	NS	24	36	12	24	0	10	NS	0	0	0	24	60	0	0	48	36	72	36	84	5		
Feb	F	168	180	180	144	264	204	11	NS	216	324	0	216	228	53	0	0	0	0	252	144	26	NS	120	0	168	132	60	42					
	C	24	24	24	0	96	24	0	NS	48	12	0	24	0	0	0	0	0	0	0	36	2	0	NS	0	0	0	24	0	0	0	0		
Mar	F	204	300	300	348	300	36	312	64	336	72	36	156	NS	46	6																		
	C	36	96	36	0	0	0	36	0	0	24	0	24	0	24	0																		
Apr	F																																	
	C																																	
May	F																																	
	C																																	
Jun	F	396	456	168	516	108	108	72	168	216	120	240	1200	56	624	288	456	240	252	324	75	180	120	192	120	252	192	58	600	612	972			
	C	96	156	108	108	108	60	60	168	96	72	240	720	22	120	84	396	144	24	252	58	132	252	228	84	72	216	132	84	240				

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Table 3 . Impingement (number individual/24 hours) of all fishes, principal fish species, and crabs at Maine Yankee, January 1978 - June 1979.

EENFI		MAINE YANKEE FISH IMPINGEMENT						
DATE	TOTAL FISH	STICKLE	SMOOTH FLOUNDER	WINTER FLOUNDER	SMELT	ALEWIFE	GREEN CRAB	ROCK CRAB
1/ 4/1978	184.	20.	35.	50.	15.	0.	29.	3.
1/10/1978	998.	10.	282.	15.	630.	0.	55.	5.
1/18/1978	136.	0.	44.	17.	55.	0.	17.	1.
1/24/1978	20.	0.	1.	2.	15.	0.	8.	2.
2/ 1/1978	19.	10.	1.	1.	3.	0.	0.	1.
2/ 8/1978	57.	0.	8.	4.	32.	0.	0.	1.
2/15/1978	24.	11.	1.	1.	3.	0.	0.	0.
2/21/1978	18.	11.	1.	1.	2.	0.	3.	0.
3/ 1/1978	42.	11.	2.	3.	22.	0.	0.	1.
3/ 7/1978	23.	0.	3.	2.	13.	0.	0.	0.
3/15/1978	59.	26.	2.	0.	24.	0.	0.	0.
3/22/1978	15.	0.	3.	0.	6.	0.	0.	0.
3/29/1978	24.	0.	7.	1.	11.	0.	0.	0.
4/ 5/1978	11.	0.	4.	1.	0.	0.	0.	0.
4/11/1978	38.	15.	0.	2.	0.	16.	0.	0.
4/19/1978	36.	9.	12.	6.	6.	0.	0.	2.
4/26/1978	69.	14.	2.	4.	4.	39.	4.	2.
5/ 3/1978	119.	0.	3.	76.	14.	1.	152.	32.
5/10/1978	115.	0.	2.	73.	10.	0.	76.	8.
5/17/1978	22.	13.	0.	3.	0.	0.	6.	1.
5/24/1978	21.	0.	9.	4.	0.	1.	20.	4.
5/30/1978	51.	30.	0.	3.	0.	5.	5.	1.
6/ 7/1978	21.	13.	0.	5.	0.	2.	22.	3.
6/14/1978	32.	5.	0.	2.	0.	7.	34.	4.
6/21/1978	22.	0.	0.	12.	3.	0.	7.	2.
6/28/1978	29.	12.	1.	1.	0.	0.	3.	6.
7/ 5/1978	22.	5.	0.	0.	0.	6.	25.	0.
7/12/1978	13.	4.	0.	1.	0.	3.	5.	3.
9/13/1978	23.	0.	3.	9.	0.	1.	3.	1.
9/20/1978	118.	0.	14.	17.	0.	82.	10.	2.
9/27/1978	139.	0.	20.	3.	3.	102.	3.	1.
10/ 3/1978	120.	19.	25.	22.	26.	7.	2.	5.
10/11/1978	149.	11.	22.	48.	7.	41.	14.	3.
10/18/1978	70.	13.	3.	9.	12.	31.	21.	3.
10/25/1978	52.	0.	2.	1.	9.	29.	1.	2.
11/ 1/1978	-----	-----	NO	COLLECTION	POSSIBLE	-----	-----	-----
11/ 8/1978	-----	-----	NO	COLLECTION	POSSIBLE	-----	-----	-----
11/14/1978	-----	-----	NO	COLLECTION	POSSIBLE	-----	-----	-----
11/21/1978	100.	14.	1.	3.	0.	69.	0.	0.
11/29/1978	85.	11.	0.	9.	18.	23.	0.	0.
12/ 6/1978	122.	9.	21.	7.	33.	7.	0.	0.
12/13/1978	60.	0.	5.	16.	16.	20.	11.	3.
12/20/1978	76.	25.	5.	3.	1.	28.	0.	0.
12/27/1978	269.	28.	72.	14.	26.	0.	6.	2.

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Table 3. (continued)

EENFI		MAINE YANKEE FISH IMPINGEMENT						
DATE	TOTAL FISH	STICKLE	SMOOTH FLOUNDER	WINTER FLOUNDER	SMELT	ALEWIFE	GREEN CRAB	ROCK CRAB
1/ 3/1979	432.	385.	24.	4.	0.	0.	0.	0.
1/10/1979	428.	315.	72.	2.	9.	0.	0.	0.
1/17/1979	750.	585.	49.	0.	26.	0.	8.	2.
1/24/1979	116.	0.	6.	4.	26.	0.	0.	0.
1/31/1979	27.	0.	5.	2.	8.	0.	0.	3.
2/ 7/1979	11.	4.	1.	0.	1.	0.	0.	0.
2/14/1979	53.	26.	9.	3.	0.	0.	0.	0.
2/21/1979	26.	12.	0.	2.	7.	0.	0.	0.
2/28/1979	42.	18.	5.	3.	0.	0.	0.	0.
3/ 7/1979	64.	0.	0.	10.	5.	33.	0.	0.
3/14/1979	46.	23.	15.	1.	0.	0.	0.	6.
6/13/1979	56.	0.	8.	25.	0.	8.	19.	3.
6/20/1979	75.	5.	2.	20.	0.	32.	52.	6.
6/27/1979	58.	11.	6.	16.	0.	9.	15.	5.

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Table 4. Basic statistics for impingement (number individuals/24 hours) of all fishes combined, principal fish species, and crabs, by month, January 1978 - June 1979.

EENFI		MAINE YANKEE FISH IMPINGEMENT						
DATE	TOTAL FISH	STICKLE	SMOOTH FLOUNDER	WINTER FLOUNDER	SMELT	ALEWIFE	GREEN CRAB	ROCK CRAB
SUMMARY FOR	1, 1978	BASED ON 4 SAMPLES						
SUM	1338	30	362	84	715	0	109	12
MEAN	334.5	7.5	90.5	21.0	178.8	0	27.3	3.0
S.D.	447.7	9.6	129.0	20.4	301.4	0	20.4	1.6
SUMMARY FOR	2, 1978	BASED ON 4 SAMPLES						
SUM	18	32	11	7	40	0	3	3
MEAN	29.5	8.0	2.8	1.8	10.0	0	0.8	0.8
S.D.	18.5	5.4	3.5	1.5	14.7	0	1.5	1.0
SUMMARY FOR	3, 1978	BASED ON 5 SAMPLES						
SUM	163	37	17	6	76	0	0	1
MEAN	32.6	7.4	3.4	1.2	15.2	0	0	0.2
S.D.	17.8	11.4	2.1	1.3	7.6	0	0	0.4
SUMMARY FOR	4, 1978	BASED ON 4 SAMPLES						
SUM	154	38	18	13	10	55	4	4
MEAN	38.5	9.5	4.5	3.3	2.5	13.8	1.0	1.0
S.D.	23.8	6.9	5.3	2.2	3.0	18.4	2.0	1.2
SUMMARY FOR	5, 1978	BASED ON 5 SAMPLES						
SUM	328	43	14	159	24	7	259	46
MEAN	65.6	8.6	2.8	31.8	4.8	1.4	51.8	9.2
S.D.	48.5	13.2	3.7	39.0	6.7	2.1	63.1	13.1
SUMMARY FOR	6, 1978	BASED ON 4 SAMPLES						
SUM	104	30	1	20	3	9	66	15
MEAN	26.0	7.5	0.3	5.0	0.8	2.3	16.5	3.8
S.D.	5.4	6.1	0.5	5.0	1.5	3.3	14.2	1.7
SUMMARY FOR	7, 1978	BASED ON 2 SAMPLES						
SUM	35	9	0	1	0	9	28	3
MEAN	17.5	4.5	0	0.5	0	4.5	14.0	1.5
S.D.	6.4	0.7	0	0.7	0	2.1	15.6	2.1
SUMMARY FOR	9, 1978	BASED ON 3 SAMPLES						
SUM	280	0	37	29	3	185	18	4
MEAN	93.3	0	12.3	9.7	1.0	61.7	6.0	1.3
S.D.	61.8	0	8.6	7.0	1.7	53.5	3.6	0.6
SUMMARY FOR	10, 1978	BASED ON 4 SAMPLES						
SUM	391	43	52	80	54	108	38	12
MEAN	97.8	10.8	13.0	20.0	13.5	27.0	9.5	3.0
S.D.	44.7	7.9	12.2	20.6	8.6	14.3	9.7	1.4
SUMMARY FOR	11, 1978	BASED ON 2 SAMPLES						
SUM	185	25	1	12	18	92	0	0
MEAN	92.5	12.5	0.5	6.0	9.0	46.0	0	0
S.D.	10.6	2.1	0.7	4.2	12.7	32.5	0	0
SUMMARY FOR	12, 1978	BASED ON 4 SAMPLES						
SUM	527	62	103	40	76	75	17	5
MEAN	131.8	15.5	25.8	10.0	19.0	18.8	4.3	1.3
S.D.	95.2	13.3	31.7	6.1	13.9	13.0	5.3	1.5

Table 4. (continued)

EENFI		MAINE YANKEE FISH IMPINGEMENT							
DATE	TOTAL FISH	STICKLE	SMOOTH FLOUNDER	WINTER FLOUNDER	SMELT	ALEWIFE	GREEN CRAB	ROCK CRAB	
SUMMARY FOR	1, 1979	BASED ON 5 SAMPLES							
SUM	1733.	1285.	156.	12.	69.	0.	8.	5.	
MEAN	346.6	257.0	31.2	2.4	13.8	0.	1.6	1.0	
S.D.	281.2	254.7	29.0	1.7	11.7	0.	3.6	1.4	
SUMMARY FOR	2, 1979	BASED ON 4 SAMPLES							
SUM	132.	60.	15.	8.	8.	0.	0.	0.	
MEAN	33.0	15.0	3.8	2.0	2.0	0.	0.	0.	
S.D.	18.4	9.3	4.1	1.4	3.4	0.	0.	0.	
SUMMARY FOR	3, 1979	BASED ON 2 SAMPLES							
SUM	110.	23.	15.	11.	5.	33.	0.	6.	
MEAN	55.0	11.5	7.5	5.5	2.5	16.5	0.	3.0	
S.D.	12.7	16.3	10.6	6.4	3.5	23.3	0.	4.2	
SUMMARY FOR	6, 1979	BASED ON 3 SAMPLES							
SUM	139.	16.	16.	61.	0.	49.	86.	14.	
MEAN	63.0	5.3	5.3	20.3	0.	16.3	28.7	4.7	
S.D.	10.4	5.5	3.1	4.5	0.	13.6	20.3	1.5	

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Table 5. Mean impingement rates (number of fish/hour) of the principal fishes encountered at Maine Yankee and all fishes combined.

	Year	Month											
		Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Total fish	1977	26.0	30.0	18.4	*	*	1.4	1.9	18.1	203.6	18.7	4.9	6.3
	1978	13.9	1.2	1.4	1.6	2.7	1.1	0.7	*	3.9	4.1	3.8	5.5
	1979	14.4	1.4	2.3	*	*	2.6						
Sticklebacks	1977	18.6	16.7	7.0	*	*	0	0.2	0.2	0.2	0.7	0.7	0.4
	1978	0.3	0.3	0.3	0.4	0.4	0.3	0.2	*	0	0.4	0.5	0.6
	1979	10.7	0.6	0.5	*	*	0.2						
Smooth flounder	1977	1.0	0.4	0.6	*	*	0	0.1	0.3	1.7	1.7	0.1	1.4
	1978	3.8	0.1	0.1	0.2	0.1	0	0	*	0.5	0.5	0	1.1
	1979	1.3	0	0.3	*	*	0.2						
Winter flounder	1977	0.6	0.3	1.3	*	*	0.3	0.2	0.6	1.8	3.4	0.2	0.5
	1978	0.9	0.1	0.1	0.1	1.3	0.2	0	*	0.4	0.8	0.2	0.4
	1979	0.1	0.1	0.2	*	*	0.8						
Rainbow smelt	1977	5.2	11.6	7.4	*	*	0	0	0.1	1.3	2.7	1.1	1.4
	1978	7.4	0.4	0.6	0.1	0.2	0	0	*	0	0.6	0.4	0.8
	1979	0.6	0.1	1.0	*	*	0						
Alewife	1977	0	0	0.1	*	*	0.1	0.6	15.1	194.8	7.2	1.6	0.7
	1978	0	0	0	0.6	0.1	0.1	0.2	*	2.6	1.1	1.9	0.8
	1979	0	0	0.7	*	*	0.7						

* = Shutdown

MONITORING ESTUARY WATER TEMPERATURE

Continuous water temperature monitoring was conducted at two depths (1 foot below the water surface and - 20 feet MSL) at each of four locations within the Montsweag Bay-Sheepscot River system in accordance with Specification 1.6. Materials and methods have been described in the Final Report and previous reports in this series. Temperature monitoring locations are shown in Figure 1.

The daily ranges of water temperature recorded at the four locations are shown in Figures 2-5. Recorded temperatures were all within the normal range of values. In the upper portion of Montsweag Bay water temperatures (Figures 2, 3) were similar to last year except during late spring 1979 when surface temperatures were somewhat lower. This is because Maine Yankee was not operating (i.e. no thermal discharge) during that time in 1979. Temperature records at the southern entrance to Montsweag Bay (Figure 4) were similar to last year's records.

Surface temperatures in the upper Sheepscot River (Figure 5) during 1978 were slightly cooler than the previous year; summertime (July, August) maximum surface temperatures were on the average 2.8°F (1.3°C) (S.D. = 2.0°F , N = 29) lower in 1978 compared to the same months one year earlier. The temperature record for 1979 at this station was similar to last year's.

POOR ORIGINAL

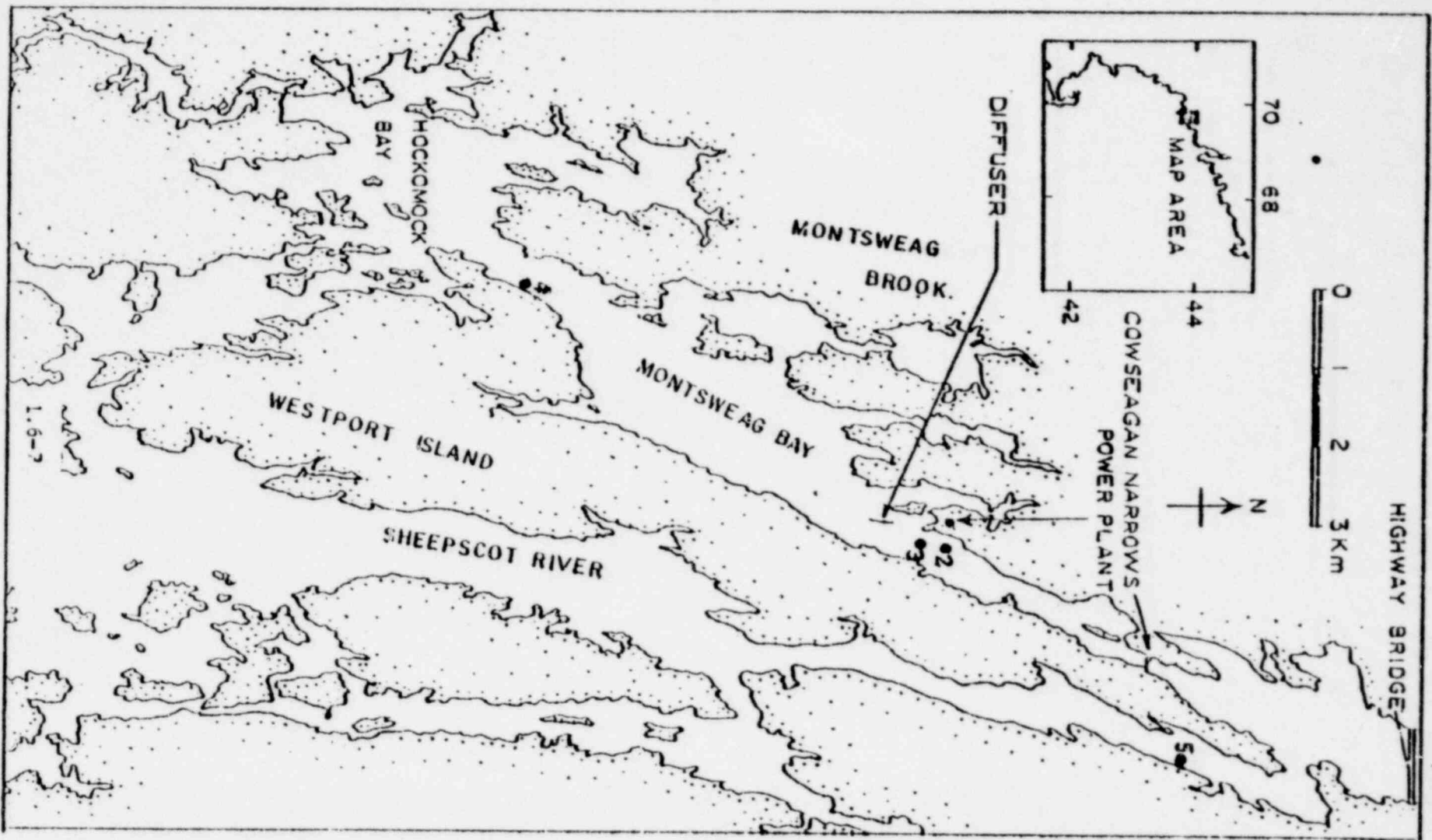


Figure 1. Continuous water temperature monitoring stations and diffuser location.

MAINE YANKEE ATOMIC POWER CO.
WISCASSET, MAINE

DAILY RANGE OF WATER TEMPERATURES

1978

LOCATION: BAILEY POINT

POOR ORIGINAL

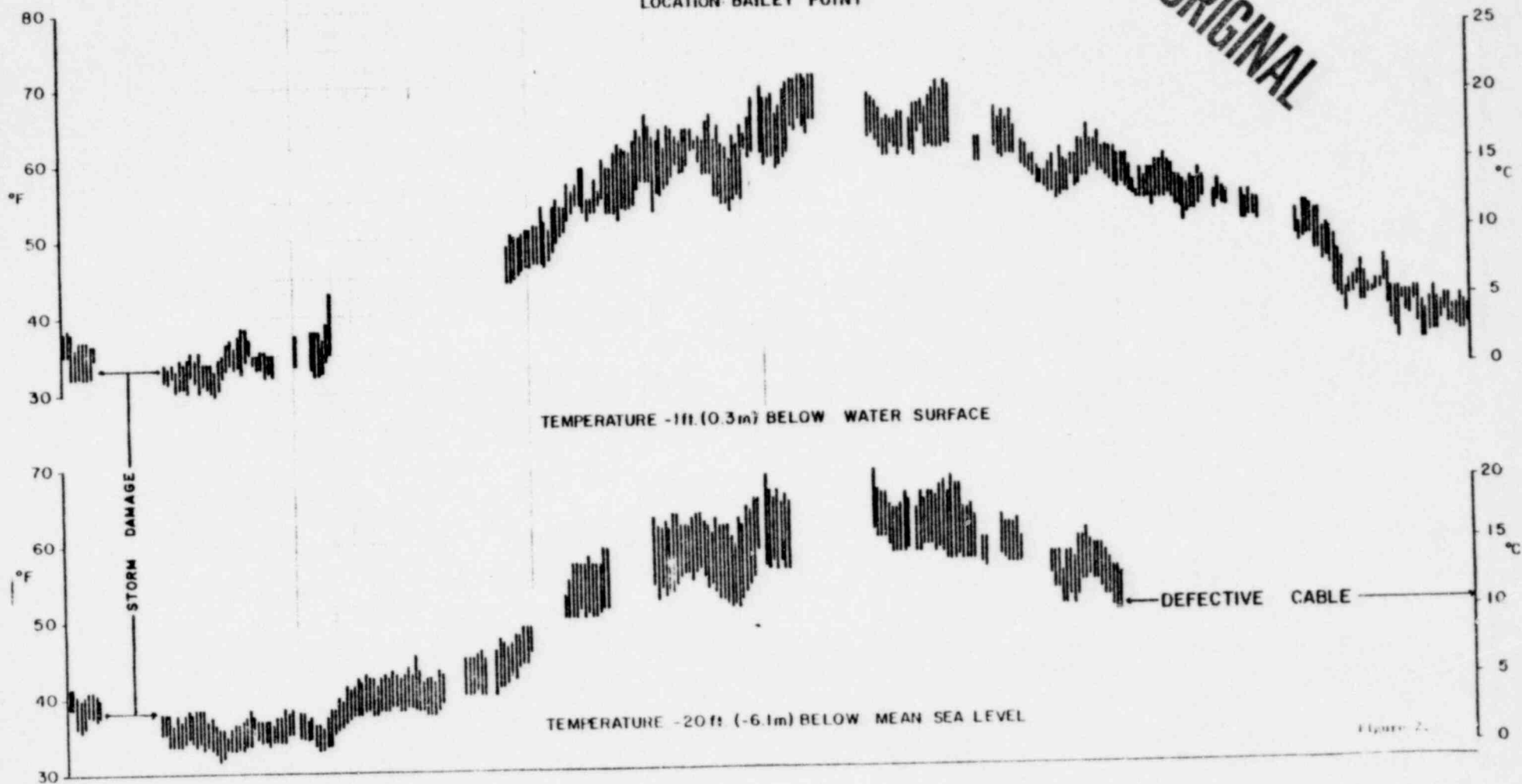


Figure 2.

0041260

MAINE YANKEE ATOMIC POWER CO.
WISCASSET, MAINE
DAILY RANGE OF WATER TEMPERATURES
1979
LOCATION: BAILEY POINT

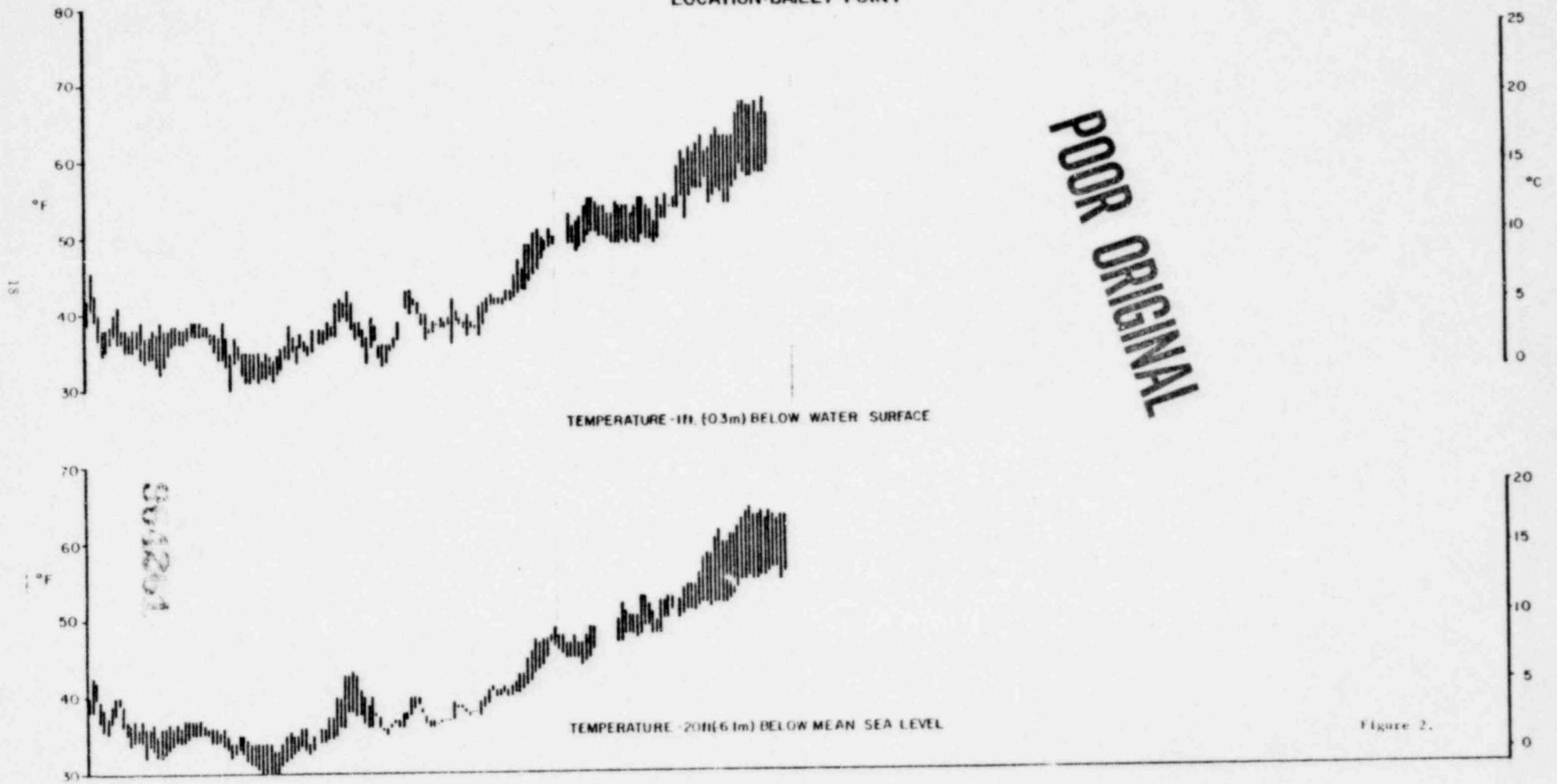


Figure 2.

MAINE YANKEE ATOMIC POWER CO.
WISCASSET, MAINE
DAILY RANGE OF WATER TEMPERATURES
1978

LOCATION: LITTLE OAK ISLAND

POOR ORIGINAL

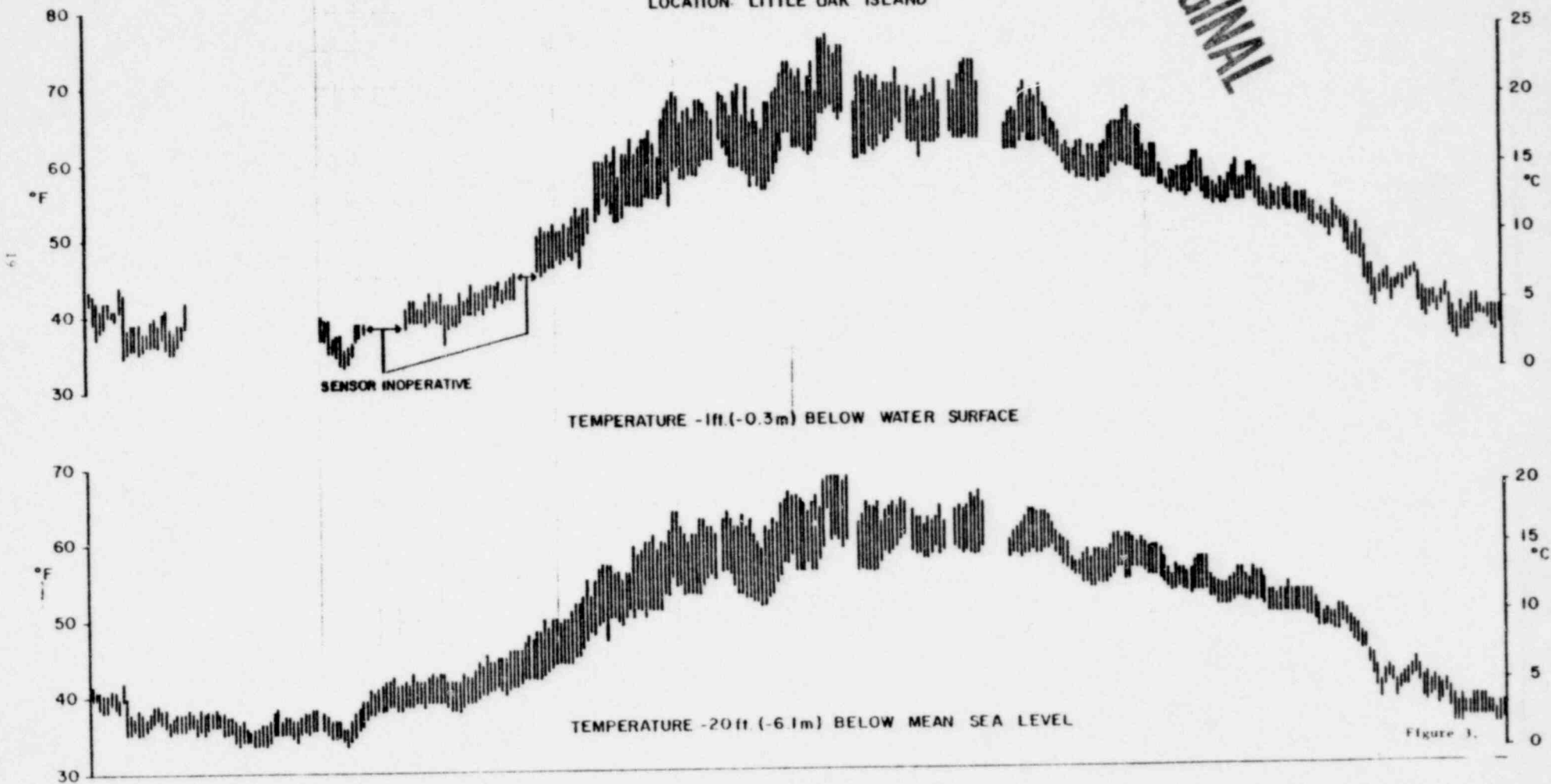


Figure 1.

001250

MAINE YANKEE ATOMIC POWER CO.
WISCASSET, MAINE
DAILY RANGE OF WATER TEMPERATURES
1979
LOCATION: LITTLE OAK ISLAND

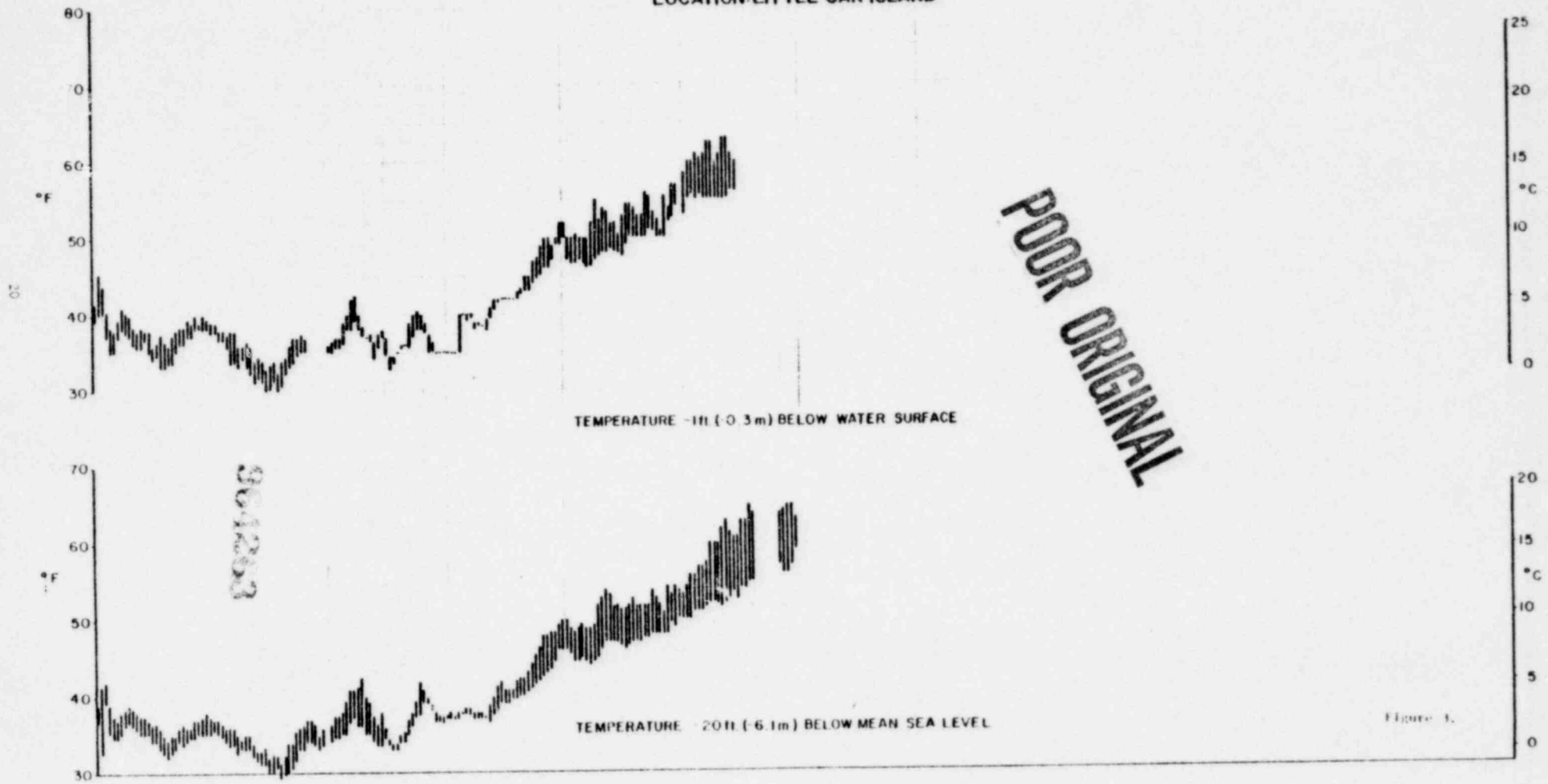


Figure 1.

MAINE YANKEE ATOMIC POWER CO
WISCASSET, MAINE

DAILY RANGE OF WATER TEMPERATURES
1978

LOCATION HARRISON'S WESTPORT SIDE

POOR ORIGINAL

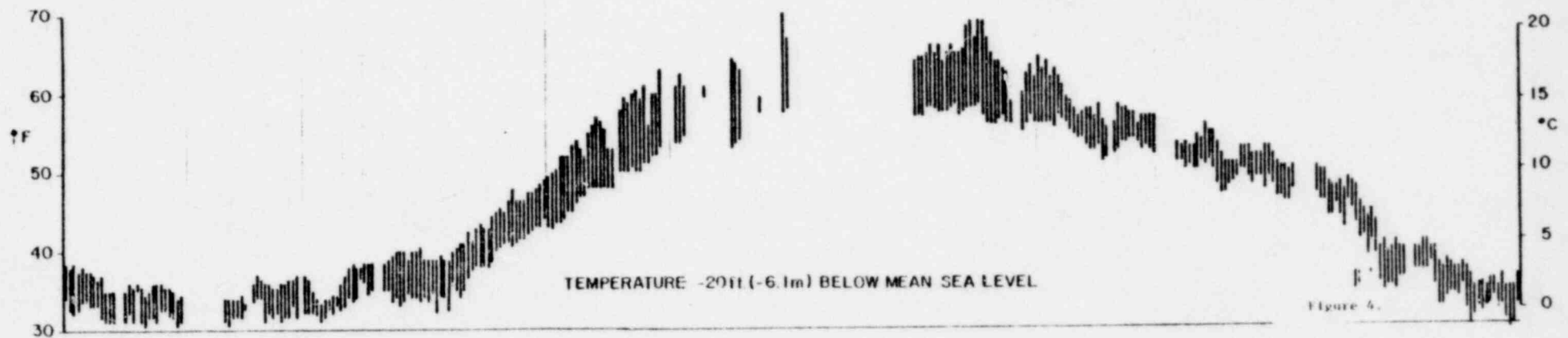
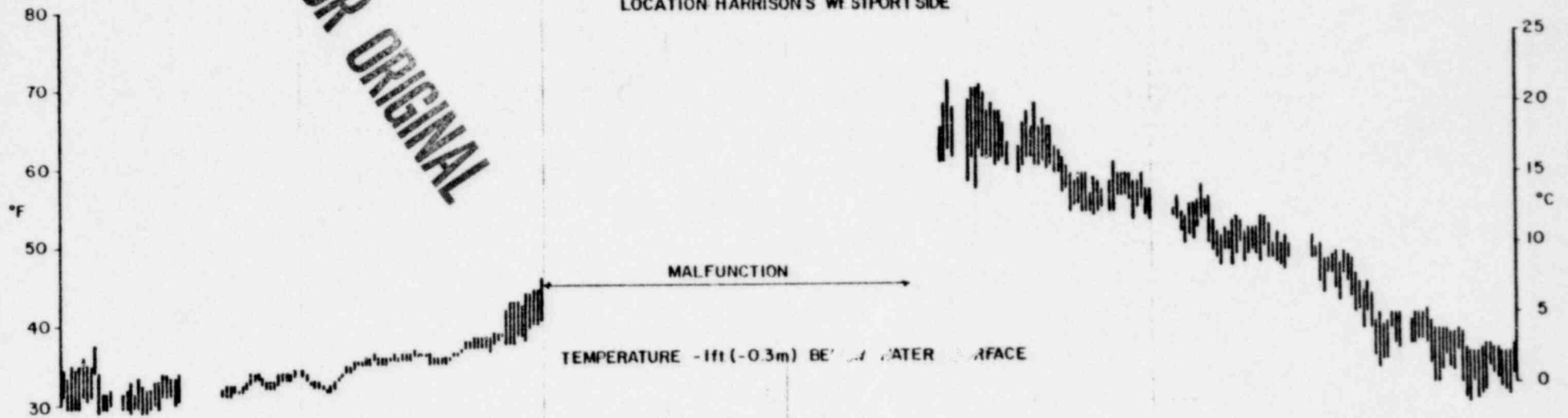


Figure 4.

001204

MAINE YANKEE ATOMIC POWER CO.
WISCASSET, MAINE
DAILY RANGE OF WATER TEMPERATURES
1979
LOCATION: HARRISON'S WESTPORT SHORE

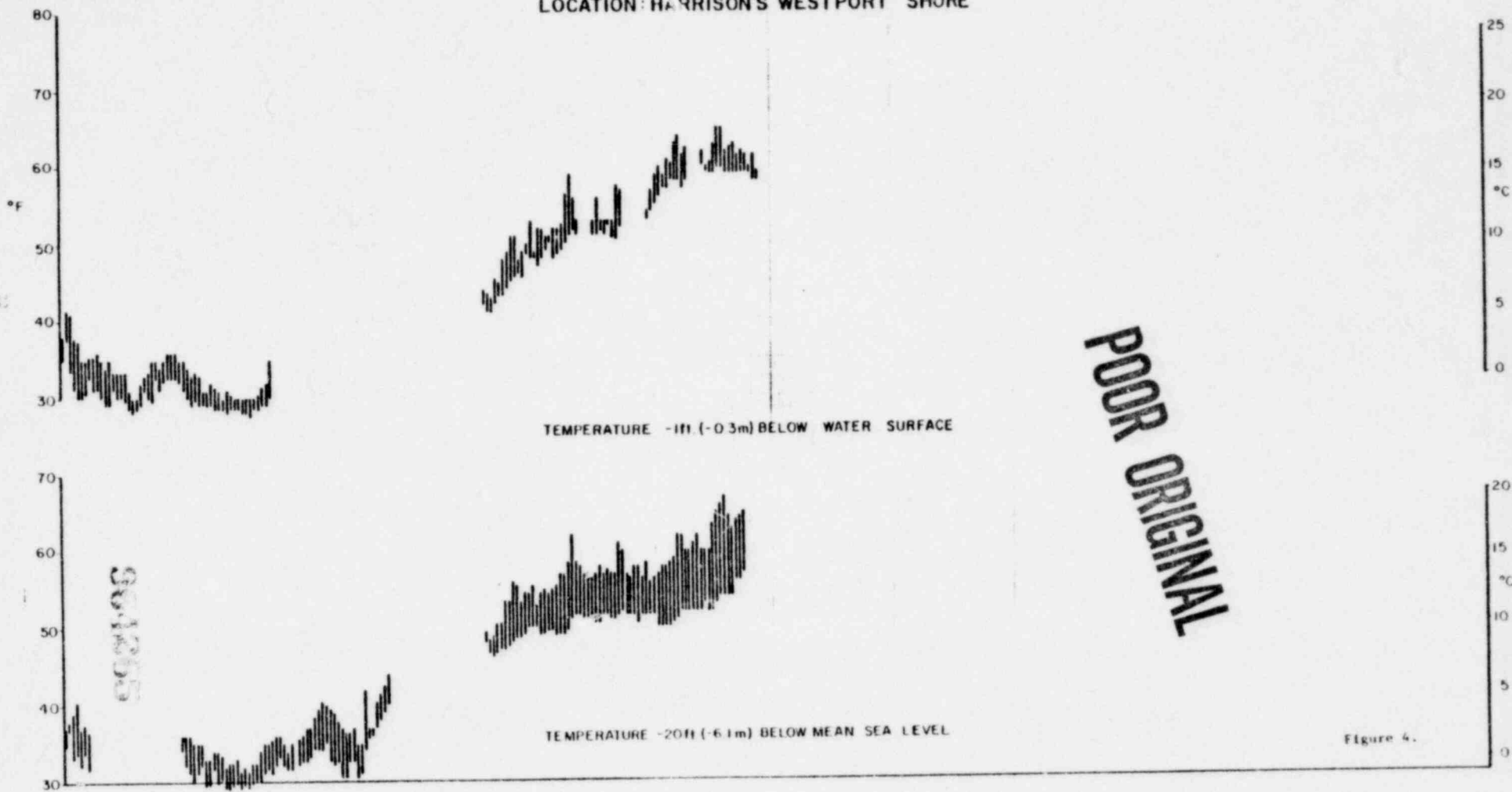


Figure 4.

MAINE YANKEE ATOMIC POWER CO.
WISCASSET, MAINE

DAILY RANGE OF WATER TEMPERATURES
1978

LOCATION: CHANEY'S LANDING

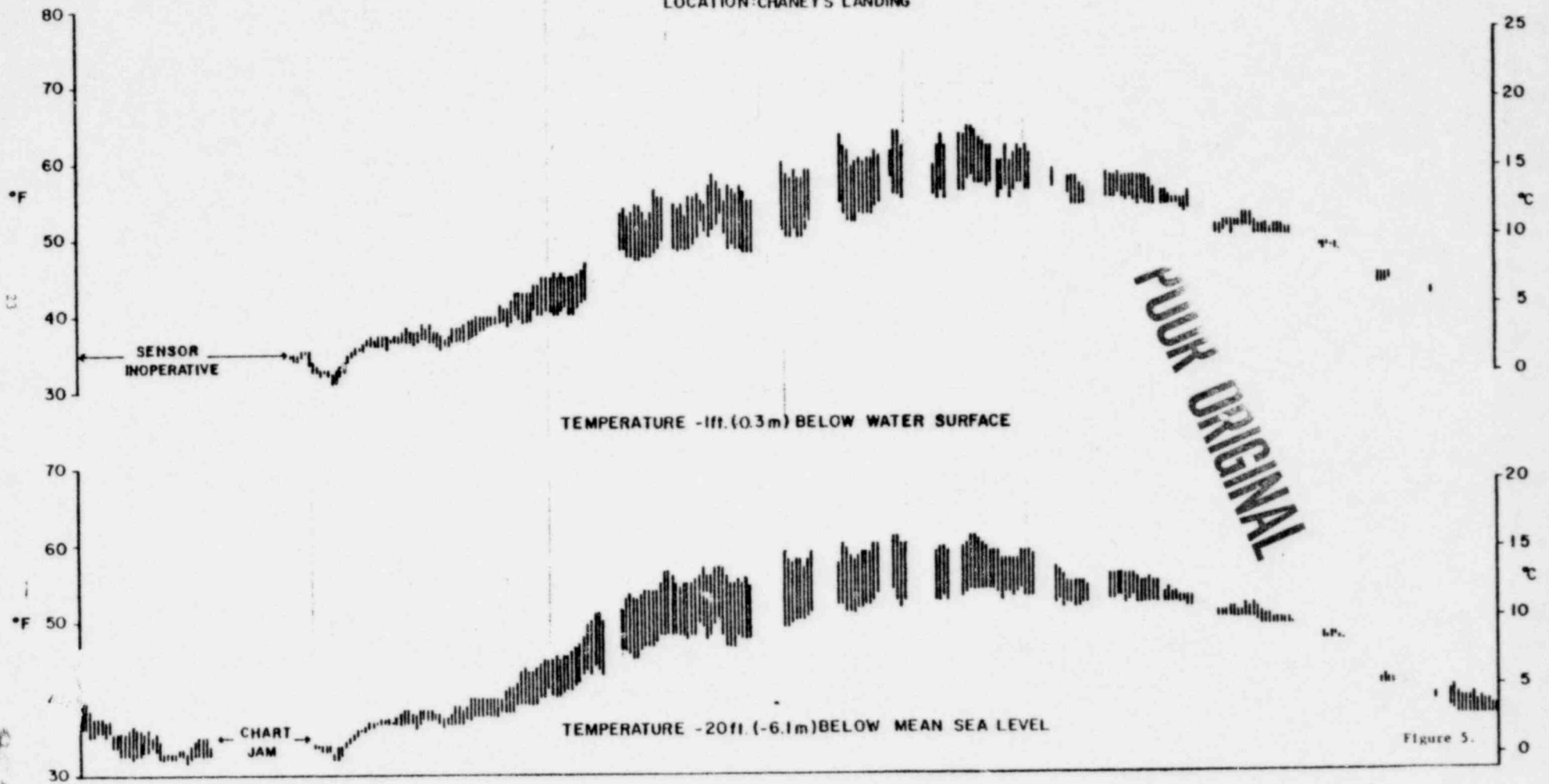
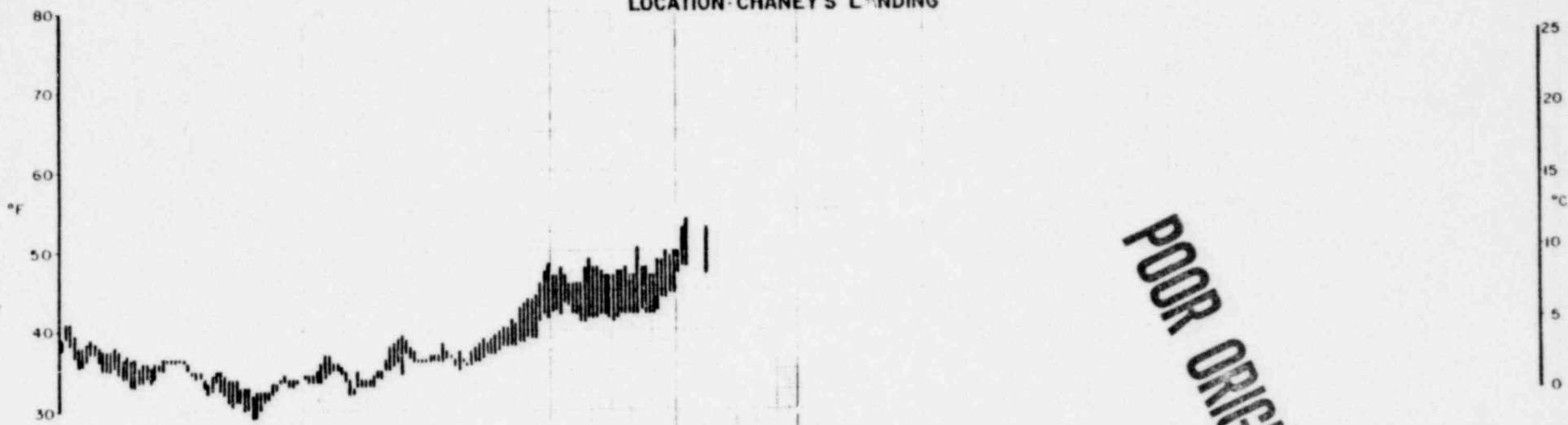


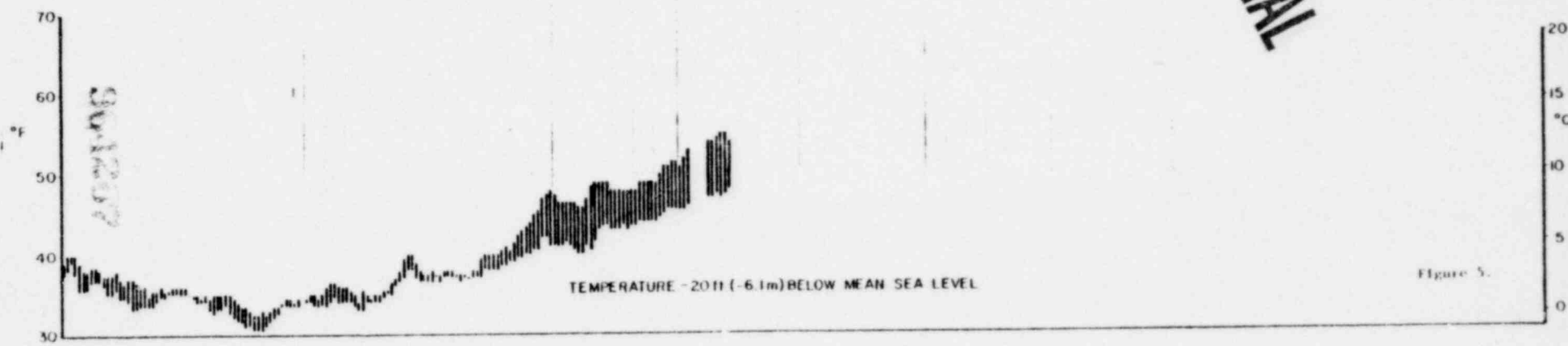
Figure 5.

5942006

MAINE YANKEE ATOMIC POWER CO.
WISCASSET, MAINE
DAILY RANGE OF WATER TEMPERATURES
1979
LOCATION: CHANEY'S LANDING



TEMPERATURE - 1ft (-0.3m) BELOW WATER SURFACE



TEMPERATURE - 20ft (-6.1m) BELOW MEAN SEA LEVEL

POOR ORIGINAL

Figure 5.