Control # 2466
DTD: 3-2-76

SEMIANNUAL OPERATING REPORT
July 1, 1975 through December 31, 1975
UNIT NOS. 1 and 2

SURRY POWER STATION

DOCKET NOS. 50-280 and 50-281

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Volume 1

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1.0 INTRODUCTION

This report is submitted to the Nuclear Regulatory Commission pursuant to Surry Power Station, Unit Nos. 1 and 2, Technical Specification 6.6, "Station Reporting Requirements", which states:

A. Routine Operating Reports

A report covering a six-month period shall be submitted in writing to the Director of the Regional Regulatory Operations Office within 60 days after January 1 and July 1 of each year. The due date of the first report shall be determined from the date of initial criticality and shall cover the period from the date the operating license was issued to the end of the report period. Such reports are due within 60 days after the end of each reporting period.

The information reported herein also satisfies additional reporting requirements established in other technical specifications and the Nuclear Regulatory Commission. In order to facilitate the referencing of material in this report with the applicable reporting requirements, an index cross-referencing the report section number and the reporting requirement is given in Section 12.0.

2.0 NONRADIOLOGICAL MONITORING PROGRAM - THERMAL AND PHYSICAL CHARACTERISTICS

2.1 TEMPERATURE AND SALINITY MONITORING

Summary

Temperatures are monitored continuously at points in the James River at thirteen (13) stations (Figure 2.1.1-1) of the tidal segment encompassing Hog Point. Near surface and bottom temperatures are recorded as indicated on the figure.

Salinity is continuously monitored at the station intakes.

Results

The results of the temperature and salinity monitoring programs are summarized in Sections 2.1.1, 2.1.2, and 2.1.3.

The licensee has had some difficulties with data loss from the temperature monitoring instruments manufactured by the Environmental Devices Corporation (ENDECO). The problems associated with these instruments have been discussed in reports to the Region II-Office of Inspection and Enforcement.

Data missing due to failure of the ENDECO instruments are supplied from the older Taylor circular chart recorders, whenever possible.

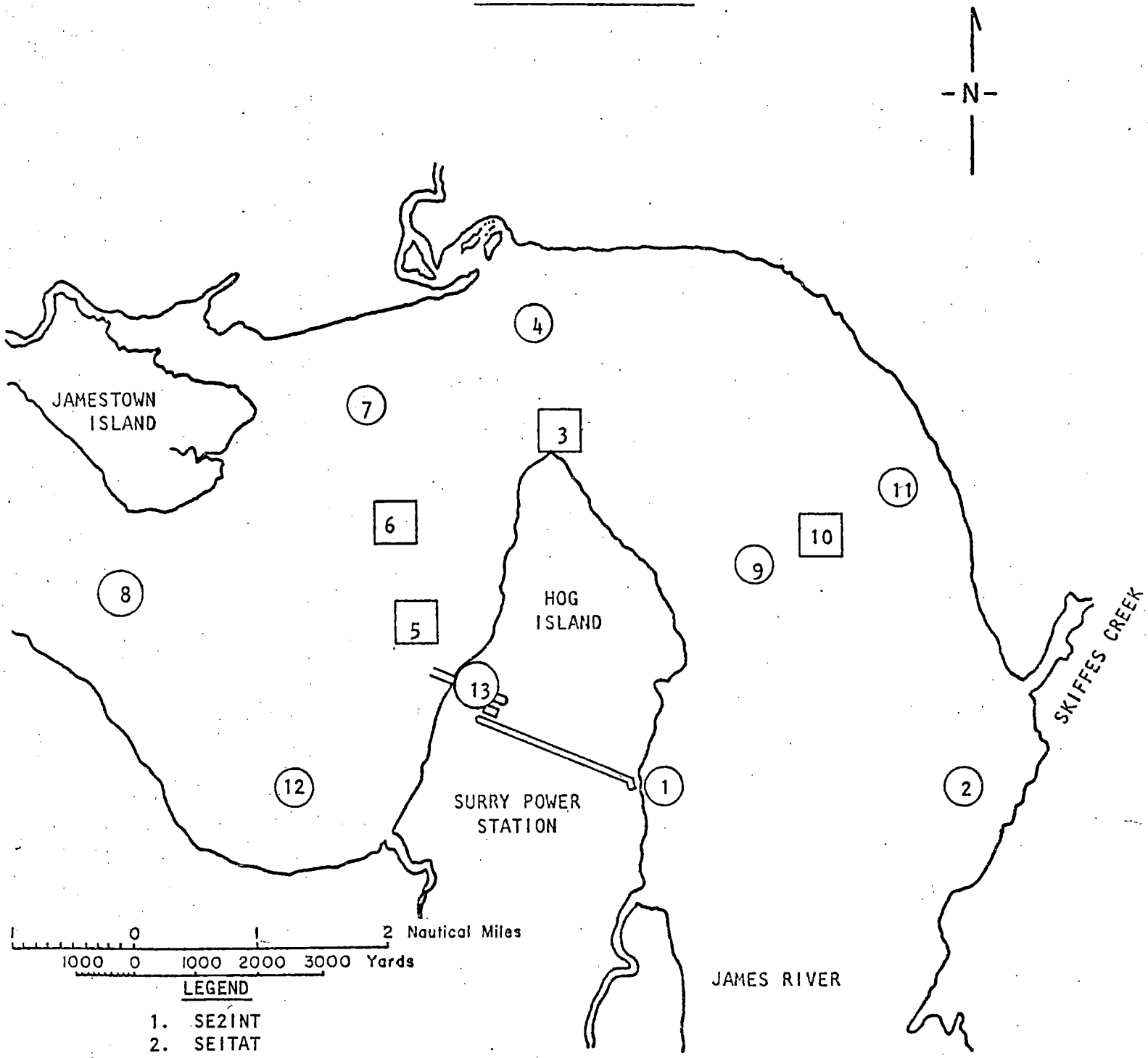
2.1.1 TEMPERATURE AND SALINITY MONITORING STATIONS IN THE JAMES RIVER

Tables 2.1.1-1 and 2.1.1-2 summarize results of the temperature and salinity monitoring program in the James River. The monthly means of the daily highs, lows, and means are reported for each month of the reporting period.

Figure 2.1.1-1

TEMPERATURE MONITORING STATIONS

SURRY POWER STATION



LEGEND

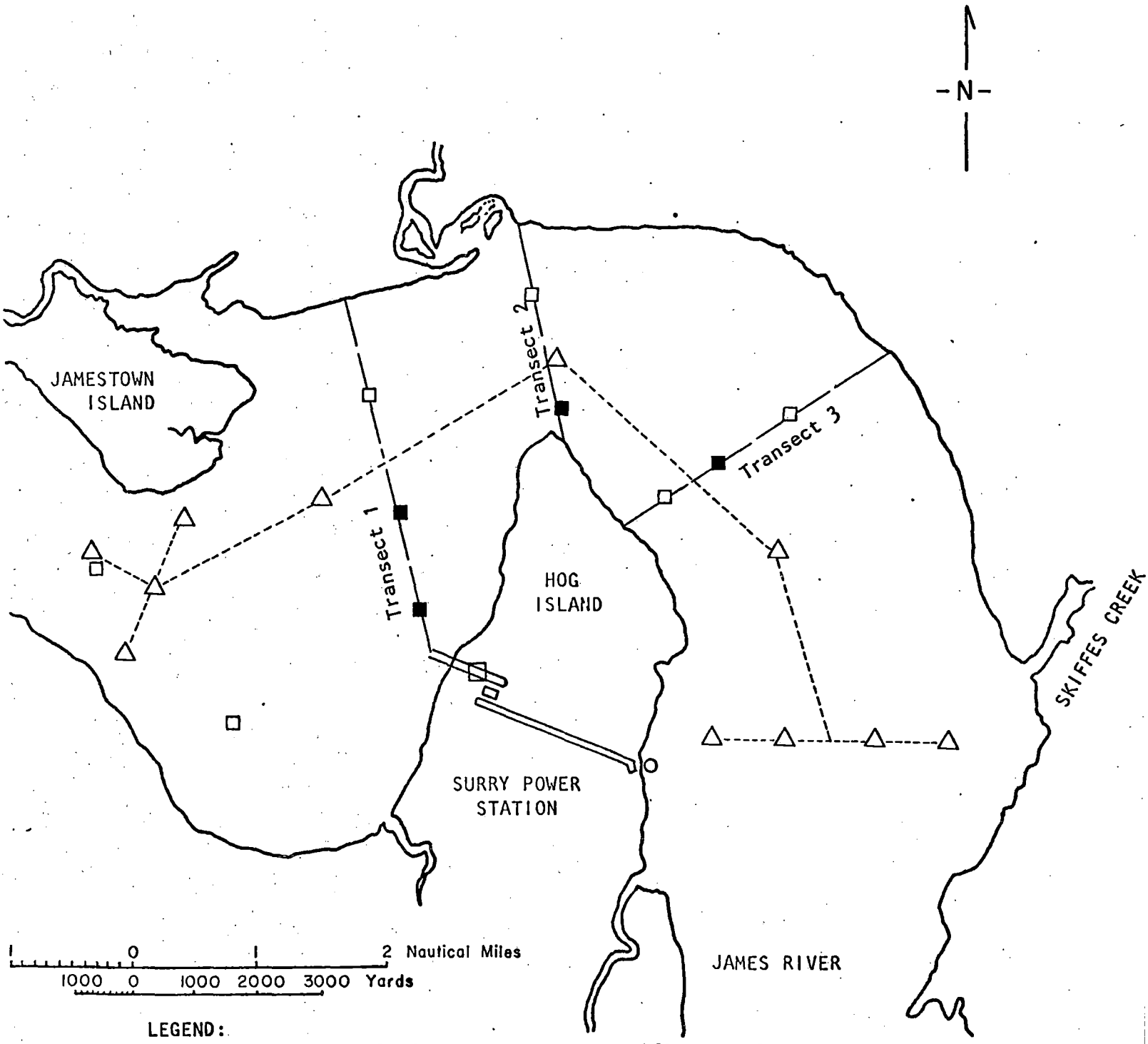
1. SE2INT
2. SEITAT
3. SC2TCT,B
4. SCITBT
5. SB3TFT,B
6. SB2TET,B
7. SBITDT
8. SAITGT
9. SA2BAT
10. SD2BDT
11. SDIBCT,B
12. SD3BBT
13. SA3GRT

○ Near Surface Temperature

□ Near Surface and Bottom Temperature

Figure 2.1.1-2

TEMPERATURE AND SALINITY
MONITORING STATIONS



LEGEND:

- △ Monthly Salinity - Temperature Profile Station
- ○ Continuous Salinity - Temperature Monitoring Station
- □ Near Surface Temperature Monitoring Station
- ■ Near Surface and Bottom Temperature Monitoring Station
- ---- Boat Cruise

Table 2.1.1-1

SURRY MONTHLY TEMPERATURE DATA

°C

MONTH	SAT6T	SAB1A	SBT1D	SBT2T	SBT2E	SBT3T	SBT3F	SCT1T	SCT2T	SCT2C	SDT1B	SDB2C	SDB2T	SDB3B	SLT1T	SAG3R	SE2IN	TYPE	DBS TYPE
7	31.4**	*	30.6**	26.1	27.6	26.4	27.5	30.7**	29.9	30.1	*	26.4	26.6	29.0	26.9	33.9	27.3	HIGH	MEAN
7	25.4**	*	25.7**	26.7	26.6	25.8	25.5	26.1**	26.6	26.5	*	25.6	25.9	27.0	25.5	31.3	25.1	LOW	MEAN
7	29**	*	28**	27.3	27.2	26.8	26.4	28**	27.6	27.9	*	26.0	26.3	27.9	26.1	32.6	26.2	MEAN	MEAN
8	31.4**	*	30.6**	*	30.1	*	32.3**	30.7**	*	*	*	*	*	31.0	*	38.0	30.0	HIGH	MEAN
8	25.4**	*	25.7**	*	26.7	*	25.6**	26.1**	*	*	*	*	*	28.5	*	34.8	27.6	LOW	MEAN
8	29**	*	28**	*	29.3	*	28**	28**	*	*	*	*	*	29.6	*	36.5	28.7	MEAN	MEAN
9	*	*	*	*	28.0	*	*	*	*	*	*	*	*	28.2	*	33.1	29.7	HIGH	MEAN
9	*	*	*	*	27.1	*	*	*	*	*	*	*	*	26.6	*	30.6	23.3	LOW	MEAN
9	*	*	*	*	27.5	*	*	*	*	*	*	*	*	27.4	*	31.9	24.5	MEAN	MEAN
10	20.0	17.2	19.4	20.0	19.6	21.5	20.9	19.8	21.0	21.5	19.8	19.7	19.6	20.6	19.4	23.4	20.6	HIGH	MEAN
10	19.2	15.4	18.4	18.7	18.7	18.7	19.2	18.9	18.8	19.0	18.9	18.7	18.8	18.8	18.3	22.9	18.9	LOW	MEAN
10	19.6	16.1	18.9	19.3	19.1	19.7	20.0	19.4	19.7	20.0	19.3	19.2	19.2	19.5	18.8	24.1	19.7	MEAN	MEAN
11	14.9	15.0	15.0	15.5	14.4	16.9	16.3	14.7	16.7	17.3	16.9	15.2	15.1	16.6	14.9	21.1	15.5	HIGH	MEAN
11	13.8	13.7	13.9	14.2	13.3	14.0	13.7	13.9	14.4	14.4	15.6	14.3	14.3	14.5	13.8	19.4	14.0	LOW	MEAN
11	14.3	14.4	14.5	14.8	13.9	15.1	14.9	14.3	15.3	15.5	16.2	14.8	14.7	15.2	14.3	20.2	14.6	MEAN	MEAN
12	10.0	10.6	10.1	8.7	8.6	10.8	12.1	8.6	10.4	12.2	*	10.3	10.2	11.9	7.3	15.0	8.7	HIGH	MEAN
12	9.0	9.4	9.1	7.5	6.8	7.1	10.6	7.9	8.0	9.7	*	9.5	9.5	9.7	6.4	13.0	7.4	LOW	MEAN
12	9.5	10.0	9.6	8.1	7.3	8.5	11.2	8.3	9.0	10.7	*	9.9	9.9	10.5	6.9	14.2	8.1	MEAN	MEAN

* Instrument malfunction

** Instrument malfunction, best available estimate.

TABLE 2.1.1-2 SALINITY DATA

Monthly Means, Lows, and Highs of Mean Daily Values
in Parts Per Thousand at 25° Celsius

MONTH	MEAN	LOW	HIGH
7	3.4	0.8	6.7
8	5.0	2.0	6.4
9	4.2	1.0	7.0
10	1.8	0.9	3.4
11	3.5	2.3	5.0
12	4.8	3.8	5.9

2.1.2 INTAKE CANAL MONITORING STATION

Table 2.1.2-1 summarizes the data recorded at the intake canal temperature monitoring station as column SE2INT. Temperatures from other river stations are given for comparison. Values shown are monthly means of daily highs, lows, and means in degrees Celsius.

Table 2.1.2-1

SURRY MONTHLY TEMPERATURE DATA

°C

MONTH	SAT6T	SA2BAT	SB1T1D1	SB2T1E T	SB2TEB	SB3TFT	SB3TFB	SC1TB1	SC2TCT	SC2TCB	SD1TB1	SD2TB1	SD2TBC	SD3TBB	SL1TAT	SA3GRT	SE2INT	TYPE	UBS TYPE
7	31.4**	*	30.6**	26.1	27.0	26.4	27.5	30.7**	29.9	30.1	*	26.4	26.6	29.0	26.9	33.9	27.3	HIGH	MEAN
7	25.4**	*	25.7**	26.7	26.0	25.8	25.5	26.1**	26.0	26.5	*	25.6	25.9	27.0	25.5	31.3	25.1	LOW	MEAN
7	29**	*	28**	27.3	27.2	26.8	26.4	28**	27.8	27.9	*	26.0	26.3	27.9	26.1	32.6	26.2	MEAN	MEAN
8	31.4**	*	30.6**	*	30.1	*	32.3**	30.7**	*	*	*	*	*	31.0	*	38.0	30.0	HIGH	MEAN
8	25.4**	*	25.7**	*	26.7	*	25.6**	26.1**	*	*	*	*	*	28.5	*	34.8	27.6	LOW	MEAN
8	29**	*	28**	*	29.3	*	28**	28**	*	*	*	*	*	29.6	*	36.5	28.7	MEAN	MEAN
9	*	*	*	*	26.0	*	*	*	*	*	*	*	*	26.2	*	33.1	29.7	HIGH	MEAN
9	*	*	*	*	27.1	*	*	*	*	*	*	*	*	26.6	*	30.6	23.3	LOW	MEAN
9	*	*	*	*	27.5	*	*	*	*	*	*	*	*	27.4	*	31.9	24.5	MEAN	MEAN
10	20.0	17.2	19.4	20.0	19.6	21.5	20.9	19.8	21.0	21.5	19.8	19.7	19.6	20.6	19.4	25.4	20.6	HIGH	MEAN
10	19.2	15.4	18.4	18.7	18.7	18.7	19.2	18.9	18.8	19.0	18.9	18.7	18.8	18.6	18.3	22.9	18.9	LOW	MEAN
10	19.6	16.1	18.9	19.3	19.1	19.7	20.0	19.4	19.7	20.0	19.3	19.2	19.2	19.5	18.8	24.1	19.7	MEAN	MEAN
11	14.9	15.0	15.0	15.5	14.4	16.9	16.3	14.7	16.7	17.3	16.9	15.2	15.1	16.6	14.9	21.1	15.5	HIGH	MEAN
11	13.8	13.7	13.9	14.2	13.3	14.0	13.7	13.9	14.4	14.4	15.6	14.3	14.3	14.5	13.8	19.4	14.0	LOW	MEAN
11	14.3	14.4	14.5	14.8	13.9	15.1	14.9	14.3	15.3	15.5	16.2	14.8	14.7	15.2	14.3	20.2	14.8	MEAN	MEAN
12	10.0	10.6	10.1	8.7	8.0	10.8	12.1	8.6	10.4	12.2	*	10.3	10.2	11.9	7.3	15.0	8.7	HIGH	MEAN
12	9.0	9.4	9.1	7.5	6.8	7.1	10.0	7.9	8.0	9.7	*	9.5	9.5	9.7	6.4	13.0	7.4	LOW	MEAN
12	9.5	10.0	9.6	8.1	7.3	8.5	11.2	8.3	9.0	10.7	*	9.9	9.9	10.5	6.9	14.2	8.1	MEAN	MEAN

* Instrument malfunction

** Instrument malfunction, best available estimate.

2.1.3 DISCHARGE CANAL MONITORING STATION

Table 2.1.3-1 summarizes the data recorded at the discharge canal temperature monitoring station as column SA3GRT. Temperatures from other river stations are given for comparison. Temperatures shown are monthly means of daily highs, lows, and means in degrees Celsius.

Table 2.1.3-1

SURRY MONTHLY TEMPERATURE DATA

°C

MONTH	SAT6T	SA2bA1	SB1TDT	SB2TET	SB2TEb	SB5TFT	SB3TFB	SC1TbT	SC2TCT	SC2TCb	SD1TbT	SD2bCT	SD2bCb	SD3bbT	SL1TAT	SA3GRT	SE2INT	TYPE	OBS TYPE
7	31.4**	*	30.6**	26.1	27.6	26.4	27.5	30.7**	29.9	30.1	*	26.4	26.6	29.0	26.9	33.9	27.3	HIGH	MEAN
7	25.4**	*	25.7**	26.7	26.0	25.8	25.5	26.1**	26.0	26.5	*	25.6	25.9	27.0	25.5	31.3	25.1	LOW	MEAN
7	29**	*	28**	27.5	27.2	26.8	26.4	28**	27.6	27.9	*	26.0	26.3	27.9	26.1	32.6	26.2	MEAN	MEAN
8	31.4**	*	30.6**	*	30.1	*	32.3**	30.7**	*	*	*	*	*	31.0	*	38.0	30.0	HIGH	MEAN
8	25.4**	*	25.7**	*	26.7	*	25.6**	26.1**	*	*	*	*	*	28.5	*	34.8	27.6	LOW	MEAN
8	29**	*	28**	*	29.3	*	28**	28**	*	*	*	*	*	29.6	*	36.5	28.7	MEAN	MEAN
9	*	*	*	*	28.0	*	*	*	*	*	*	*	*	28.2	*	33.1	29.7	HIGH	MEAN
9	*	*	*	*	27.1	*	*	*	*	*	*	*	*	26.6	*	30.6	23.3	LOW	MEAN
9	*	*	*	*	27.5	*	*	*	*	*	*	*	*	27.4	*	31.9	24.5	MEAN	MEAN
10	20.0	17.2	19.4	20.0	19.6	21.5	20.9	19.8	21.0	21.5	19.8	19.7	19.6	20.6	19.4	25.4	20.6	HIGH	MEAN
10	19.2	15.4	18.4	18.7	18.7	18.7	19.2	18.9	18.8	19.0	18.9	18.7	18.8	18.8	18.3	22.9	18.9	LOW	MEAN
10	19.6	16.1	18.9	19.3	19.1	19.7	20.0	19.4	19.7	20.0	19.3	19.2	19.2	19.5	18.8	24.1	19.7	MEAN	MEAN
11	14.9	15.0	15.0	15.5	14.4	16.9	16.3	14.7	16.7	17.3	16.9	15.2	15.1	16.6	14.9	21.1	15.5	HIGH	MEAN
11	13.8	13.7	13.9	14.2	13.3	14.0	13.7	13.9	14.4	14.4	15.6	14.3	14.3	14.5	13.8	19.4	14.0	LOW	MEAN
11	14.3	14.4	14.5	14.8	13.9	15.1	14.9	14.3	15.3	15.5	16.2	14.8	14.7	15.2	14.3	20.2	14.8	MEAN	MEAN
12	10.0	10.6	10.1	8.7	8.0	10.8	12.1	8.6	10.4	12.2	*	10.3	10.2	11.9	7.3	15.0	8.7	HIGH	MEAN
12	9.0	9.4	9.1	7.5	6.8	7.1	10.0	7.9	8.0	9.7	*	9.5	9.5	9.7	6.4	13.0	7.4	LOW	MEAN
12	9.5	10.0	9.6	8.1	7.3	8.5	11.2	8.3	9.0	10.7	*	9.9	9.9	10.5	6.9	14.2	8.1	MEAN	MEAN

* Instrument malfunction

** Instrument malfunction, best available estimate.

2.2 SALINITY AND TEMPERATURE SPECIAL SURVEYS

Summary

The salinity and temperature monitoring program encompasses the segment of the James River Estuary which extends from the southern shore of Jamestown Island to below the intake of the Surry Power Station. The horizontal and vertical salinity and temperature of this tidal segment is determined at monthly intervals as follows: Cruises are conducted at slack before flood tide. A four (4) station transect, which is between the intake structure and Skiffes Creek, is sampled from surface to bottom at two (2) meter intervals. A second transect is made near the upper limits of the segment, the exact location of which is based on the salinity regime of the system. The approximate locations of the sampling stations and the cruise route are shown on T.S. Figure 2.2-1.

Results

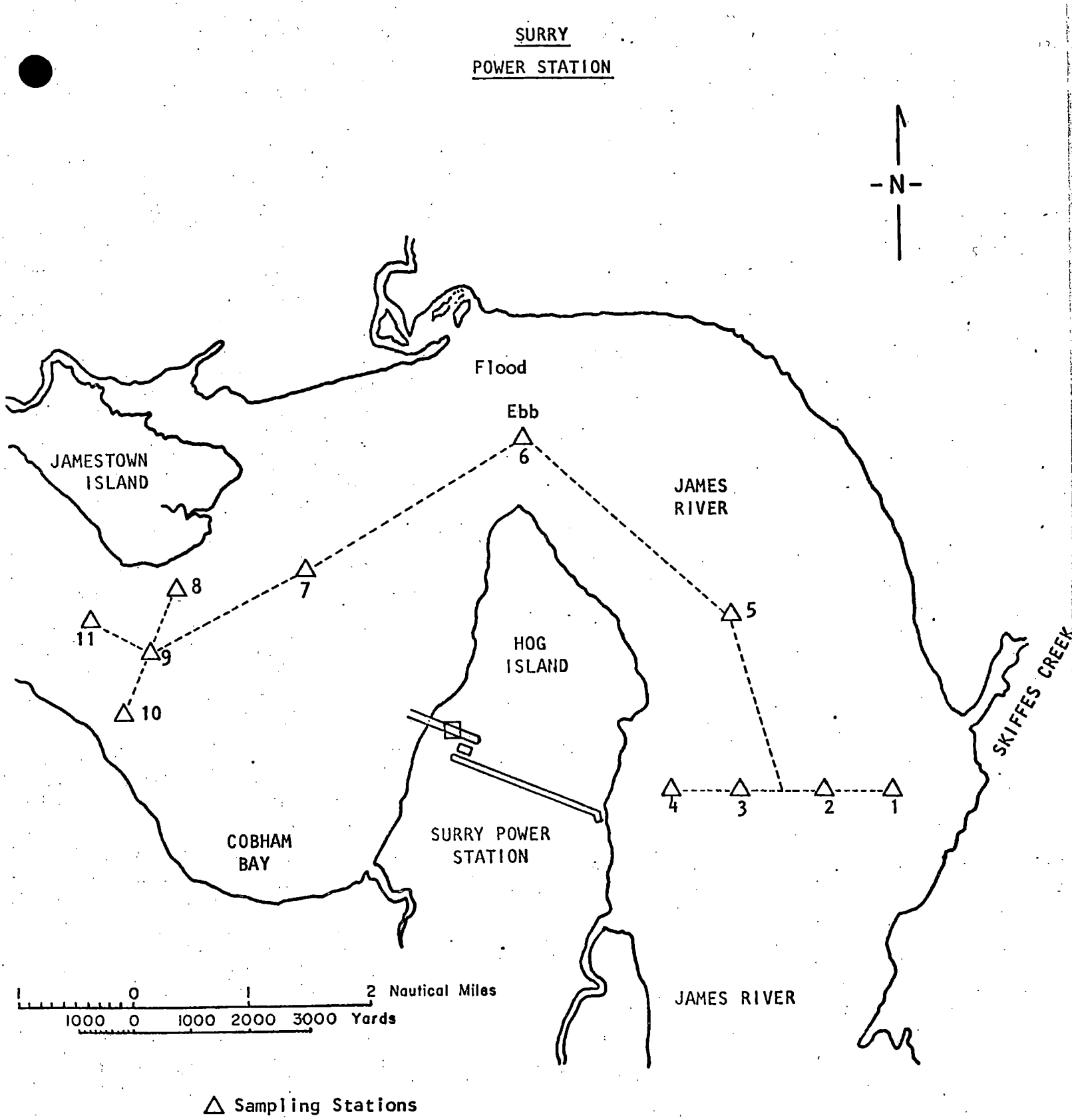
Monthly temperature and salinity surveys were conducted at eleven (11) sampling stations as shown in Figure 2.2-1. Data obtained from these surveys are summarized in graphical form in Figures 2.2-2 through 2.2-13.

Conclusions

The salinity in this segment of the river varied between 0 and 8.3 parts per thousand (ppt) during the reporting period. There is no measurable difference in salinity occurring as a result of the diversion of water through the cooling system. Therefore it is concluded that the operation of the station had no significant effect on the salinity structure of the James River.

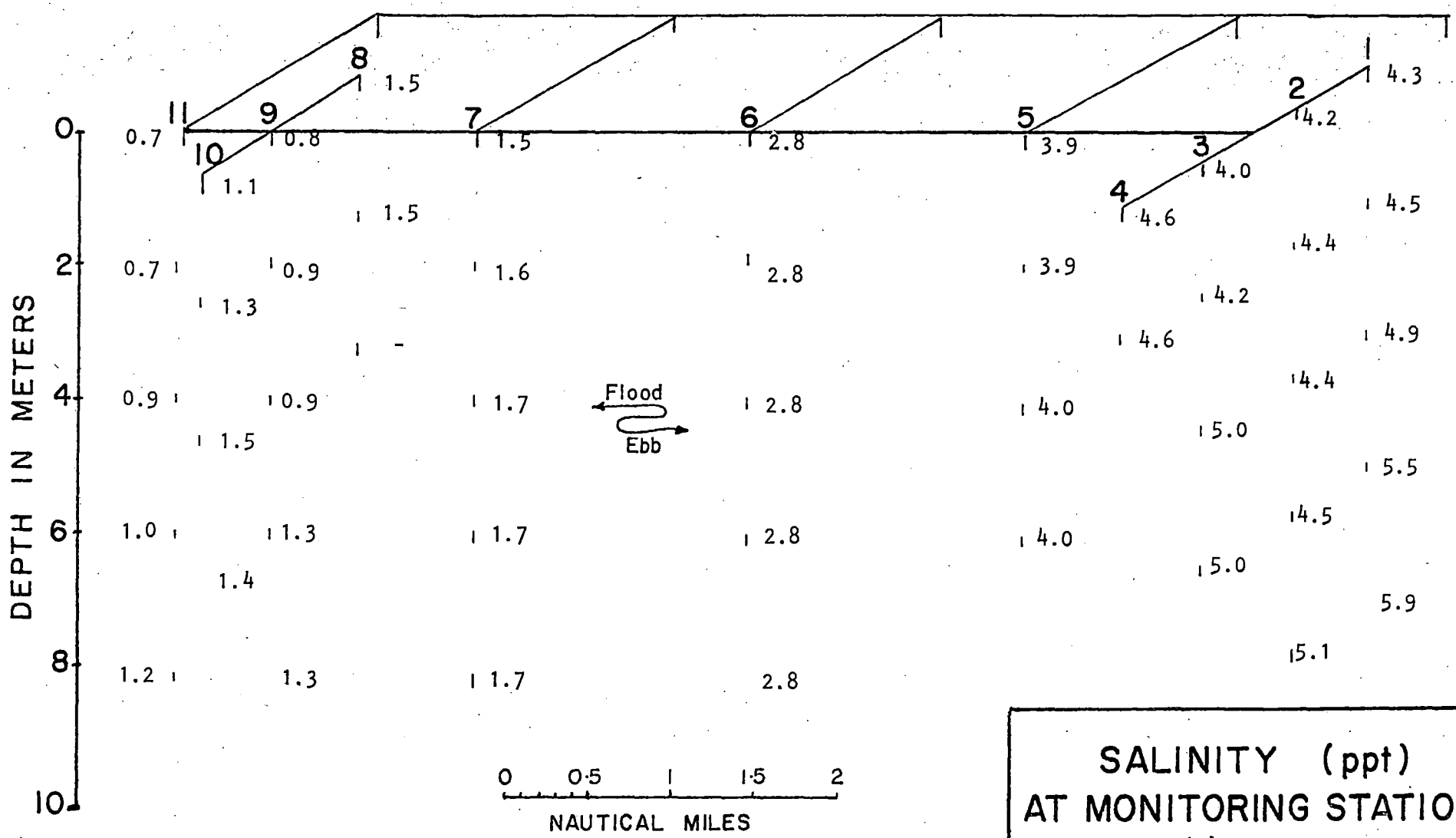
Temperature readings taken in conjunction with the salinity surveys are also presented.

Figure 2.2-1


SURRY
POWER STATION
N
Flood
Ebb
JAMESTOWN ISLAND
JAMES RIVER
HOG ISLAND
SKIFFES CREEK
COBHAM BAY
SURRY POWER STATION
JAMES RIVER
1
2
3
4
5
6
7
8
9
10
11
1 0 1 2 Nautical Miles
1000 0 1000 2000 3000 Yards
Sampling Stations

JAMES RIVER

JAMESTOWN ISLAND TO SKIFFES CREEK

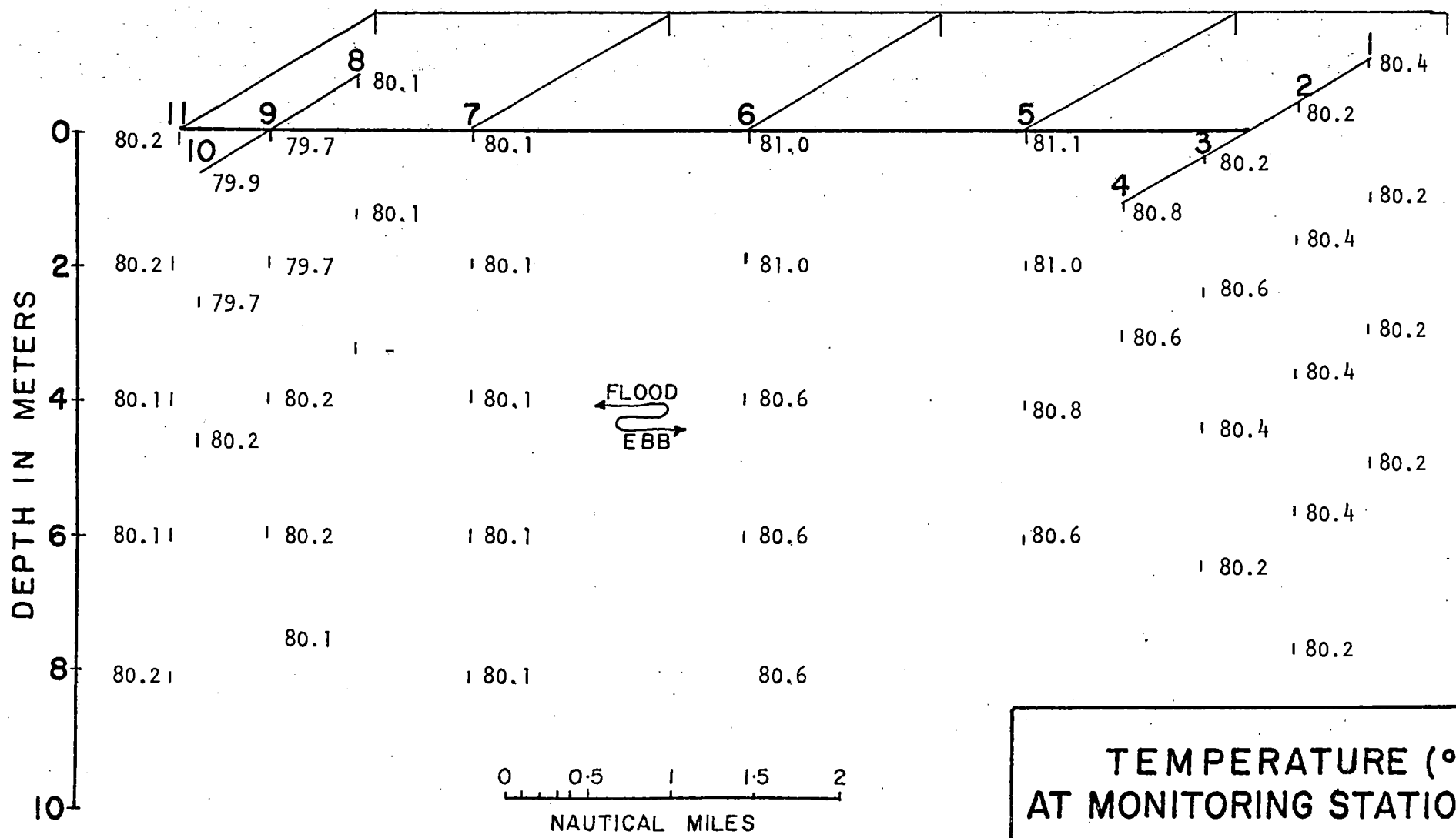


SALINITY (ppt)
AT MONITORING STATIONS
July
1975

Figure 2.2-2

JAMES RIVER

JAMESTOWN ISLAND TO SKIFFES CREEK

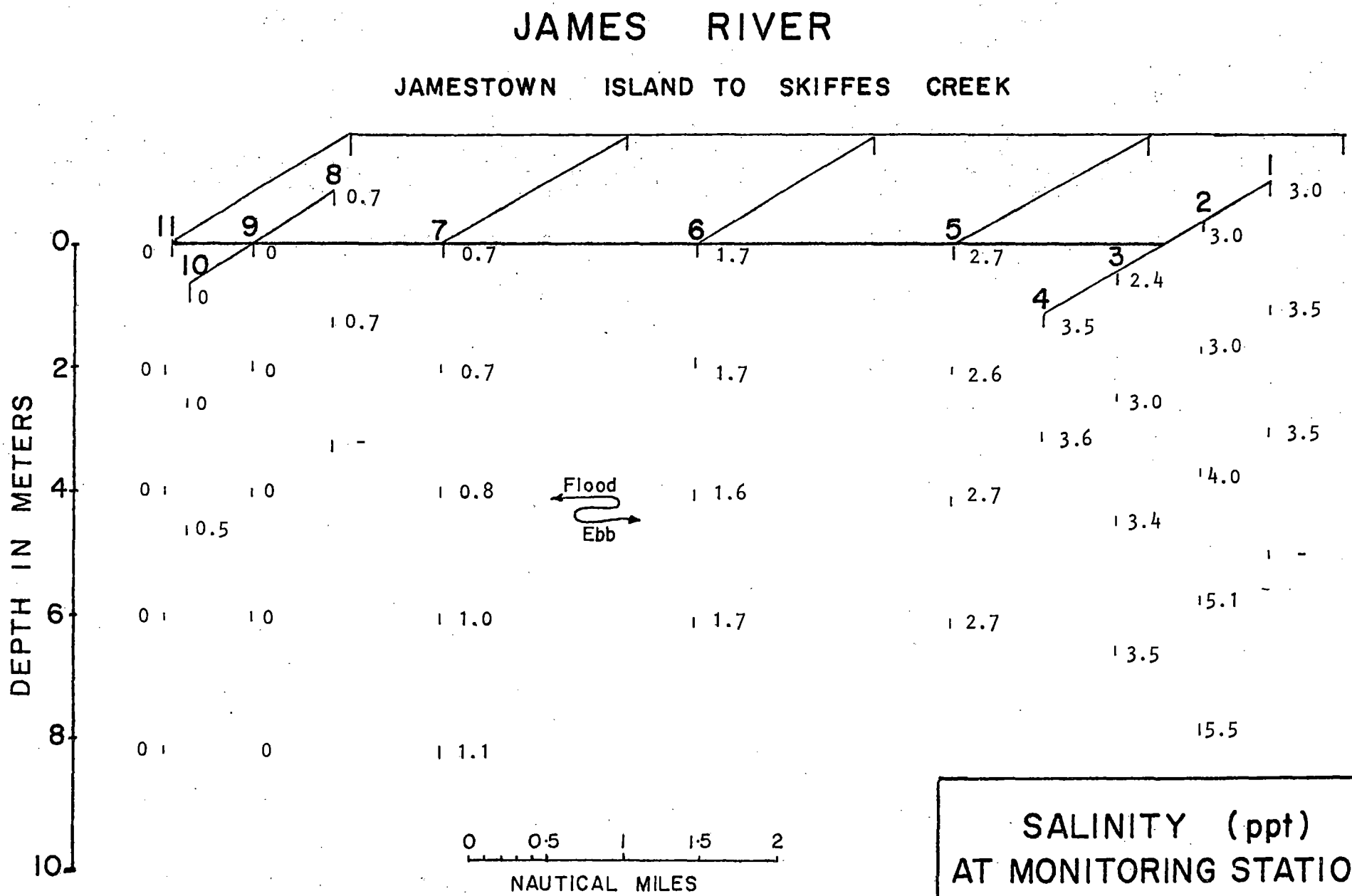


TEMPERATURE (°C) AT MONITORING STATIONS

July

1975

Figure 2.2-3

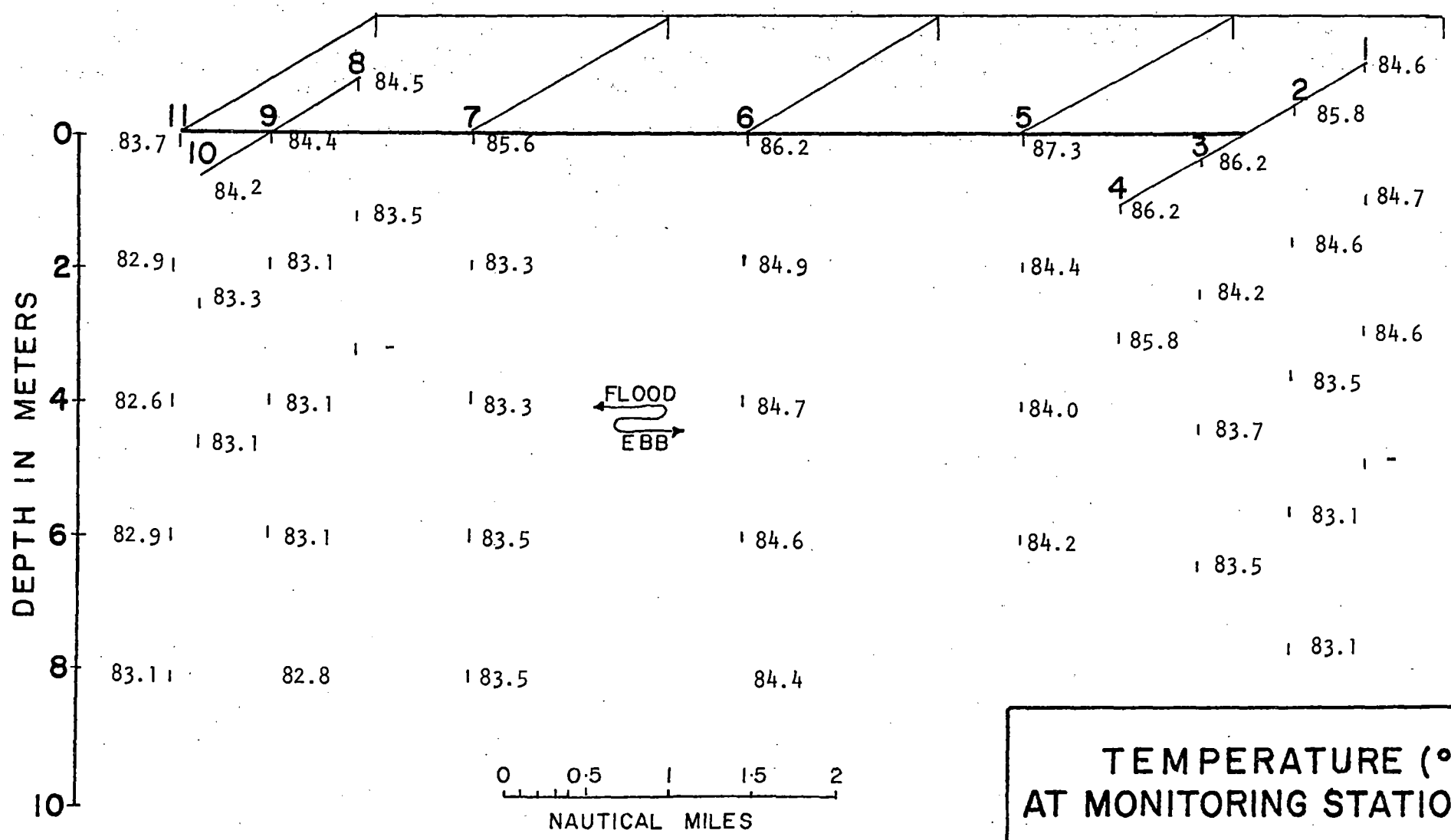


SALINITY (ppt)
AT MONITORING STATIONS
August
1975

Figure 2.2-4

JAMES RIVER

JAMESTOWN ISLAND TO SKIFFES CREEK

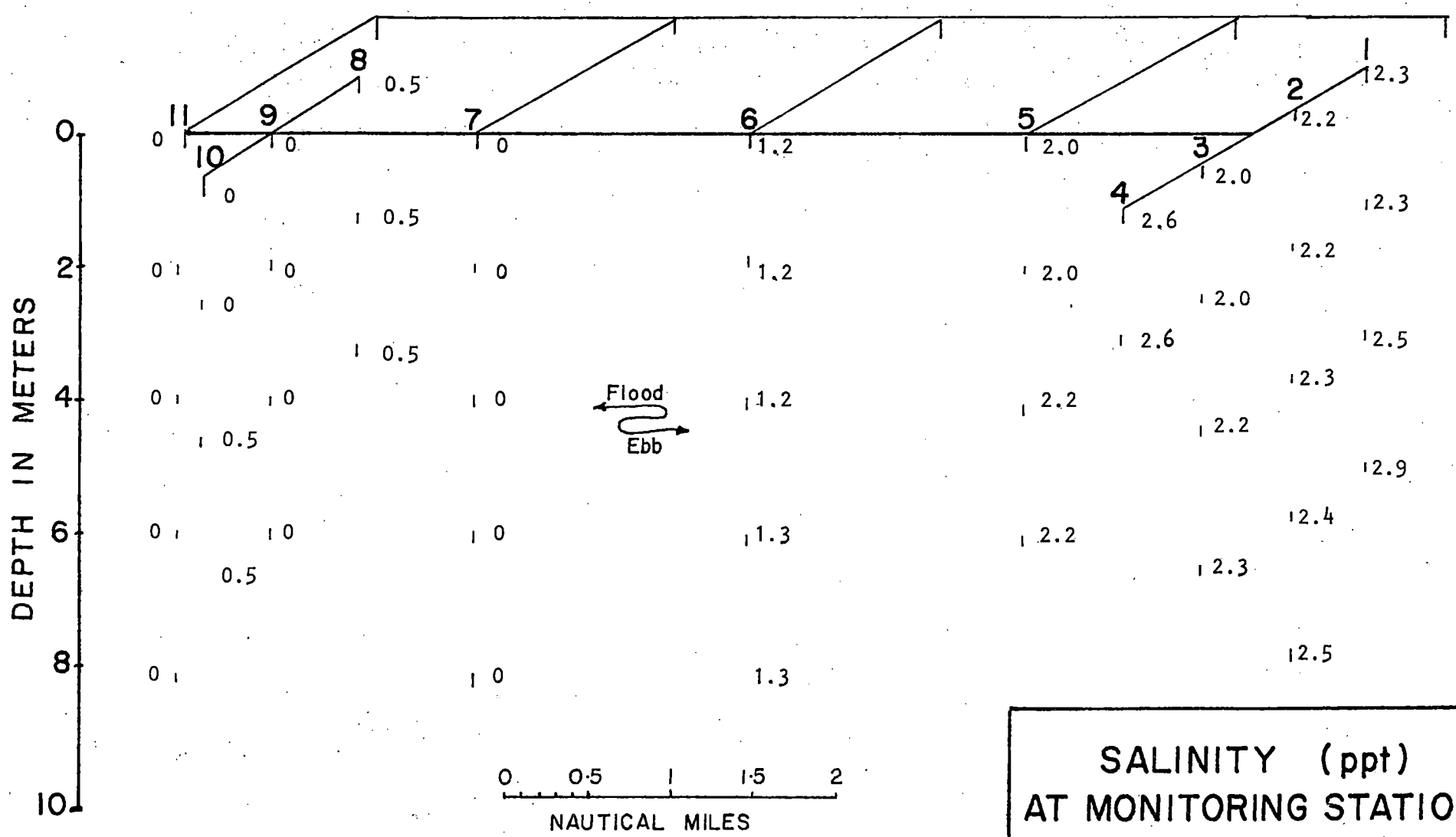


TEMPERATURE (°C) AT MONITORING STATIONS

August

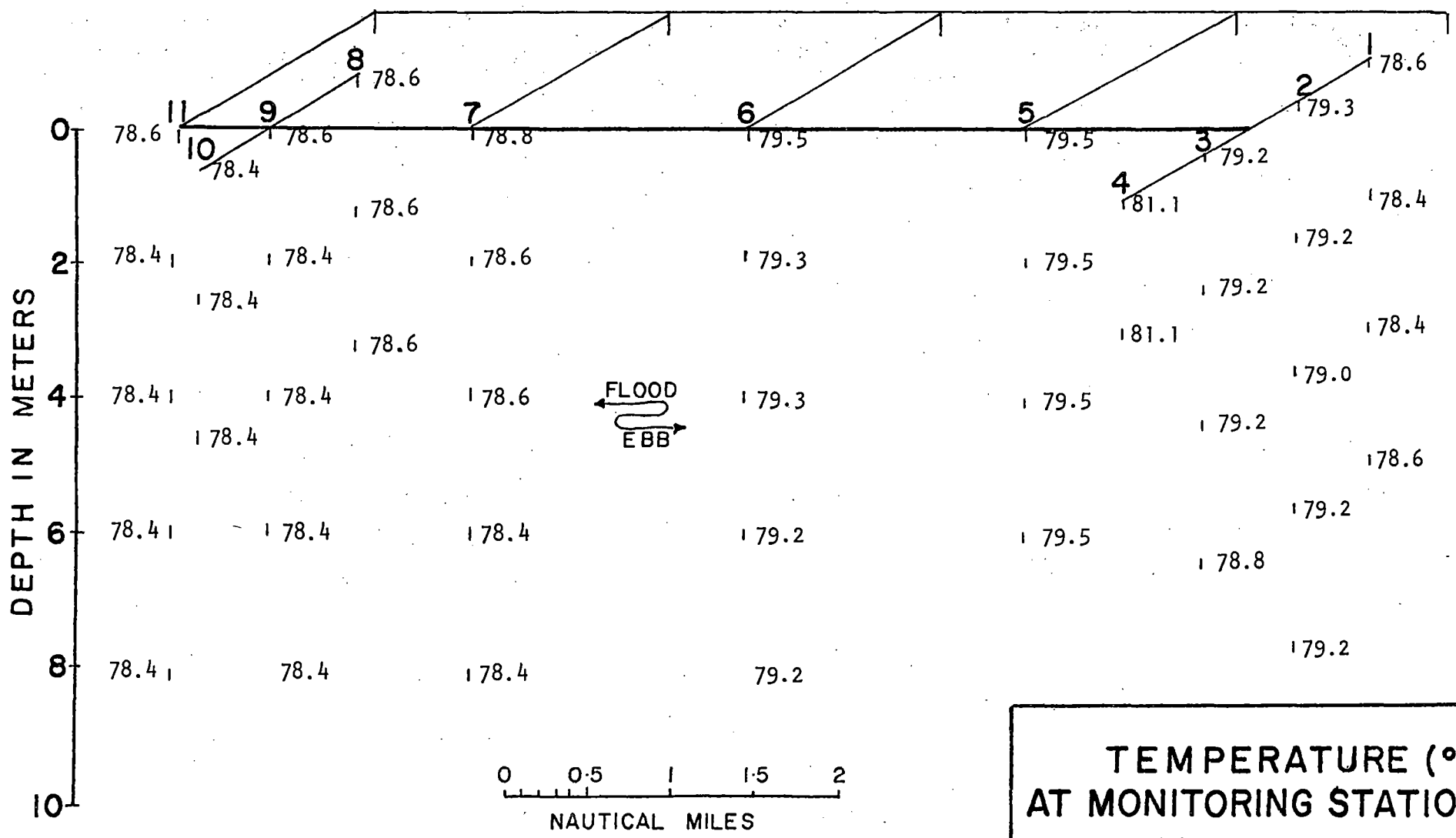
1975

Figure 2.2-5



SALINITY (ppt)
AT MONITORING STATIONS
September
1975

Figure 2.2-6

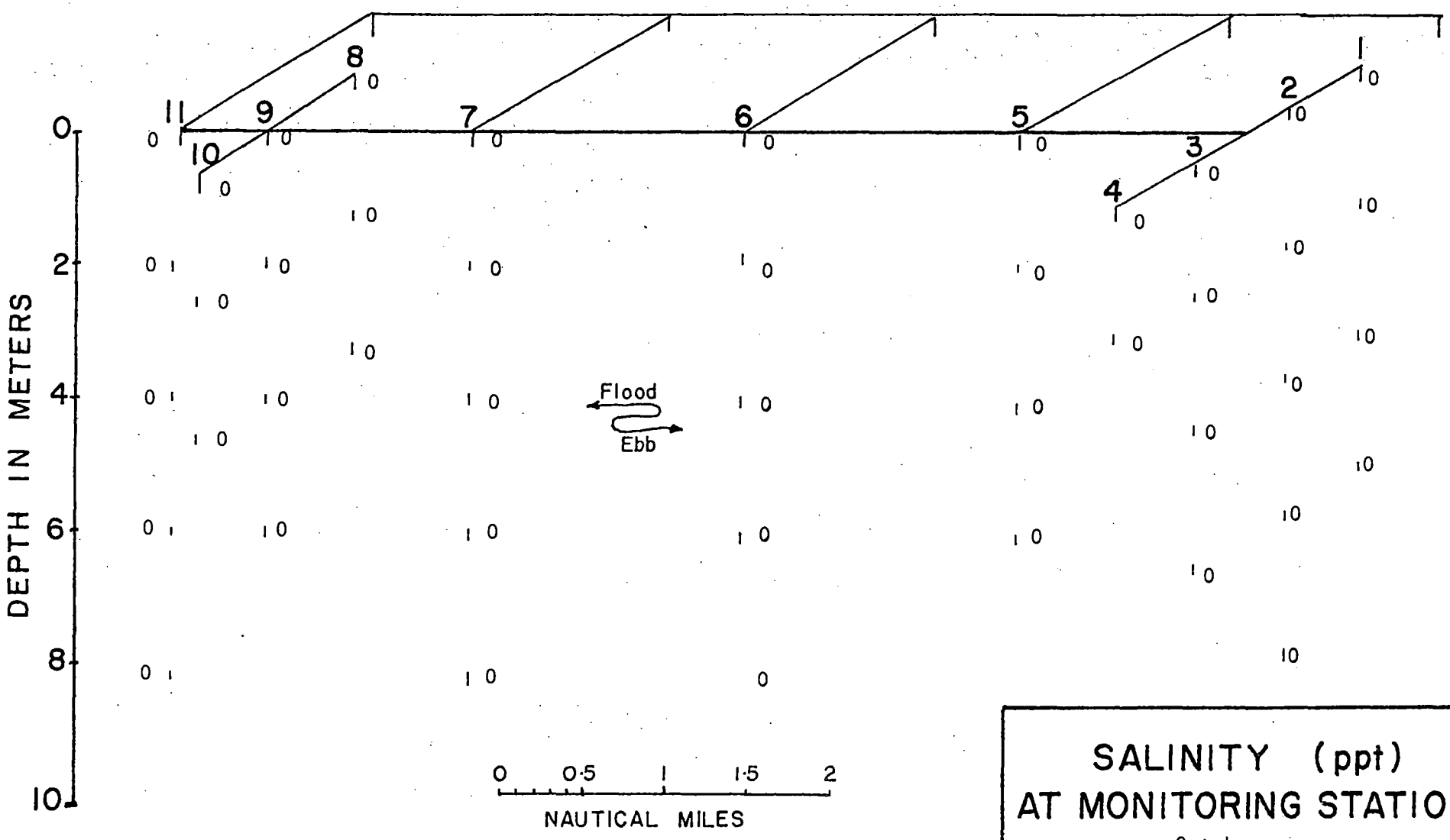


TEMPERATURE (°C) AT MONITORING STATIONS

September

1975

Figure 2.2-7

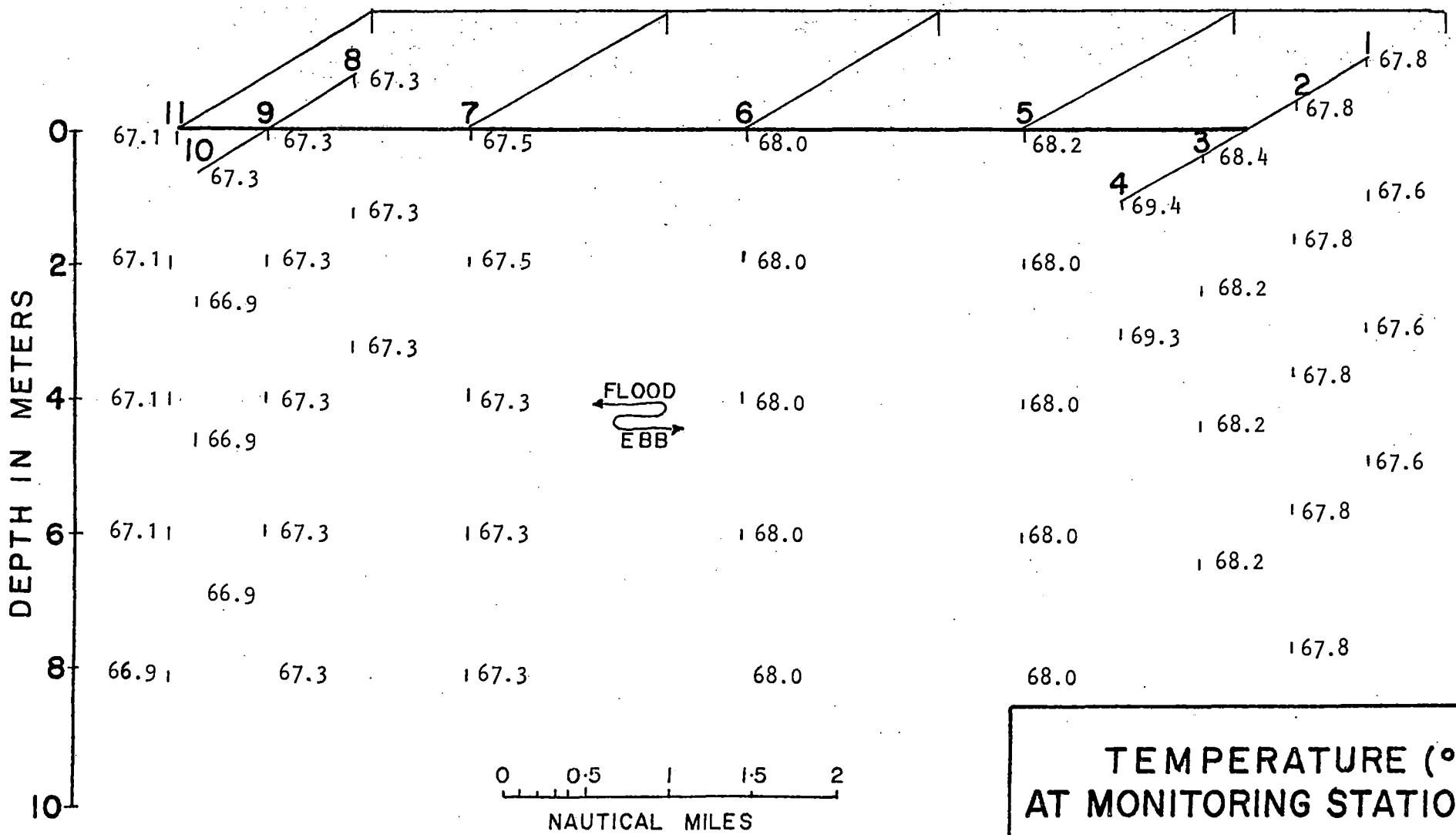


SALINITY (ppt)
AT MONITORING STATIONS
October
1975

Figure 2.2-8

JAMES RIVER

JAMESTOWN ISLAND TO SKIFFES CREEK



TEMPERATURE (°C) AT MONITORING STATIONS

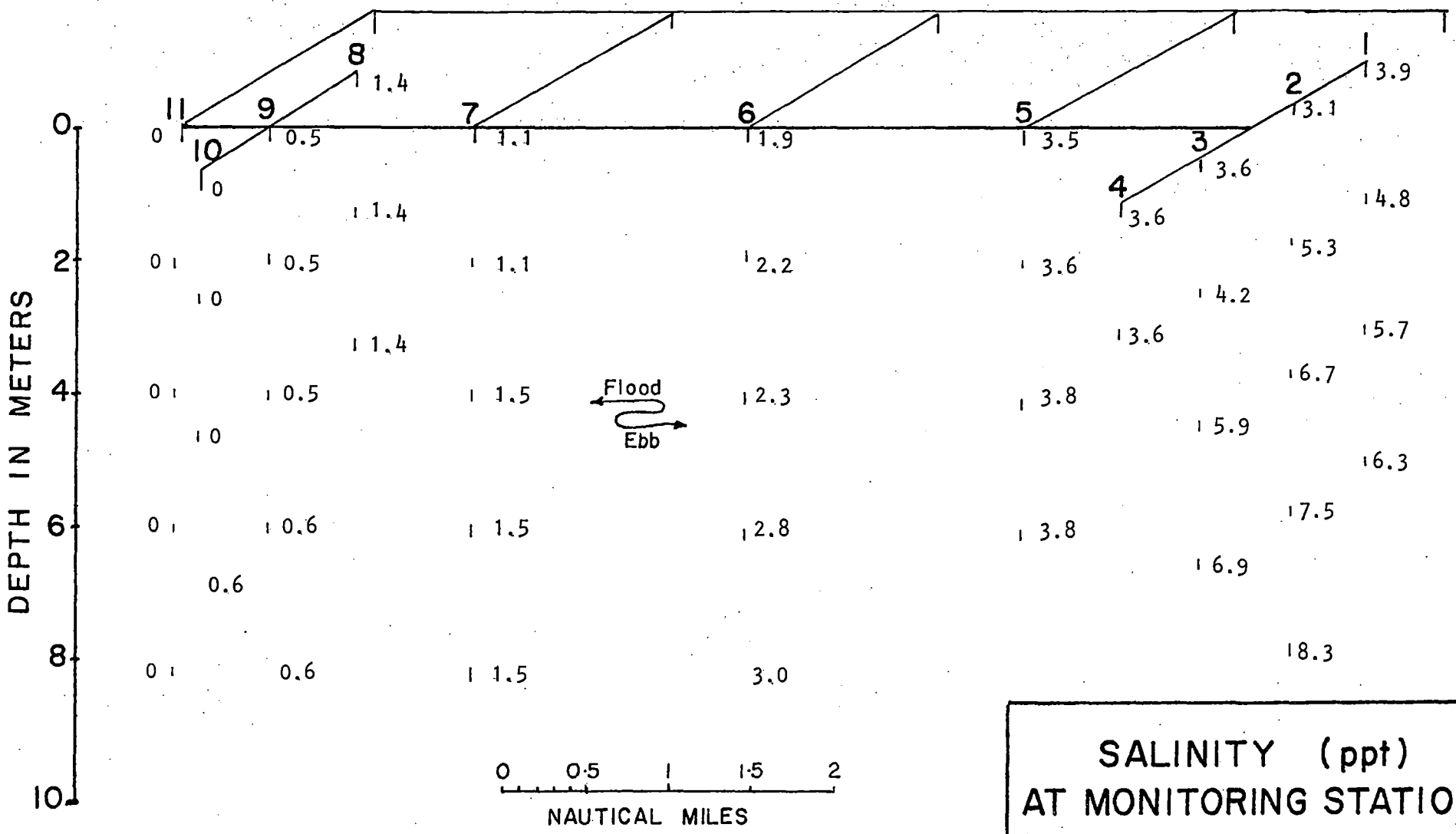
October

1975

Figure 2.2-9

JAMES RIVER

JAMESTOWN ISLAND TO SKIFFES CREEK



SALINITY (ppt)
AT MONITORING STATIONS

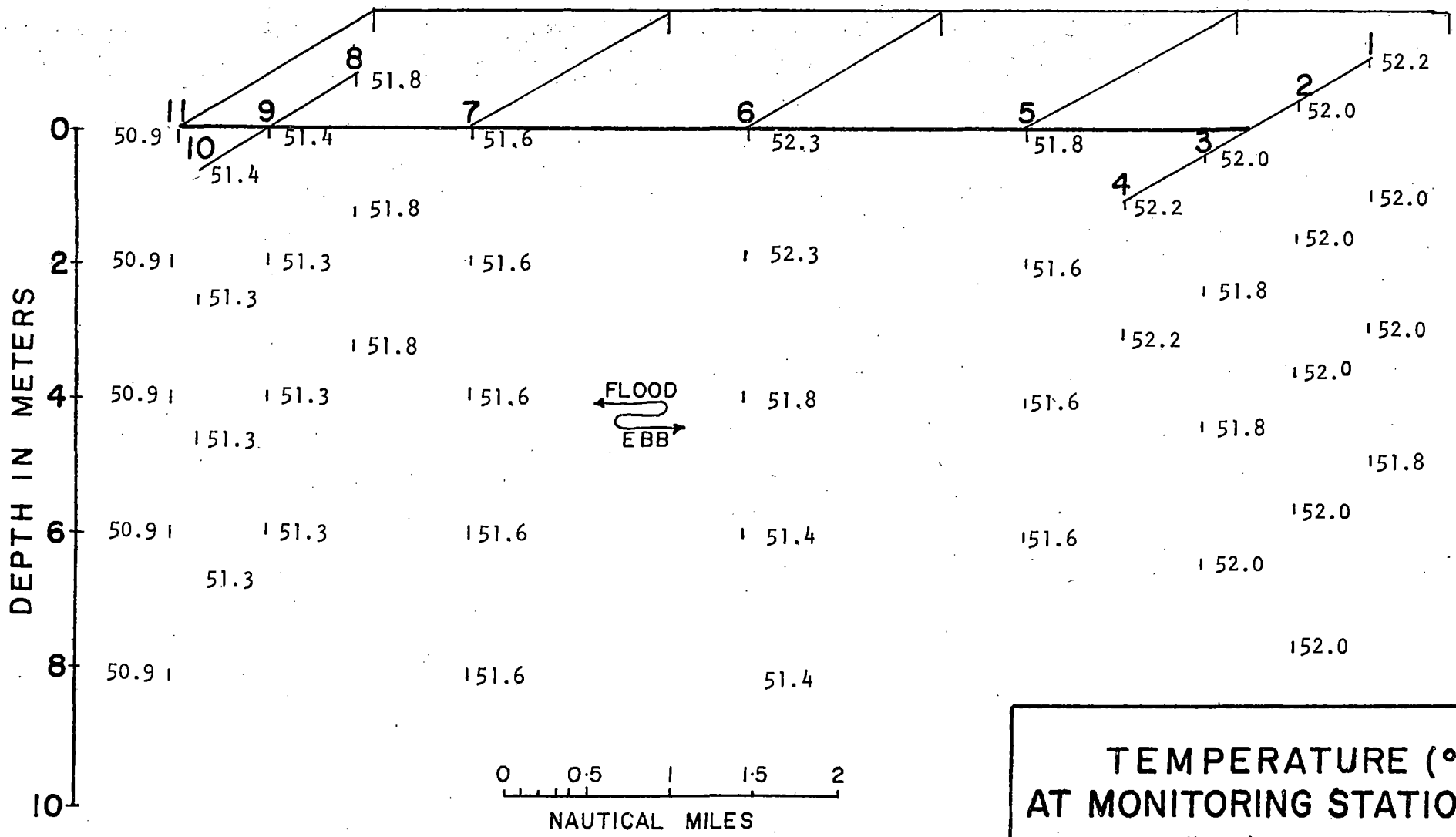
November

1975

Figure 2.2-10

JAMES RIVER

JAMESTOWN ISLAND TO SKIFFES CREEK



TEMPERATURE (°C) AT MONITORING STATIONS

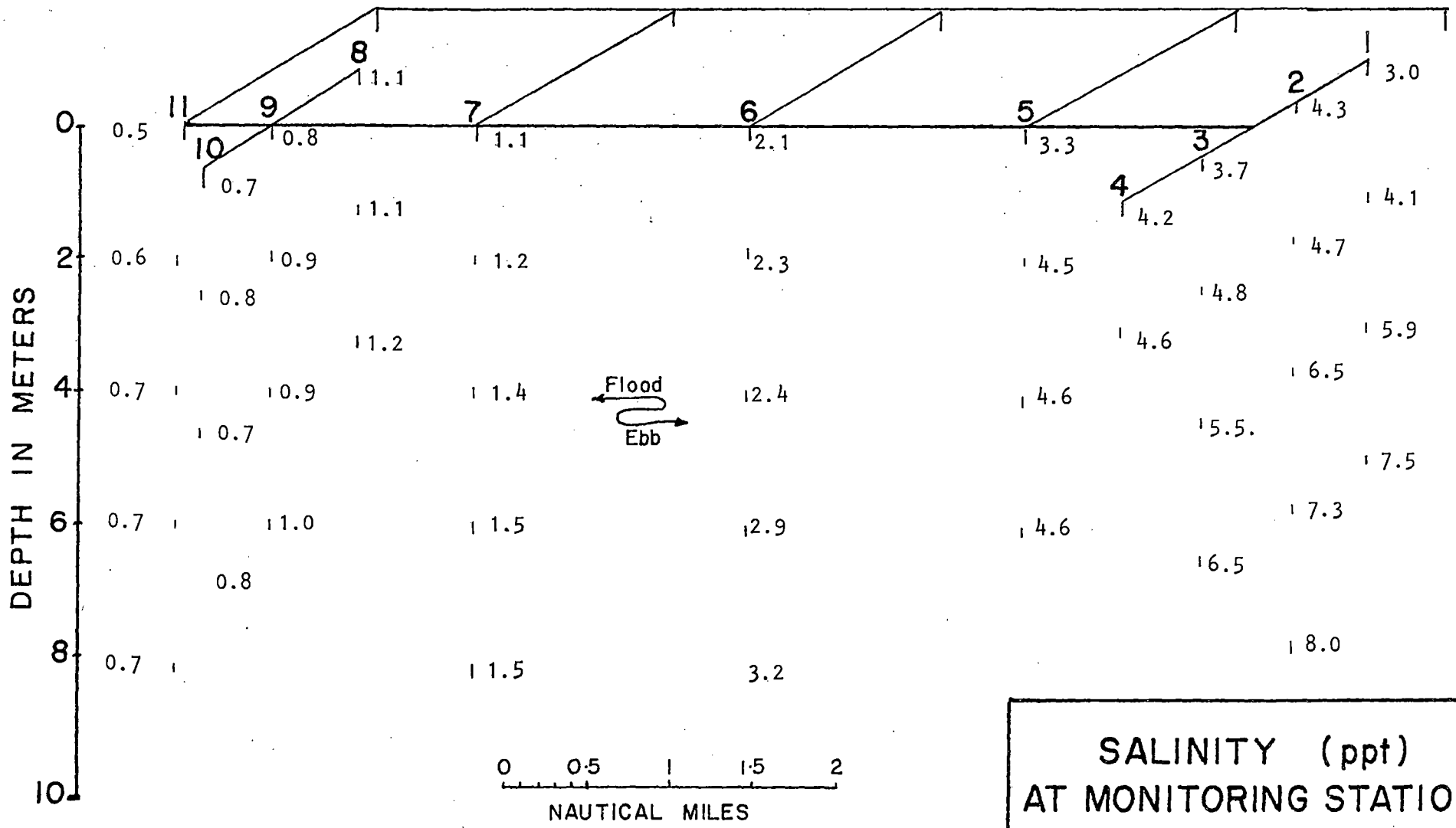
November

1975

Figure 2.2-11

JAMES RIVER

JAMESTOWN ISLAND TO SKIFFES CREEK



SALINITY (ppt)
AT MONITORING STATIONS

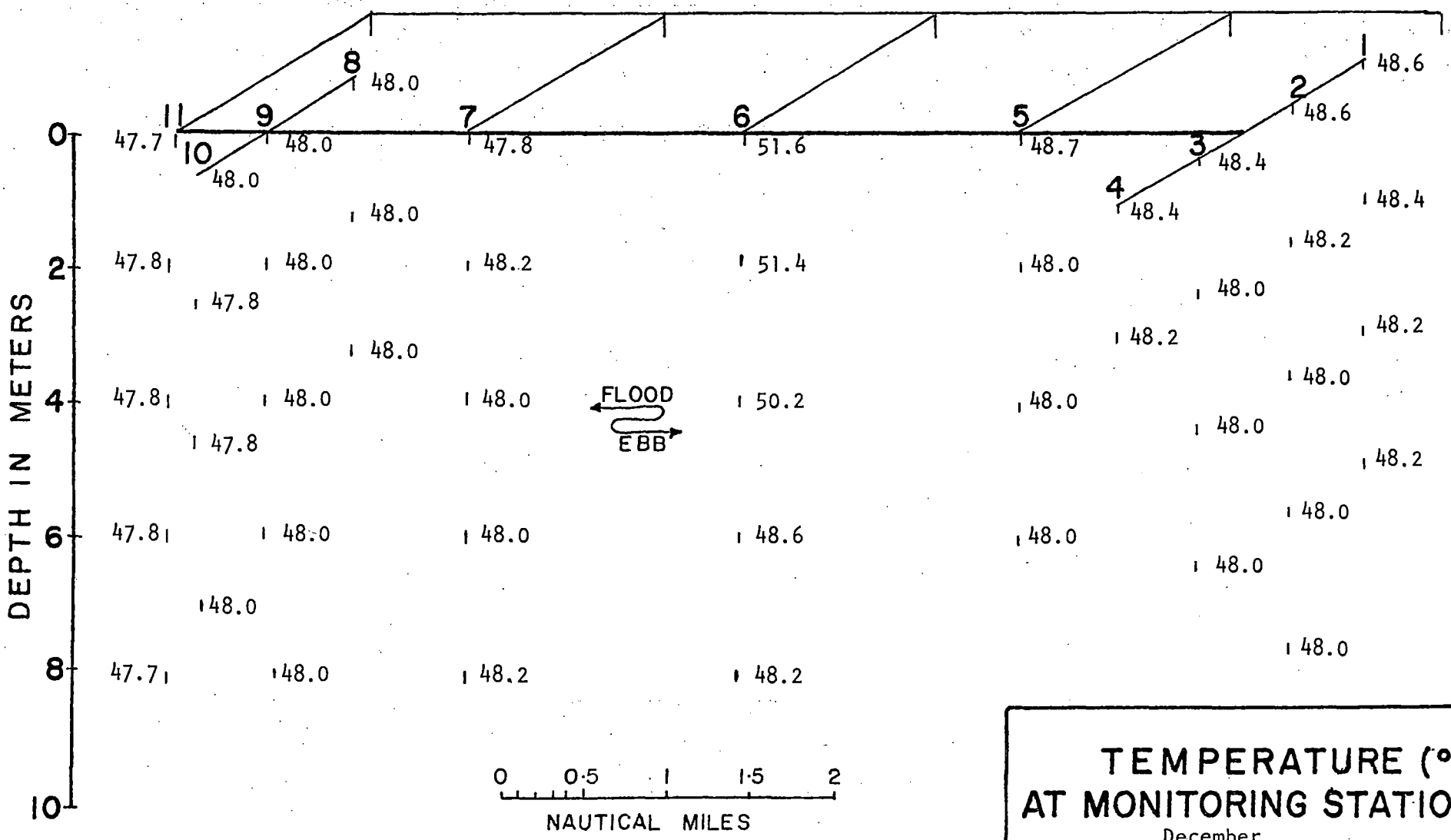
December

1975

Figure 2.2-12

JAMES RIVER

JAMESTOWN ISLAND TO SKIFFES CREEK


DEPTH IN METERS
0
2
4
6
8
10
11
10
9
8
7
6
5
4
3
2
1
47.7
48.0
48.0
48.0
47.8
47.8
48.0
48.0
47.8
47.8
48.0
48.0
47.8
48.0
48.0
48.0
47.7
48.0
48.2
48.0
48.2
48.0
48.0
48.0

2.3 FRESHWATER DISCHARGE OF THE JAMES RIVER AT RICHMOND AND HOG ISLAND

The daily freshwater discharge of the James River and the James River and Kanawha Canal gages at Richmond have been combined and tabulated in Table 2.3-1. The calculated freshwater flow at Hog Island is also tabulated in Table 2.3-1.

The freshwater flow of the James River at Hog Island has been calculated using the flow at Richmond and the relative drainage area of the James River above and below Richmond to Hog Island. The area above Richmond is 6757 square miles and the area from Richmond to Hog Island is 2760 square miles.

Therefore:

$$B = A \times \frac{(6757 + 2760)}{6757}$$

Where: B = Flow at Hog Island

A = Flow at Richmond

The time of flow from Richmond to Hog Island is variable, being dependent upon the flow at Richmond.

TABLE 2.3-1

FRESHWATER DISCHARGE OF THE JAMES RIVER AT RICHMOND AND HOG ISLAND
JULY-DECEMBER, 1975

DATE	JAMES RIVER DISCHARGE AT RICHMOND, C.F.S.	CALCULATED JAMES RIVER DISCHARGE AT HOG POINT, C.F.S.
July 1, 1975	4,694	6,611
2	4,176	5,882
3	3,618	5,096
4	3,458	4,870
5	3,488	4,913
6	3,538	4,983
7	4,006	5,642
8	4,436	6,248
9	4,176	5,882
10	4,306	6,065
11	4,056	5,713
12	4,324	6,090
13	6,048	8,518
14	32,492	45,764
15	38,928	54,829
16	21,428	30,181
17	28,828	40,603
18	19,328	27,223
19	11,410	16,071
20	8,060	11,352
21	6,310	8,887
22	5,490	7,732
23	5,360	7,549
24	4,972	7,003
25	4,842	6,820
26	9,969	14,040
27	8,750	12,324
28	6,610	9,310
29	5,360	7,549
30	5,230	7,366
31	4,842	6,820
August 1, 1975	4,324	6,090
2	3,606	5,079
3	3,676	5,178
4	3,338	4,702
5	3,238	4,561
6	4,972	7,003
7	9,688	13,645
8	7,390	10,409
9	7,230	10,183
10	5,472	7,707
11	4,574	6,442
12	3,976	5,600
13	3,906	5,502
14	3,488	4,913
15	3,338	4,702

TABLE 2.3-1 (Cont'd)

DATE	JAMES RIVER DISCHARGE AT RICHMOND, C.F.S.	CALCULATED JAMES RIVER DISCHARGE AT HOG POINT, C.F.S.
August 16, 1975	3,318	4,673
17	6,030	8,493
18	5,212	7,341
19	3,688	5,194
20	3,268	4,603
21	3,458	4,070
22	2,740	3,859
23	2,980	4,197
24	2,632	3,707
25	2,840	4,000
26	3,338	4,702
27	3,250	4,578
28	2,454	3,456
29	2,204	3,104
30	2,314	3,259
31	2,184	3,076
September 1, 1975	8,396	11,826
2	12,711	17,903
3	7,551	10,635
4	6,218	8,758
5	4,635	6,528
6	3,985	5,613
7	3,238	4,561
8	3,288	4,631
9	3,318	4,673
10	3,488	4,913
11	3,506	4,938
12	3,338	4,702
13	3,148	4,434
14	3,168	4,462
15	2,980	4,197
16	2,492	3,510
17	2,540	3,578
18	2,610	3,676
19	2,808	3,955
20	3,874	5,456
21	4,472	6,299
22	4,454	6,273
23	5,622	7,918
24	26,428	37,223
25	45,410	63,959
26	74,874	105,458
27	65,910	92,832
28	27,410	38,606
29	16,810	23,676
30	12,210	17,197

TABLE 2.3-1 (Cont'd)

DATE	JAMES RIVER DISCHARGE AT RICHMOND, C.F.S.	CALCULATED JAMES RIVER DISCHARGE AT HOG POINT, C.F.S.
October 1, 1975	9,670	13,620
2	8,230	11,592
3	6,910	9,732
4	6,302	8,876
5	6,012	8,468
6	5,342	7,524
7	4,972	7,003
8	4,972	7,003
9	4,842	6,820
10	4,972	7,003
11	4,972	7,003
12	4,712	6,637
13	4,574	6,442
14	4,454	6,273
15	4,574	6,442
16	4,574	6,442
17	4,324	6,090
18	5,472	7,707
19	17,846	25,136
20	30,346	42,741
21	21,328	30,040
22	13,128	18,490
23	10,230	14,409
24	8,418	11,856
25	7,248	10,209
26	6,610	9,310
27	6,170	8,690
28	5,750	8,099
29	5,620	7,916
30	5,230	7,366
31	4,972	7,003
November 1, 1975	4,972	7,003
2	4,712	6,637
3	4,454	6,273
4	4,454	6,273
5	4,324	6,090
6	4,194	5,907
7	4,194	5,907
8	4,472	6,299
9	4,006	5,642
10	4,194	5,907
11	4,194	5,907
12	4,592	6,468
13	7,110	10,014
14	15,928	22,434
15	10,248	14,434
16	9,688	13,645
17	9,128	12,856

TABLE 2.3-1 (Cont'd)

DATE	JAMES RIVER DISCHARGE AT RICHMOND, C.F.S.	CALCULATED JAMES RIVER DISCHARGE AT HOG POINT, C.F.S.
November 18, 1975	7,738	10,899
19	6,610	9,310
20	6,310	8,887
21	5,872	8,270
22	5,212	7,341
23	5,472	7,707
24	5,092	7,172
25	4,824	6,794
26	4,824	6,794
27	4,824	6,794
28	4,694	6,611
29	4,436	6,248
30	4,306	6,065
December 1, 1975	4,306	6,065
2	4,176	5,882
3	4,056	5,713
4	4,176	5,882
5	3,918	5,518
6	3,918	5,518
7	3,938	5,547
8	4,556	6,417
9	5,194	7,316
10	5,872	8,270
11	5,854	8,245
12	5,566	7,840
13	5,176	7,290
14	4,658	6,561
15	4,676	6,586
16	4,936	6,952
17	4,288	6,040
18	4,158	5,856
19	4,038	5,687
20	3,888	5,476
21	3,958	5,575
22	3,670	5,169
23	3,520	4,958
24	3,638	5,124
25	3,638	5,124
26	4,306	6,065
27	9,970	14,042
28	11,410	16,071
29	9,868	13,899
30	10,058	14,166
31	10,610	14,944

2.5 CHEMICAL RELEASES TO THE COOLING WATER SYSTEM

Table 2.5-1 through 2.5-6 identify and summarize the chemicals which were released to the cooling water system for the period July 1, 1975 through December 31, 1975.

SURRY POWER STATION

CHEMISTRY REPORT

JULY ,19 75

T.S. 6.6.A.11

TABLE 2.5-1

PRIMARY COOLANT ANALYSIS	UNIT NO. 1			UNIT NO. 2		
	MAXIMUM	MINIMUM	AVERAGE	MAXIMUM	MINIMUM	AVERAGE
Gross Radioact., µCi/ml	3.45E-1	9.65E-2	1.90E-1	3.55E-1	1.33E-2	2.43E-1
Suspended Solids, ppm	0.1	0.0	0.1	0.2	0.0	0.1
Gross Tritium, µCi/ml	5.88E-2	3.31E-2	4.27E-2	6.50E-2	4.09E-2	5.67E-2
Iodine-131, µCi/ml	1.11E-1	7.81E-3	7.42E-2	8.49E-3	1.78E-3	5.08E-3
I-131/I-133	1.19	.77	1.00	.92	.15	.44
Hydrogen, cc/kg	30.0	18.2	22.7	26.2	15.0	20.6
Lithium, ppm	.90	.30	.46	.72	.34	.50
Boron-10, ppm +	240.2	52.9	116.4	290.9	174.6	208.5
Oxygen-16, ppm	0	0	0	0	0	0
Chloride, ppm	.12	.05	.06	.12	.05	.06
pH @ 25°C	6.75	6.02	6.52	6.50	5.92	6.25

+ Boron-10 = Total Boron x 0.196

NON-RADIOACTIVE CHEMICAL
RELEASES, POUNDS
T.S. 4.13.A.8

Phosphate 0 Boron 612

Sulfate 1390 Chromate 0.35

Remarks:

SURRY POWER STATION

CHEMISTRY REPORT

AUGUST ,19 75

T.S. 6.6.A.11

TABLE 2.5-2

PRIMARY COOLANT ANALYSIS	UNIT NO. 1			UNIT NO. 2		
	MAXIMUM	MINIMUM	AVERAGE	MAXIMUM	MINIMUM	AVERAGE
Gross Radioact., µCi/ml	2.61E-1	* 2.70E-2	1.96E-1	4.80E-1	1.54E-1	2.75E-1
Suspended Solids, ppm	0.1	0.0	0.1	0.1	0.0	0.1
Gross Tritium, µCi/ml	8.98E-2	1.81E-2	3.96E-2	6.40E-2	4.29E-2	5.69E-2
Iodine-131, µCi/ml	5.17E-2	4.40E-2	4.93E-2	6.19E-1	6.45E-3	9.14E-2
I-131/I-133	0.84	0.62	0.72	1.00	0.54	0.76
Hydrogen, cc/kg	18.2	10.3	15.0	28.3	16.2	21.6
Lithium, ppm	0.48	0.20	0.34	0.68	0.46	0.55
Boron-10, ppm +	*181.5	40.2	66.4	186.4	160.7	169.7
Oxygen-16, ppm	0	0	0	0	0	0
Chloride, ppm	.09	.05	.06	.09	.05	.06
pH @ 25°C	6.88	6.13	6.60	6.50	6.22	6.34

+ Boron-10 = Total Boron x 0.196

NON-RADIOACTIVE CHEMICAL
RELEASES, POUNDS
T.S. 4.13.A.8

Phosphate 0 Boron 930

Sulfate 834 Chromate 0.54

Remarks: * Unit Shutdown

SURRY POWER STATION

CHEMISTRY REPORT

SEPTEMBER ,19 75

T.S. 6.6.A.11

TABLE 2.5-3

PRIMARY COOLANT ANALYSIS	UNIT NO. 1			UNIT NO. 2		
	MAXIMUM	MINIMUM	AVERAGE	MAXIMUM	MINIMUM	AVERAGE
Gross Radioact., µCi/ml	3.21E-1	3.95E-2	2.10E-1	3.00E-1	1.44E-1	2.33E-1
Suspended Solids, ppm	0.01	0.00	0.01	0.01	0.00	0.01
Gross Tritium, µCi/ml	6.30E-2	3.74E-2	5.13E-2	1.30E-1	6.79E-2	1.04E-1
Iodine-131, µCi/ml	3.38E-2	3.04E-2	3.17E-2	2.25E-1	9.29E-3	3.80E-2
I-131/I-133	0.99	0.51	0.72	1.23	0.43	0.73
Hydrogen, cc/kg	28.8	*0.0	15.4	31.6	16.4	22.4
Lithium, ppm	0.26	*0.03	*0.18	0.60	0.26	0.46
Boron-10, ppm +	*290.0	23.9	117.0	203.2	110.1	161.9
Oxygen-16, ppm	0.00	*8.80	*0.93	0.000	0.000	0.000
Chloride, ppm	0.07	0.05	0.06	0.07	0.05	0.06
pH @ 25°C	6.85	5.40	6.56	6.52	6.11	6.36

+ Boron-10 = Total Boron x 0.196

NON-RADIOACTIVE CHEMICAL
RELEASES, POUNDS
T.S. 4.13.A.8

Phosphate 4 Boron 386

Sulfate 838 Chromate 0.18

Remarks: *Unit shutdown for refueling.

SURRY POWER STATION

CHEMISTRY REPORT

OCTOBER ,1975

T.S. 6.6.A.11 Table 2.5-4

PRIMARY COOLANT ANALYSIS	UNIT NO. 1			UNIT NO. 2		
	MAXIMUM	MINIMUM	AVERAGE	MAXIMUM	MINIMUM	AVERAGE
Gross Radioact., µCi/ml	4.46E-2	1.16E-3	1.64E-2	2.88E-1	1.21E-2	1.53E-1
Suspended Solids, ppm	0.6	0.1	0.3	0.2	0.0	0.1
Gross Tritium, µCi/ml	9.67E-2	9.94E-3	3.38E-2	7.49E-2	3.04E-2	4.79E-2
Iodine-131, µCi/ml	4.30E-2	2.19E-5	6.07E-3	1.64E-2	1.48E-3	7.26E-3
I-131/I-133	*	*	*	0.53	0.06	0.30
Hydrogen, cc/kg	0.00	0.00	0.00	28.3	13.4	19.0
Lithium, ppm	0.03	0.00	<0.01	0.71	0.31	0.47
Boron-10, ppm +	514.9	286.9	453.1	356.1 **	136.8	184.2
Oxygen-16, ppm	5.80	0.40	2.16	0.000	0.000	0.000
Chloride, ppm	0.14	0.05	0.07	0.09	0.05	0.06
pH @ 25°C	5.55	4.50	5.09	6.62	5.91	6.37

+ Boron-10 = Total Boron x 0.196

NON-RADIOACTIVE CHEMICAL
RELEASES, POUNDS
T.S. 4.13.A.8

Phosphate 0 Boron 926.8

Sulfate 560 Chromate 0.24

Remarks: * Unit 1 shutdown for refueling during the entire month.

** Reactor Trip

SURRY POWER STATION

CHEMISTRY REPORT

NOVEMBER ,19 75

T.S. 6.6.A.11

Table 2.5-5

PRIMARY COOLANT ANALYSIS	UNIT NO. 1			UNIT NO. 2		
	MAXIMUM	MINIMUM	AVERAGE	MAXIMUM	MINIMUM	AVERAGE
Gross Radioact., µCi/ml	3.94E-2	1.10E-3	6.07E-3	3.00E-1	1.78E-1	2.35E-1
Suspended Solids, ppm	0.4	0.0	0.1	0.2	0.0	0.1
Gross Tritium, µCi/ml	2.03E-2	8.85E-3	1.35E-2	1.74E-1	6.52E-2	1.17E-1
Iodine-131, µCi/ml	1.03E-3	1.11E-4	5.63E-4	3.39E-2	7.82E-3	1.52E-2
I-131/I-133	*	*	*	0.7440	0.3463	0.5240
Hydrogen, cc/kg	0.0*	0.0*	0.0*	24.6	19.4	21.0
Lithium, ppm	0.37	0.0*	0.14*	1.00	0.60	0.84
Boron-10, ppm +	500.6	432.8	480.8	139.6	116.4	128.0
Oxygen-16, ppm	2.00*	0.00	0.84	0.00	0.00	0.00
Chloride, ppm	0.12	0.05	0.06	0.07	0.05	0.05
pH @ 25°C	6.20	4.85	5.42	6.90	6.50	6.70

+ Boron-10 = Total Boron x 0.196

NON-RADIOACTIVE CHEMICAL
RELEASES, POUNDS
T.S. 4.13.A.8

Phosphate 0 Boron 969.4

Sulfate 1112 Chromate 0.06

Remarks: * Unit shutdown for refueling.

SURRY POWER STATION

CHEMISTRY REPORT

DECEMBER ,19 75

T.S. 6.6.A.11

Table 2.5-6

PRIMARY COOLANT ANALYSIS	UNIT NO. 1			UNIT NO. 2		
	MAXIMUM	MINIMUM	AVERAGE	MAXIMUM	MINIMUM	AVERAGE
Gross Radioact., µCi/ml	3.47E-1	8.79E-4	1.47E-1	3.07E-1	1.71E-1	2.46E-1
Suspended Solids, ppm	0.1	0.0	0.1	0.2	0.0	0.1
Gross Tritium, µCi/ml	6.40E-2	5.55E-3	2.55E-2	1.27E-1	5.04E-2	9.42E-2
Iodine-131, µCi/ml	5.93E-2	3.47E-3	1.63E-2	5.03E-2	1.53E-2	2.36E-2
I-131/I-133	0.53	0.11	0.33	0.76	0.40	0.53
Hydrogen, cc/kg	19.5	1.4*	11.1	25.6	12.5	18.7
Lithium, ppm	0.65	0.10*	0.34	0.87	0.58	0.75
Boron-10, ppm +	507.1*	134.3	241.5	119.9	94.3	109.4
Oxygen-16, ppm	0	0	0	0	0	0
Chloride, ppm	0.11	0.05	0.06	0.05	0.05	0.05
pH @ 25°C	6.75	5.10	6.00	6.91	6.62	6.77

+ Boron-10 = Total Boron x 0.196

NON-RADIOACTIVE CHEMICAL
RELEASES, POUNDS
T.S. 4.13.A.8

Phosphate 0 Boron 1789

Sulfate 834 Chromate 0.56

Remarks: *Unit shutdown for refueling.

3.0 NON-RADIOLOGICAL MONITORING PROGRAM - BIOLOGICAL

The Non-radiological Monitoring Program - Biological applies to the monitoring of the biological variables in the ten (10) mile segment of the James River Estuary centered at Hog Island. The biological monitoring program which is closely related to the physical and chemical programs is conducted to determine the planktonic, nektonic, and benthic characteristics of the tidal segment centered at Hog Island and to determine biological changes that occur as a result of the operation of the Surry Power Station.

3.1 PLANKTON

Summary

Water samples for plankton analyses are collected at each of six (6) stations as indicated in Figure 3.1-1. Samples are also collected in the intake and discharge canals. During the month of August, sampling was augmented with six (6) additional stations to provide more comparisons among stations within and outside the plume. Phytoplankton samples are taken monthly and are analyzed quantitatively in terms of sample volume to determine both the dominant genera of the community and the chlorophyll "a" content. Zooplankton samples are analyzed quantitatively in terms of sample volume to determine generic composition, life history stage and, where possible, species. The sampling interval is approximately monthly, taking into consideration life-history information about important species in the area which have planktonic stages in their life histories.

Results

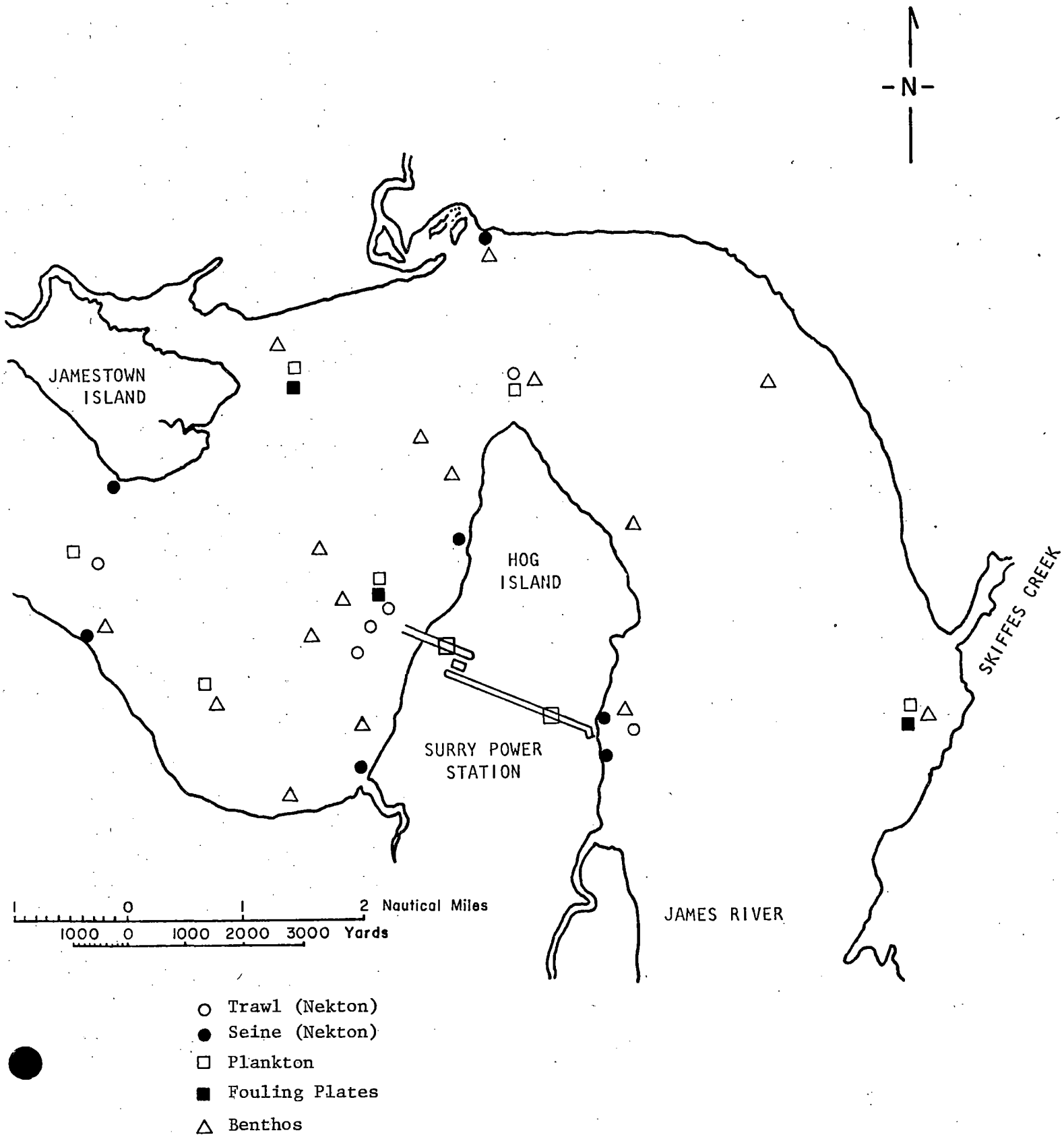
The results of this survey are contained in the report prepared by the Virginia Institute of Marine Science entitled "Vepco Surry Power Plant Study, Progress Report" dated January, 1976 which is appended to this section as Appendix 3.0.

Conclusions

Refer to the referenced report.

Figure 3.1-1

BIOLOGICAL SAMPLE STATIONS



3.2 ATTACHED BENTHIC COMMUNITY

Summary

Fouling plates that are 125- by 75-mm asbestos boards are suspended 1 meter above the bottom at the instrument tower locations shown in Figure 3.1-1 are used to obtain samples. Two vertical and two horizontal plates are suspended at each indicated location. One of each pair is removed and replaced at quarterly intervals; the other pair is left in place for one year before being removed and replaced. The benthic communities attached to the plates are analyzed for species composition and diversity.

Results

The results of this survey are contained in the report prepared by the Virginia Institute of Marine Science entitled "Vepco Surry Power Plant Study, Progress Report" dated January, 1976 which is appended to this section as Appendix 3.0.

Conclusions

Refer to the referenced report.

3.3 EPIBENTHOS

Summary

Replicate benthic grab samples are collected at the stations shown in Figure 3.1-1. Collection is made on a quarterly basis, except during June, July, and August when they are made monthly. Population characteristics such as species composition, diversity, evenness, redundancy, and richness are determined. The data are analyzed to detect changes in specific components of the epibenthic community including the brackish water clam *Rangia cuneata* and blue crab *Callinectes sapidus*.

Results

The results of this survey are contained in the report prepared by the Virginia Institute of Marine Science entitled, "Vepco Surry Power Plant Study, Progress Report" dated January, 1976 which is appended to this report as Appendix 3.0.

Conclusions

Refer to referenced report.

3.4 NEKTON

Fisheries investigations will be reported separately as results from monthly surveys, results from special seine surveys, ichthyoplankton entrainment study, and thermal plume entrainment study.

3.4.1 MONTHLY SURVEYS

Monthly surveys employing beach seines and otter trawls have been conducted since May, 1970. Four years of data were analyzed and reported in the Semiannual Operating Report, January 1, 1974 through June 30, 1974 as a comparison of pre- and postoperative conditions.

Data for July - December 1975 are presented as Tables 3.4.1-1 through 3.4.1-7. The cumulative account of the number of species, diversity, evenness, and richness by gear by season is presented as Figure 3.4.1-1. For purposes of this semiannual report, summer and fall (1975) points have been added to the figure. Winter (1975) data points on Figure 3.4.1-1 are based on one month (December) and are included for informational purposes only.

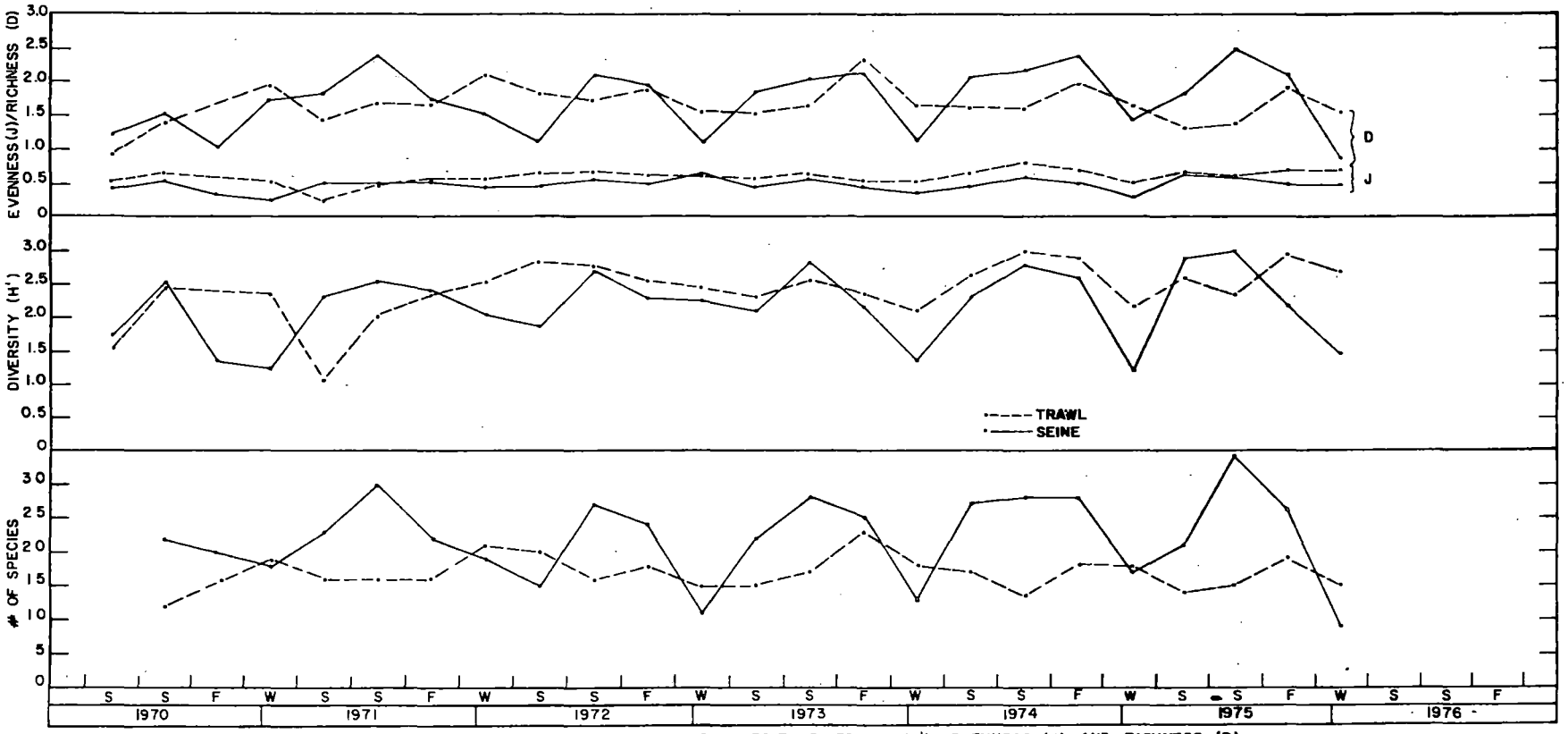


FIGURE 1: COMPOSITE OF NUMBERS OF SPECIES, DIVERSITY (H'), EVENNESS (J), AND RICHNESS (D) BY SEASON FOR SEINE AND TRAWL SAMPLES - SURRY POWER STATION

Figure 3.4.1-1

TABLE 3.4.1-1 -- DIVERSITY (H'), EVENNESS (J), RICHNESS (D): COMPOSITES BY SEASON

	SEINE			TRAWL		
	H'	J	D	H'	J	D
Summer 1975	2.9704	0.5839	2.4595	2.3219	0.5943	1.3535
Fall 1975	2.1498	0.4574	2.0908	2.9084	0.6847	1.8757
Winter* 1975	1.4555	0.4592	0.8640	2.6873	0.6878	1.5218

* Represents only one month's (December) data

TABLE 3.4.1-2 -- H' FOR SEINE DATA - SURRY

STATION

DATE	INTAKE SOUTH	INTAKE NORTH	HOG POINT WEST	CHIPPOKES CREEK	GOOSE HILL	JAMESTOWN ISLAND	COLLEGE CREEK	COMPOSITE
7-75	2.7004	1.4456	2.0826	2.4075	1.7113	1.4788	2.7204	2.3846
8-75	1.2980	2.4628	1.4282	1.3934	1.8058	2.7529	0.5769	1.7726
9-75	0.9015	1.3720	1.0855	1.6106	1.0865	1.4941	2.2140	2.0242
10-75	2.0130	2.2155	0.4436	1.5259	1.4513	2.1458	2.1031	2.1266
11-75	2.3936	0.5033	0.5682	1.1914	0.9310	1.8804	1.0121	1.4066
12-75	1.8675	1.4591	0.9995	0.9183	0.4206	1.1399	0.0905	1.4555

TABLE 3.4.1-3 -- H' FOR TRAWL DATA - SURRY

STATION

DATE	HOG POINT	INTAKE	DISCHARGE NORTH	DISCHARGE MIDDLE	DISCHARGE SOUTH	GOOSE HILL	COMPOSITE
7-75	0.5033	1.3710	2.1457	1.6446	1.8690	0.9183	2.0066
8-75	0.8454	1.3868	1.5219	1.7114	1.9778	0.0000	2.1248
9-75	2.0169	2.4309	1.6573	2.2152	1.3483	1.5850	2.0791
10-75	1.3753	1.5305	2.2040	1.5305	0.0000	0.0000	2.5258
11-75	2.9001	2.1665	2.9306	3.0521	2.3200	1.9577	3.3577
12-75	1.9155	2.5766	2.8936	1.4238	1.8068	1.5343	2.6873

TABLE 3.4.1-4 -- EVENNESS FOR SEINE DATA - SURRY

STATION

DATE	INTAKE SOUTH	INTAKE NORTH	HOG POINT WEST	CHIPPOKES CREEK	GOOSE HILL	JAMESTOWN ISLAND	COLLEGE CREEK	COMPOSITE
7-75	0.6912	0.4032	0.5095	0.6959	0.5151	0.4125	0.7352	0.4960
8-75	0.8190	0.8209	0.4505	0.4645	0.5037	0.7679	0.1820	0.3817
9-75	0.3882	0.4573	0.4675	0.6231	0.4203	0.5322	0.8565	0.4765
10-75	0.7170	0.7385	0.2218	0.4814	0.4838	0.7153	0.6331	0.5100
11-75	0.9260	0.5033	0.2841	0.5957	0.4009	0.6268	0.3915	0.3801
12-75	0.8043	0.9206	0.9995	0.9183	0.2103	0.4410	0.0905	0.4592

TABLE 3.4.1-5 -- EVENNESS FOR TRAWL DATA - SURRY

STATION

DATE	HOG POINT	INTAKE	DISCHARGE NORTH	DISCHARGE MIDDLE	DISCHARGE SOUTH	GOOSE HILL	COMPOSITE
7-75	0.5033	0.8650	0.7643	0.5188	0.6230	0.9183	0.5597
8-75	0.8454	0.6934	0.9602	0.7371	0.6593	0.0000	0.7083
9-75	0.8686	0.8103	0.7138	0.7384	0.4494	1.0000	0.6010
10-75	0.6876	0.9656	0.7851	0.9656	0.0000	0.0000	0.7968
11-75	0.8090	0.6835	0.7919	0.9188	0.8264	0.7573	0.8215
12-75	0.7410	0.8128	0.8072	0.4116	0.5040	0.5935	0.6878

TABLE 3.4.1-6 -- RICHNESS FOR SEINE DATA - SURRY

STATION

DATE	INTAKE SOUTH	INTAKE NORTH	HOG POINT WEST	CHIPPOKES CREEK	GOOSE HILL	JAMESTOWN ISLAND	COLLEGE CREEK	COMPOSITE
7-75	2.0132	1.3094	1.8597	1.2333	0.9742	1.2574	1.7227	2.4197
8-75	0.3201	1.3066	1.2293	0.8573	1.4272	1.6190	0.7876	2.1949
9-75	0.8412	0.9003	0.5541	0.7542	0.5931	0.5830	1.0092	1.6286
10-75	0.9856	1.2340	0.5401	0.9952	0.8492	1.0264	1.2338	1.7053
11-75	1.1991	0.3155	0.4128	0.4351	0.5063	1.0426	0.6505	1.2331
12-75	0.8724	0.7737	0.1892	0.3869	0.4202	0.6041	0.1552	0.8640

TABLE 3.4.1-7 -- RICHNESS FOR TRAWL DATA - SURRY

STATION

DATE	HOG POINT	INTAKE	DISCHARGE NORTH	DISCHARGE MIDDLE	DISCHARGE SOUTH	GOOSE HILL	COMPOSITE
7-75	0.3155	0.8614	1.0475	1.0913	1.0383	0.6309	1.3094
8-75	0.2891	0.6543	0.8614	0.6745	0.9922	0.0000	0.8860
9-75	0.9592	1.3153	0.7930	1.0447	0.9374	1.2619	1.1695
10-75	0.7679	0.6309	1.1794	0.6309	0.0000	0.0000	1.3096
11-75	1.8474	1.3838	1.8439	1.8928	1.1352	0.8610	1.9124
12-75	0.8729	1.4248	1.5982	1.3120	1.6705	0.8027	1.5218

3.4.2 POPULATION ESTIMATES

Several fish species inhabit the waters of the James River around Hog Island at certain stages in their life cycle during certain times of the year. In an effort to estimate numbers of fish inhabiting the shore zone waters during times of expected high population density in an area from the intake structure to the discharge groin, three sample stations (Hog Point-West, Hog Point-North, Hog Point-East) were sampled (Figure 3.4.2-1). Data are reported as Table 3.4.2-1.

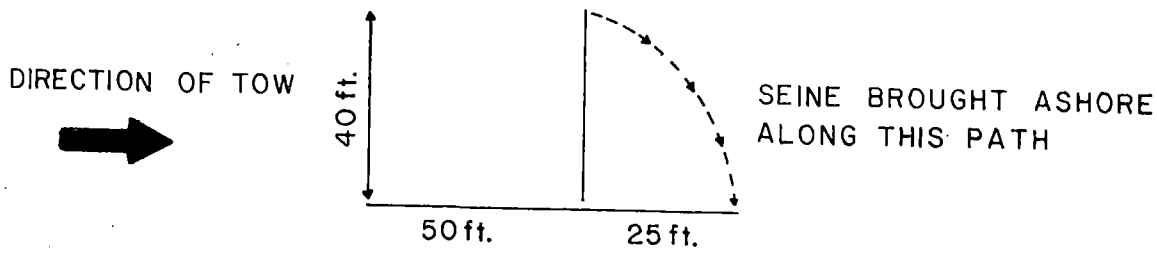
In order for population estimates to approach total populations of a species within a given area in any reliable manner, certain assumptions have to be made: (1) Fish are uniformly distributed throughout the area from the shoreline to 40 feet out from the shoreline; (2) Catch efficiency of a haul seine is about fifty percent; and (3) Sample station habitats, and therefore the entire multiplicity of shoreline habitats, are similar and equal in their ability to attract and support young fish.

That these assumptions do not hold true, especially in the oligohaline reaches of tidal estuaries, is shown by the high degree of variability between and within species, between and within stations, and between replicates of a station. However, to fulfill the requirements of this section of the Surry Technical Specifications, the following methodology was used in an attempt to estimate populations.

The shoreline between the discharge and intake, is about 30,000 feet long and provides 400 possible 75-foot sampling stations. Sample values for all species have been projected to reflect the numbers of fish occupying a 40-foot wide strip along this shore on the given sample days.

A fifty-foot haul seine having 1/4 inch bar mesh netting was used to sample a premeasured 75-foot stretch of beach. A replicate sample was taken within minutes of the first sample.

A sample consisted of stretching the seine perpendicular to the shore, hauling it 50 feet and then having the offshore man bring his end ashore in an arc about 25 feet further along the beach as shown below.

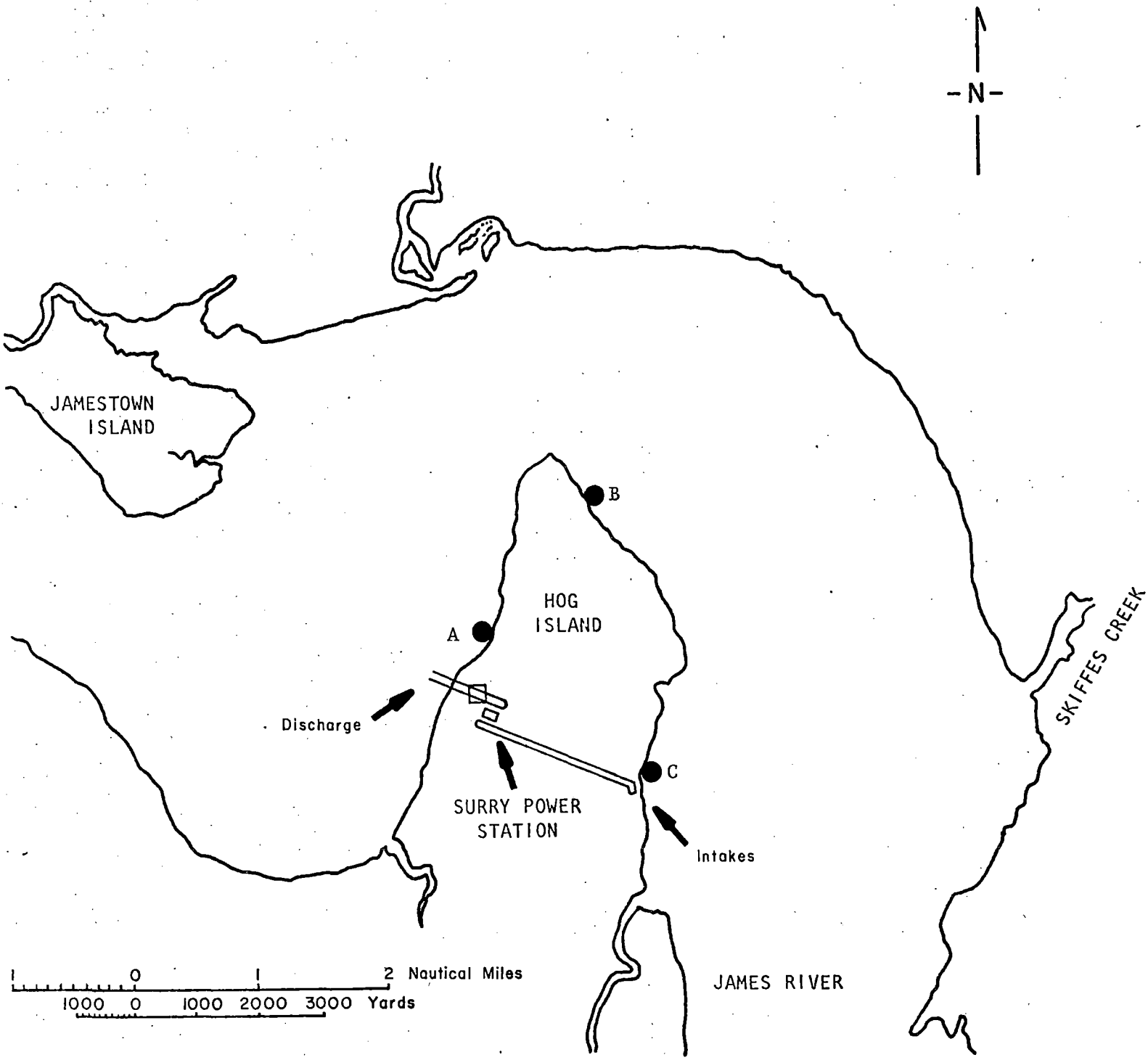


Hence, a small portion of the sample unit (about 8-10%) is not covered. The population estimates do not include an expansion for this unsampled area and thus should consistently underestimate the population values by a small amount.

It should be pointed out that all of the species sampled, within the size ranges taken, are schooling species except for possibly spottail shiner, golden shiner, channel catfish, and white perch. Schooling will also cause large variances to be associated with population estimates.

SURRY

POWER STATION



A--Hog Point-West
B--Hog Point-North
C--Hog Point-East

TABLE 3.4.2-1

Date	# Fish	# Samples	Population Est.	Standard Deviation of Estimate	Life Stage
Alosa aestivalis					
7/22/75	11	6	733	67	Juvenile
7/29/75	8	6	533	353	Juvenile
8/08/75	21	6	1,400	1,176	Juvenile
8/11/75	14	6	933	625	Juvenile
8/18/75	1	6	67	67	Juvenile
8/27/75	16	6	1,067	989	Juvenile
10/03/75	330	6	22,001	19,034	Juvenile
10/08/75	29	6	1,933	993	Juvenile
10/10/75	8	6	533	304	Juvenile
10/31/75	59	6	3,934	3,462	Juvenile
11/20/75	10	6	667	446	Juvenile
12/05/75	61	6	4,067	2,554	Juvenile
12/12/75	1	6	67	67	Juvenile
12/29/75	5	6	333	67	Juvenile
Alosa pseudoharengus					
10/10/75	1	6	67	67	Juvenile
Alosa sapidissima					
10/03/75	10	6	667	267	Juvenile
10/07/75	1	6	67	67	Juvenile
10/31/75	1	6	67	67	Juvenile
11/20/75	2	6	133	67	Juvenile
Anchoa mitchilli					
8/08/75	21	6	1,400	1,322	Juvenile/Adult
8/11/75	17	6	1,133	489	Juvenile/Adult
8/18/75	2	6	133	67	Juvenile/Adult
8/27/75	6	6	400	253	Adult
9/12/75	6	6	400	67	Adult
10/08/75	1	6	67	67	Adult
11/20/75	1	6	67	67	Adult
Anguilla rostrata					
8/27/75	1	6	67	67	Juvenile
10/08/75	1	6	67	67	Juvenile
Brevoortia tyrannus					
7/22/75	22	6	1,467	1,388	Juvenile
8/11/75	75	6	5,000	67	Juvenile
8/18/75	9	6	600	67	Juvenile
8/27/75	65	6	4,334	2,165	Juvenile
9/19/75	9	6	600	67	Juvenile
10/10/75	12	6	800	547	Juvenile

TABLE 3.4.2-1 (Cont'd)

Date	# Fish	# Samples	Population Est.	Standard Deviation of Estimate	Life Stage
Caranx hippos					
8/27/75	1	6	67	67	Juvenile
Cyprinus carpio					
7/22/75	1	6	67	67	Juvenile
Dorosoma cepedianum					
7/22/75	80	6	5,334	3,433	Juvenile
7/23/75	1	6	67	67	Juvenile
7/29/75	14	6	933	856	Juvenile
8/08/75	15	6	1,000	573	Juvenile
8/11/75	7	6	467	67	Juvenile
8/18/75	2	6	133	67	Juvenile/Adult
8/27/75	6	6	400	67	Juvenile
9/19/75	1	6	67	67	Juvenile
10/08/75	1	6	67	67	Juvenile
10/10/75	4	6	267	67	Juvenile
10/31/75	5	6	333	262	Juvenile/Adult
Dorosoma petenense					
7/22/75	8	6	533	396	Juvenile
7/23/75	1	6	67	67	Juvenile
8/11/75	1	6	67	67	Juvenile
8/27/75	1	6	67	67	Juvenile
10/03/75	1	6	67	67	Juvenile
10/10/75	1	6	67	67	Juvenile
12/26/75	1	6	67	67	Juvenile
Esox americanus					
7/22/75	7	6	467	67	Juvenile
Fundulus diaphanus					
7/22/75	2	6	133	67	Adult
8/11/75	1	6	67	67	Adult
8/18/75	1	6	67	67	Adult
8/27/75	2	6	133	67	Adult
9/19/75	2	6	133	67	Adult
10/08/75	1	6	67	67	Adult
11/20/75	2	6	133	67	Adult
Fundulus heteroclitus					
11/20/75	43	6	2,867	67	Adult
12/05/75	3	6	200	67	Adult

TABLE 3.4.2-1 (Cont'd)

Date	# Fish	# Samples	Population Est.	Standard Deviation of Estimate	Life Stage
Hybognathus nuchalis					
7/22/75	12	6	800	516	Adult
7/29/75	3	6	200	67	Adult
8/08/75	2	6	133	67	Adult
8/11/75	3	6	200	67	Adult
8/27/75	11	6	733	67	Adult
9/12/75	2	6	133	67	Adult
10/03/75	4	6	267	67	Adult
10/07/75	9	6	600	67	Adult
10/08/75	28	6	1,867	422	Adult
10/10/75	43	6	2,867	431	Adult
10/31/75	14	6	933	422	Adult
11/20/75	1	6	67	67	Adult
Ictalurus catus					
8/08/75	1	6	67	67	Adult
9/12/75	2	6	133	67	Juvenile
Ictalurus nebulosus					
7/22/75	19	6	1,267	579	Juvenile
7/23/75	1	6	67	67	Juvenile
7/29/75	2	6	133	67	Juvenile
8/18/75	1	6	67	67	Juvenile
8/27/75	1	6	67	67	Juvenile
9/12/75	6	6	400	179	Juvenile
Ictalurus punctatus					
7/22/75	2	6	133	67	Juvenile
7/23/75	2	6	133	67	Juvenile
7/29/75	6	6	400	327	Juvenile
8/11/75	1	6	67	67	Juvenile
8/27/75	5	6	333	67	Juvenile/Adult
9/12/75	35	6	2,333	1,473	Juvenile/Adult
10/08/75	4	6	267	67	Juvenile
10/10/75	2	6	133	67	Juvenile/Adult
10/31/75	1	6	67	67	Juvenile

TABLE 3.4.2-1 (Cont'd)

Date	# Fish	# Samples	Population Est.	Standard Deviation of Estimate	Life Stage
Leiostomus xanthurus					
7/22/75	54	6	3,600	1,200	Juvenile
7/29/75	59	6	3,934	1,695	Juvenile/Adult
8/08/75	2	6	133	67	Juvenile
8/11/75	3	6	200	67	Juvenile
8/18/75	6	6	400	67	Juvenile
8/27/75	5	6	333	191	Juvenile
9/12/75	69	6	4,600	675	Juvenile
9/19/75	1	6	67	67	Juvenile
10/07/75	3	6	200	67	Juvenile/Adult
10/08/75	13	6	867	431	Juvenile
10/10/75	4	6	267	67	Juvenile
10/31/75	5	6	333	67	Juvenile
11/20/75	1	6	67	67	Juvenile
12/05/75	1	6	67	67	Juvenile
Lepomis gibbosus					
7/22/75	3	6	200	67	Juvenile
7/29/75	5	6	333	67	Juvenile/Adult
8/08/75	1	6	67	67	Juvenile
8/18/75	1	6	67	67	Juvenile
8/27/75	4	6	267	67	Juvenile/Adult
9/12/75	1	6	67	67	Adult
10/08/75	7	6	467	67	Juvenile
10/10/75	1	6	67	67	Juvenile
10/31/75	4	6	267	198	Juvenile
12/26/75	1	6	67	67	Juvenile
Lutjanus griseus					
10/07/75	1	6	67	67	Juvenile
Membras martinica					
9/19/75	2	6	133	67	Juvenile
10/10/75	1	6	67	67	Juvenile
Menidia beryllina					
7/22/75	16	6	1,067	523	Juvenile/Adult
7/23/75	4	6	267	67	Juvenile/Adult
7/29/75	10	6	667	304	Juvenile/Adult
8/08/75	2	6	133	67	Juvenile/Adult
8/11/75	5	6	333	191	Juvenile/Adult
8/18/75	1	6	67	67	Juvenile/Adult
8/27/75	4	6	267	198	Juvenile/Adult
9/12/75	2	6	133	67	Juvenile/Adult
9/19/75	5	6	333	67	Juvenile/Adult
10/03/75	4	6	267	198	Juvenile/Adult

TABLE 3.4.2-1 (Cont'd)

Date	# Fish	# Samples	Population Est.	Standard Deviation of Estimate	Life Stage
Menidia beryllina					
10/07/75	1	6	67	67	Juvenile
10/08/75	16	6	1,067	198	Juvenile/Adult
10/10/75	14	6	933	368	Juvenile
10/31/75	47	6	3,133	932	Juvenile/Adult
11/20/75	123	6	8,200	5,566	Juvenile/Adult
12/05/75	101	6	6,734	3,245	Juvenile/Adult
12/12/75	63	6	4,200	1,496	Juvenile/Adult
12/26/75	24	6	1,600	575	Juvenile/Adult
12/29/75	39	6	2,600	1,293	Juvenile/Adult
Menidia menidia					
7/22/75	60	6	4,000	2,201	Juvenile/Adult
7/29/75	8	6	533	286	Juvenile/Adult
8/08/75	48	6	3,200	2,811	Juvenile/Adult
8/11/75	41	6	2,733	2,030	Juvenile/Adult
8/27/75	24	6	1,600	677	Juvenile/Adult
9/12/75	33	6	2,200	1,272	Juvenile/Adult
9/19/75	27	6	1,800	812	Juvenile/Adult
10/03/75	7	6	467	333	Juvenile/Adult
10/07/75	1	6	67	67	Juvenile/Adult
10/08/75	3	6	200	67	Juvenile/Adult
10/10/75	8	6	533	198	Juvenile/Adult
10/31/75	30	6	2,000	820	Juvenile/Adult
11/20/75	7	6	467	317	Juvenile/Adult
12/05/75	2	6	133	67	Juvenile/Adult
12/12/75	24	6	1,600	700	Juvenile/Adult
12/26/75	2	6	133	67	Juvenile/Adult
Micropogon undulatus					
9/12/75	1	6	67	67	Juvenile
Morone americana					
7/22/75	1	6	67	67	Adult
7/29/75	1	6	67	67	Adult
8/08/75	3	6	200	67	Juvenile/Adult
8/11/75	1	6	67	67	Adult
8/18/75	2	6	133	67	Adult
8/27/75	4	6	267	67	Juvenile/Adult
9/12/75	5	6	333	191	Juvenile/Adult
9/19/75	1	6	67	67	Adult
10/03/75	1	6	67	67	Adult
10/07/75	1	6	67	67	Juvenile
10/08/75	5	6	333	67	Juvenile/Adult
10/10/75	2	6	133	67	Juvenile/Adult
10/31/75	3	6	200	67	Juvenile

TABLE 3.4.2-1 (Cont'd)

Date	# Fish	# Samples	Population Est.	Standard Deviation of Estimate	Life Stage
Mugil cephalus					
7/22/75	4	6	267	67	Juvenile
7/27/75	3	6	200	67	Juvenile
8/11/75	4	6	267	198	Juvenile/Adult
9/12/75	2	6	133	67	Adult
10/08/75	2	6	133	67	Juvenile/Adult
Notomigonus crysoleucas					
7/22/75	41	6	2,733	2,275	Adult
7/23/75	14	6	933	67	Adult
7/29/75	3	6	200	67	Adult
8/08/75	5	6	333	191	Adult
8/11/75	4	6	267	198	Adult
8/27/75	2	6	133	67	Adult
9/12/75	4	6	267	67	Adult
9/19/75	1	6	67	67	Adult
10/03/75	2	6	133	67	Adult
10/07/75	1	6	67	67	Adult
10/10/75	8	6	533	353	Adult
10/31/75	1	6	67	67	Adult
Notropis analostanus					
12/29/75	1	6	67	67	Juvenile
Notropis hudsonius					
7/22/75	173	6	11,534	4,657	Juvenile/Adult
7/23/75	10	6	667	67	Juvenile/Adult
7/29/75	53	6	3,534	1,509	Juvenile/Adult
8/08/75	38	6	2,533	886	Juvenile/Adult
8/11/75	63	6	4,200	1,934	Juvenile/Adult
8/18/75	7	6	467	123	Juvenile/Adult
8/27/75	12	6	800	273	Juvenile/Adult
9/12/75	52	6	3,467	1,026	Juvenile/Adult
9/19/75	60	6	4,000	1,556	Juvenile/Adult
10/03/75	57	6	3,800	1,396	Juvenile/Adult
10/07/75	30	6	2,000	1,570	Juvenile/Adult
10/08/75	35	6	2,333	531	Juvenile/Adult
10/10/75	42	6	2,800	1,343	Juvenile/Adult
10/31/75	49	6	3,267	926	Juvenile/Adult
11/20/75	48	6	3,200	1,269	Juvenile/Adult
12/05/75	8	6	533	169	Juvenile/Adult
12/12/75	64	6	4,267	1,961	Juvenile/Adult
12/26/75	9	6	600	306	Juvenile/Adult

TABLE 3.4.2-1 (Cont'd)

Date	# Fish	# Samples	Population Est.	Standard Deviation of Estimate	Life Stage
Paralichthys dentatus					
10/10/75	1	6	67	67	Juvenile
Pomatomus saltatrix					
8/08/75	1	6	67	67	Juvenile
8/11/75	3	6	200	67	Juvenile

3.4.3 ICHTHYOPLANKTON ENTRAINMENT STUDY

Refer to the following report by the Virginia Institute of Marine Science for preliminary results and conclusions.

Ichthyoplankton Entrainment Study
VEPCO Surry Nuclear Power Station
Progress Report No. 2, January 1976

by

J. V. Merriner and A. D. Estes
Virginia Institute of Marine Science
Gloucester Point, VA. 23062

The Ichthyoplankton Entrainment Study at VEPCO Nuclear Power Plant located near Surry, Virginia is ongoing at VIMS. The study was initiated in April, 1975 through agreement with the Virginia Electric and Power Company. Assessment of the kinds and magnitude of ichthyoplankton being entrained and passed through the facility is its goal.

Fish eggs and larvae of many freshwater and some marine species that inhabit lower salinities are found near the VEPCO Surry plant. These organisms, particularly those that are pelagic, are potentially subject to entrainment. Adult, juvenile, and some postlarval fish can negotiate the water currents developed by the intake pumps and usually avoid entrainment. Our study is directed toward fish eggs and larvae, but specimens of later life stages in our samples are recorded and logged into the data set.

Samples through November, 1975 have been sorted and stored in vials. Individual specimen measurements have been recorded through the October samples. These data have been logged on sheets and punched on computer cards for later analysis. Statistical analysis of the data will be presented in the final contract report.

Species lists and abundance of fish eggs, larvae, juveniles, and adults captured in samples through October, 1975 as well as ranges of temperature, salinity, and dissolved oxygen for each sampling station are presented in this report.

Materials and Methods

Materials and methods for this study are discussed in the progress report submitted to VEPCO on July 31, 1975.[1]

Results and Discussion

Preliminary sampling and two 24-hour sampling stations during April, captured mostly juvenile and adult fishes.[1] Some fish larvae and eggs were present, but only in low numbers. The most abundant species were Atlantic menhaden (*Brevoortia tyrannus*), bay anchovy (*Anchoa mitchilli*), and spot (*Leiostomus xanthurus*).

To date, the highest diversity of species was captured in May (Table 1; Fig. 1). Diversity then tapered off through June to a low in July. August samples indicated an increase in the number of species and this trend continued into September. The number of species then fell to its lowest point in October.

Numbers of fish captured were low in May (Table 1; Fig. 2). During the first week of June, fish captured increased sharply to their highest concentrations and remained high throughout June and July. August, September, and October showed a gradual decrease to a low point during October.

During May, the presumed height of the spawning season, numbers of individuals remained quite low, although diversity was generally high (Tables 1-9; Figs. 1 & 2). Fish captured during early May were equally represented by larval and juvenile stages. Greatest numbers were recorded for fish eggs, but only one species was found. During the latter part of May,

[1] Merriner, J. V., and A. D. Estes. Ichthyoplankton Entrainment Study, VEPCO Nuclear Power Station, Progress Report - July 1975, 21 p.

larvae became more prevalent in the samples, but actual numbers remained low. Numbers of juvenile and adult fish declined, especially menhaden and anchovy.

Larvae of the threadfin shad, Dorosoma petenense and the gizzard shad, Dorosoma cepedianum were found in May samples in low concentrations. Several specimens of the alosine fishes were captured also. They were usually identified as Alosa species, since identification of the larvae is difficult. Beal, 1968[2] and Lippson, 1974[3] provide good keys for larval alosine fishes, but these proved ineffective for the larvae we captured. Size and condition of the specimens were the limiting factors.

Two species of larval cyprinids (the German carp, Cyprinus carpio and the spottail shiner, Notropis hudsonius) were captured in the May samples, though neither were present in appreciable concentrations. Eggs of the German carp were abundant in samples taken the early part of May. Their numbers decreased as the month progressed. A few eggs were found at the intake, but the majority appeared in the discharge canal samples.

Three species of silversides (Tidewater silverside, Menidia beryllina; Atlantic silverside, Menidia menidia; and the rough silverside, Membras martinica appeared in our May samples. All life stages were represented.

[2] Beal, Kenneth Lee. 1968. Age and growth of the blueback herring, Alosa aestivalis (Mitchill). M.A. Thesis, College of William and Mary. 83 pp.

[3] Lippson, Alice J. and R. Lynn Moran. 1974. Manual for Identification of Early Developmental Stages of Fishes of the Potomac River Estuary. Environmental Technology Center, Martin Marietta Corporation, Baltimore, Maryland. 282 pp.

Larval naked gobies, Gobiosoma bosci, first appeared during early May and became increasingly abundant as May progressed. Most specimens were captured in night samples and no adults were captured.

Several species were represented by one or only a few specimens. Three species of larval killifish (mummichog, Fundulus heteroclitis; banded killifish, Fundulus diaphanus; and striped killifish, Fundulus majalis) were captured. Some adult fish of these species were also found. One larval centrarchid (bluegill, Lepomis macrochirus) was captured in late May. Several specimens of larval channel catfish, Ictalurus punctatus, were caught in the discharge canal samples. Juvenile American eel, Anguilla rostrata, were caught at both the intake and discharge.

During May, numbers of individuals captured per unit volume increased at night. This is attributed to diurnal habits of many species and reduced net avoidance during darkness.

Abundance of larval fish increased sharply during June, Tables 1, 10-17; Fig. 2. The total number of species caught dropped somewhat, but remained fairly high, Table 1; Fig. 1. Most species captured were represented by only a few fish. Two species, bay anchovy and naked goby, comprised over 90 percent of the total catch (Tables 10-17). Bay anchovy reached concentrations of 27 per cubic meter of water strained (Table 15) and gobies reached concentrations of 50 per cubic meter (Table 15). In addition, many eggs of the bay anchovy were found, reaching concentrations of 119 eggs per cubic meter, Tables 15, 17.

Occurrence of other species was marginal. Most abundant of these were larval silversides, of which the Atlantic silversides was most prevalent.

One new species in our collections, the northern pipefish (Syngnathus fuscus) was represented by several larvae.

In July, the diversity decreased significantly (Fig. 1) but abundance remained high. Bay anchovy and naked goby still comprised over 90 per cent of the specimens captured (Tables 18-21). Eggs of bay anchovy were still present, but concentrations had dropped from the June levels (119/m^3) to less than 25 eggs/meter^3 (Tables 19 & 21). No eggs were captured in the July 29-30 samples. The silversides group again represented the majority of the other specimens caught.

Our mid-August samples indicated continued goby and bay anchovy spawning activity but to a lesser degree. Concentrations of gobies and anchovy in the samples had decreased (Tables 22 and 23). Many of the specimens were in the postlarval stages, but larvae were still present in the samples. Fish diversity increased slightly and several new species (weakfish, Cynoscion regalis; hogchoker, Trinectes maculatus; and Atlantic croaker) were in the samples. Juvenile croaker had been captured in the spring, but August specimens were postlarval fish, indicating that the 1975 spawning had begun and the animals were moving upriver into the nursery grounds.

Dominant species in the September sample were still the naked goby and bay anchovy (Tables 24 & 25). Although they comprised a large percentage of the catch, numbers were quite

low. Concentrations of anchovy exceeded 2 per cubic meter only once and gobies did not reach that concentration (Table 25).

Occurrences of fish in the October samples were erratic and of low density (Tables 26 and 27). Most specimens were either postlarval or juvenile life stages and no species reached a concentration of 2 per cubic meter (Table 27).

Atlantic croaker was the most abundant species in October, followed the bay anchovy. Juvenile blueback herring, Alosa aestivalis, were caught sporatically throughout the sample period, indicating their fall migration from the upriver nursery area had begun.

Most of the fishes were captured at night as had occurred in the preceeding months, but October data revealed even lower than usual daylight fish density.

The sampling schedule is designed to provide intensive sampling during the anticipated period of greatest spawning activity by anadromous and semi-anadromous fishes. May samples indicated an increase in the number of species represented by larval fish, but numbers of larvae captured remained low.

Intensive sampling (weekly) continued through June. This was fortunate in that the greatest larval fish and egg abundance appeared in our June samples, but represented a reduced species diversity. Bay anchovy and naked goby made up over 90 per cent of the specimens caught. Other larval fish were caught, but their numbers remained low.

Surry Nuclear Power Plant is located at the fringe of the freshwater zone. Salinities may vary five to six parts per

thousand, (Table 30) depending upon meteorological conditions. During periods of increased runoff, salinities may be lowered to less than one PPT. Conversely, during extended dry spells, salinities may exceed seven PPT. Therefore we would expect to find a mixture of freshwater and estuarine fish plus young of marine migrant species.

We did not anticipate the capture of eggs of nest-building species, but some of the larval and postlarval stages should have been entrained. Very few specimens of this type were found in our samples (i.e. centrarchids and cyprinids).

Pelagic spawners, other than bay anchovy, were not as abundant as anticipated. The two Dorosoma species appeared in May and June samples, but numbers were generally quite low. Larval alosine fishes only appeared in the samples occasionally in the spring months.

A summary of the hydrographic data is presented in Tables 28, 29 and 30.

Conclusions

Commercially important fish species were not captured in significant numbers. Some juvenile croaker were captured in the late spring and again in early fall. Juvenile spot were also captured in the spring, but neither were prevalent in the samples. Channel catfish were captured, but their numbers were extremely low. Other species of commercial importance rarely appeared in our samples and then only in minute numbers. Our data indicate that very little entrainment of commercially important fish took place at Surry Nuclear Power Station between May and October 1975.

Forage fishes are being entrained in high numbers. Although not commercially valuable, these fish play an important role in the estuarine ecosystem. They are a primary source of food for the piscivorous fishes, which are generally the commercially important species.

Concentrations of larval channel catfish, German carp, and carp eggs were significantly higher in the discharge canal. Some were captured at the intake, but comparisons of catch indicate there are resident populations of these fish located in the high level canal and/or in the discharge canal.

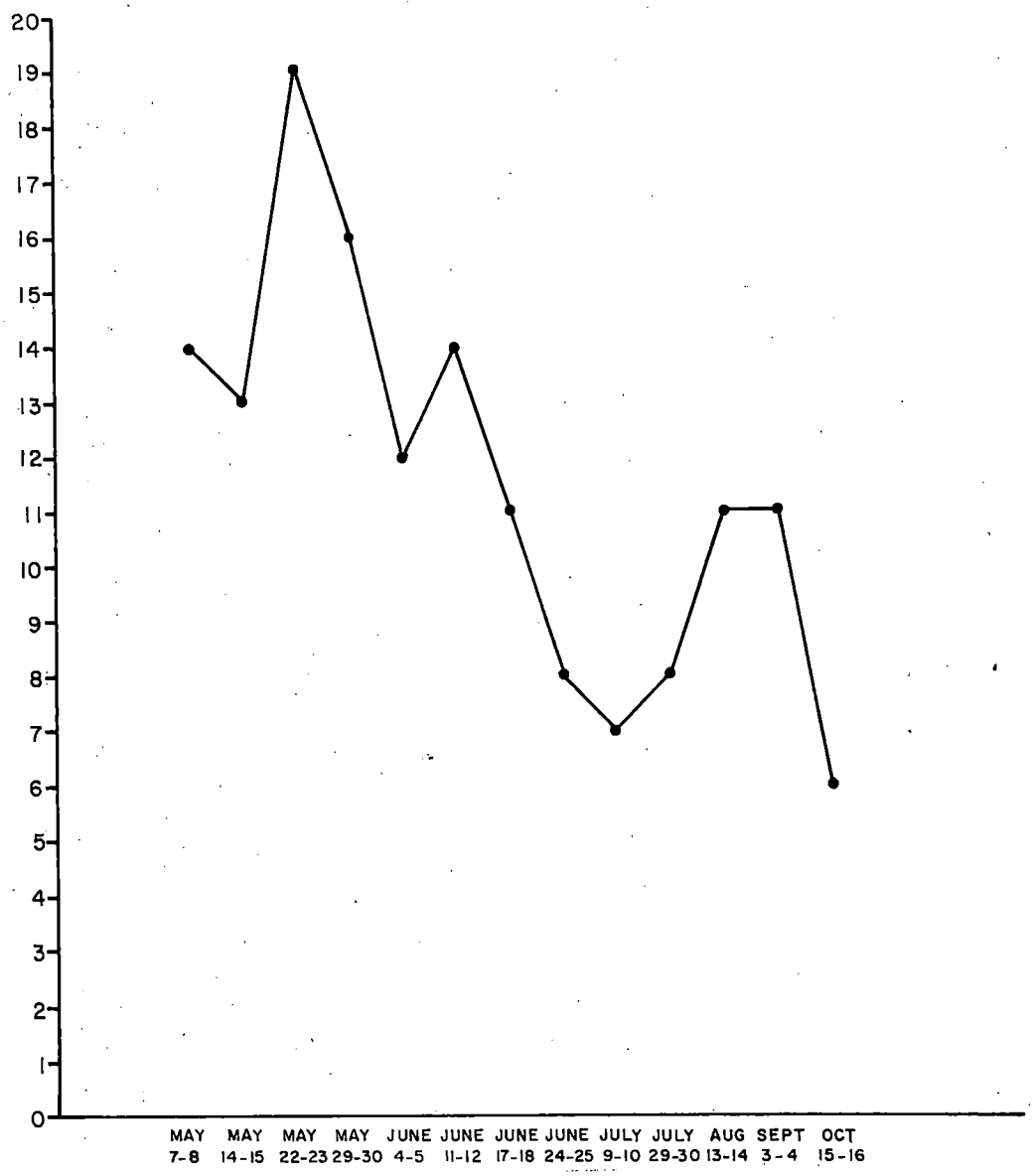


Figure 1. Average number of species caught during a 24 hour station from May through October, 1975

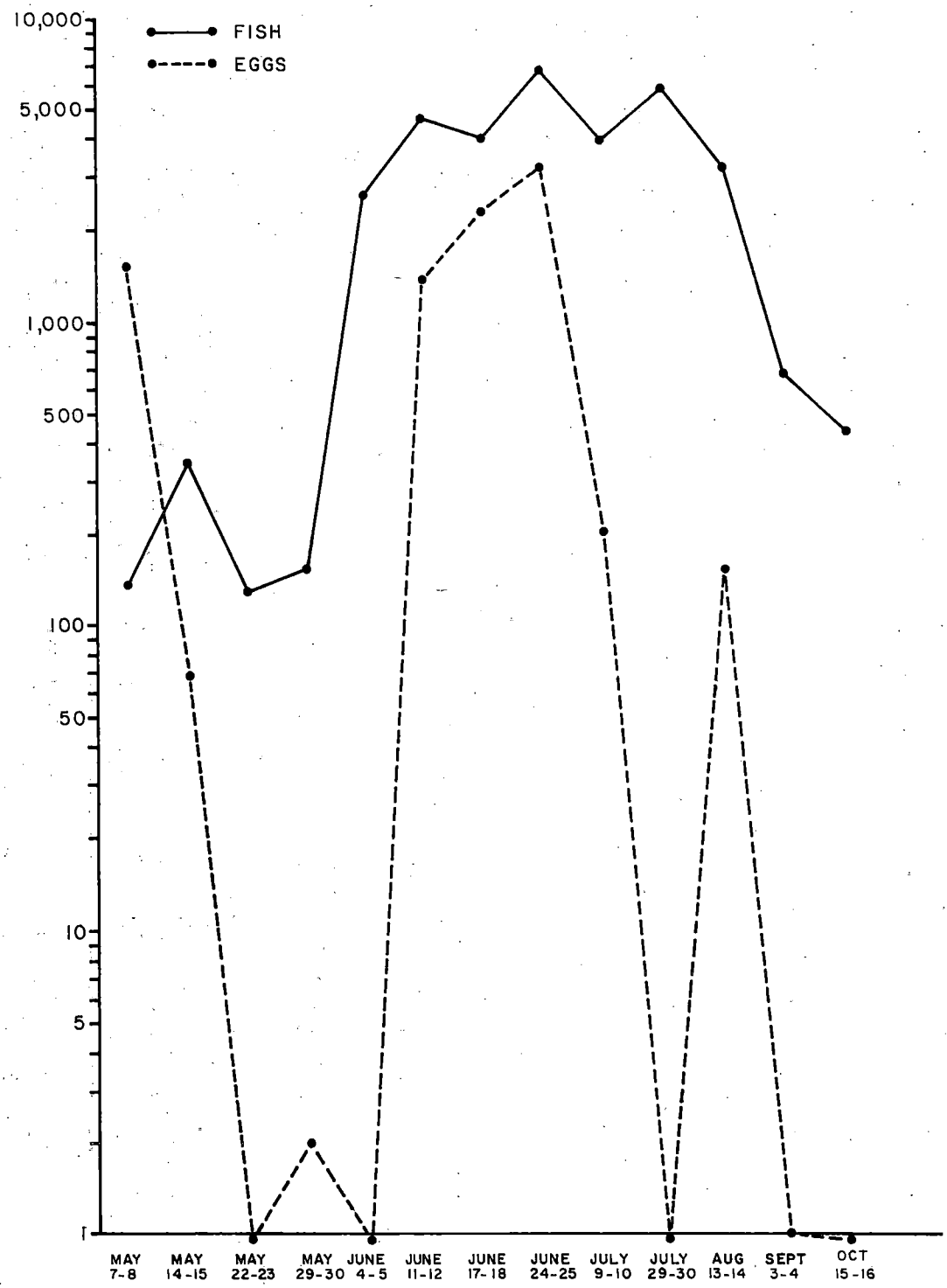


Figure 2. Total number of fish and eggs captured during 24 hour stations from May through October, 1975

Table 1. Diversity and number of fish and fish eggs captured during 24 hour stations from May through October, 1975

Sample Dates	Eggs	Fish	Total	Number of Species
7-8 May	1542	139	1681	14
14-15 May	68	348	416	13
22-23 May	0	129	129	19
29-30 May	2	153	155	16
4-5 June	0	2513	2513	12
11-12 June	1356	4449	5805	14
17-18 June	2251	3803	6054	11
24-25 June	3163	6565	9728	8
9-10 July	199	3737	3936	7
29-30 July	0	5655	5655	8
13-14 Aug.	150	3164	3133	11
3-4 Sept.	1	667	668	11
15-16 Oct.	0	426	426	6

TABLE 2. Species and number of individuals captured during 24 hour station on 7 - 8 May 1975

Species	Station Time	Intake						Discharge					
		Surface		Midwater		Bottom		Surface		Midwater		Bottom	
		Left	Right	Left	Right	Left	Right	Left	Right	Left	Right	Left	Right
Dorosoma species	1000		1										
Cyprinus carpio				1									
Unidentified A				1			1				2		
Dorosoma cepedianum							1						
Cyprinus carpio (eggs)								4		207	221	131	139
Anchoa mitchilli											1		
Notropis hudsonius	1800		2										
Dorosoma species			1										
Dorosoma cepedianum		4											
Cyprinus carpio									1	1		5	4
Alosa pseudoharengus										1			
Unidentified A										1			
Brevoortia tyrannus												1	1
Anguilla rostrata													
Leiostomus xanthurus													
Micropogon undulatus													
Unidentified (MBR)													
Menidia menidia													
Anchoa mitchilli													
Anchoa mitchilli	0200		1	1							1		1
Menidia beryllina			5	1					1				
Cyprinus carpio (eggs)			1		1			4		16	12	80	76
Micropogon undulatus				1	1				2				
Leiostomus xanthurus				2	2	2				4	3		2
Brevoortia tyrannus				1	1					2		1	2
Unidentified A				2									
Notropis hudsonius						1							
Dorosoma species							1					1	
Anguilla rostrata									1				
Cyprinus carpio													
Gobiosoma bosci													

TABLE 2. (continued)

Species	Station Time	Intake						Discharge					
		Surface		Midwater		Bottom		Surface		Midwater		Bottom	
		Left	Right	Left	Right	Left	Right	Left	Right	Left	Right	Left	Right
Dorosoma species	1400							1					
Cyprinus carpio													
Unidentified A				2									
Dorosoma cepedianum		1		1	1				2	8	7	10	14
Cyprinus carpio (eggs)													
Anchoa mitchilli													
Notropis hudsonius	2200												
Dorosoma species				1									
Dorosoma cepedianum													
Cyprinus carpio												7	2
Alosa pseudoharengus													
Unidentified A					1								
Brevoortia tyrannus										4	3	1	1
Anguilla rostrata			1										
Leiostomus xanthurus				1							5		1
Micropogon undulatus						1							
Unidentified (MBR)									1				
Menidia menidia										1			
Anchoa mitchilli											1		
Anchoa mitchilli	0600												
Menidia beryllina			1										
Cyprinus carpio (eggs)		2	1	5	2		11	34	21	85	121	53	271
Micropogon undulatus													
Leiostomus xanthurus			1			1							
Brevoortia tyrannus													
Unidentified A				1									
Notropis hudsonius										2			
Dorosoma species		8	8							4	1		1
Anguilla rostrata													
Cyprinus carpio											1	1	
Gobiosoma bosci							1						

TABLE 3. Species and calculated number of individuals per 100 cubic meter captured during 24 hour station on 7 - 8 May 1975

Species	Station Time	Intake						Discharge					
		Surface		Midwater		Bottom		Surface		Midwater		Bottom	
		Left	Right	Left	Right	Left	Right	Left	Right	Left	Right	Left	Right
Dorosoma cepedianum	1000		2				5						
Cyprinus carpio(eggs)				9(lar)				20		819	819	584	572
Unidentified A				9			5				7		
Anchoa mitchilli											4		
Notropis hudsonius	1800	12											
Dorosoma cepedianum		6	24										
Cyprinus carpio(eggs)									4	4		10	16
Alosa pseudoharengus										4			
Unidentified										4			
Brevoortia tyrannus												2	4
Anguilla rostrata													
Leiostomus xanthurus													
Micropogon undulatus													
Unidentified A													
Menidia beryllina													
Anchoa mitchilli													
Anchoa mitchilli	0200		6	4							3		3
Dorosoma cepedianum			6										
Menidia beryllina			28	4					4		3(lar)		
Cyprinus carpio(eggs)			6		3			14	7	52	38(e)	268	243
Unidentified A				7									
Leiostomus xanthurus				7	7	8				13	9	3	6
Micropogon undulatus				4	3								
Brevoortia tyrannus				4	3					6			6
Notropis hudsonius						4							
Dorosoma petenense							3					3	
Anguilla rostrata									4				
Gobiosoma bosci													

Larvae - lar
Eggs - e

TABLE 3. (continued)

Species	Station Time	Intake						Discharge					
		Surface		Midwater		Bottom		Surface		Midwater		Bottom	
		Left	Right	Left	Right	Left	Right	Left	Right	Left	Right	Left	Right
Dorosoma cepedianum	1400			12				4					
Cyprinus carpio(eggs)		6		6	4				15	32	27	36	56
Unidentified A													
Anchoa mitchilli													
Notropis hudsonius	2200												
Dorosoma cepedianum				11									
Cyprinus carpio(eggs)												28	8
Alosa pseudoharengus													
Unidentified									4				
Brevoortia tyrannus										15	11	4	4
Anguilla rostrata			8										
Leiostomus xanthurus				11							18		4
Micropogon undulatus						20							
Unidentified A					7								
Menidia beryllina										4			
Anchoa mitchilli											4		
Anchoa mitchilli	0600												
Dorosoma cepedianum													
Menidia beryllina			5								3(lar)	4(lar)	
Cyprinus carpio(eggs)		10	5	53	33		50	128	77	292	571(e)	197(e)	982
Unidentified A				11									
Leiostomus xanthurus			5			7							
Micropogon undulatus													
Brevoortia tyrannus													
Notropis hudsonius										7			
Dorosoma petenense		41	36					4		3	3		4
Anguilla rostrata													
Gobiosoma bosci							5						

Larvae - lar
Eggs - e

Table 4. Species and number of individuals captured during 24 hour station on 14 - 15 May 1975

Species	Station Time	Intake						Discharge					
		Surface		Midwater		Bottom		Surface		Midwater		Bottom	
		Left	Right	Left	Right	Left	Right	Left	Right	Left	Right	Left	Right
Dorosoma petenense	1000	2								2	2		3
Cyprinus carpio (eggs)			1			12	17			3	3	4	3
Leiostomus xanthurus													
Notropis hudsonius				1									
Cyprinus carpio					2								
Menidia beryllina					1		1		1				
Unidentified A								1					
Anchoa mitchilli											1		
Gobiosoma bosci												1	
Cyprinus carpio (eggs)	1800	1							1		1	3	3
Unidentified A		1		5	2				1			1	
Dorosoma petenense		64	54		1					1	1	3	
Menidia beryllina			1										
Notropis hudsonius				1	1						1		
Brevoortia tyrannus									1				
Anchoa mitchilli											1		
Cyprinus carpio												1	
Anguilla rostrata													
Leiostomus xanthurus													
Micropogon undulatus													
Unidentified (MBR)													
Membras martinica													
Gobiosoma bosci													
Notropis hudsonius	0200	2		1									
Menidia beryllina		2			1								
Dorosoma petenense		1											3
Leiostomus xanthurus				5	1		1		1	1		1	1
Micropogon undulatus				1									
Anguilla rostrata									1				
Anchoa mitchilli											1		
Cyprinus carpio (eggs)											1		
Unidentified A													
Cyprinus carpio													
Brevoortia tyrannus													
Gobiosoma bosci													

TABLE 4. Species and number of individuals captured during 24 hour station on 14 - 15 May 1975 (continued)

Species	Station Time	Intake						Discharge					
		Surface		Midwater		Bottom		Surface		Midwater		Bottom	
		Left	Right	Left	Right	Left	Right	Left	Right	Left	Right	Left	Right
Dorosoma petenense	1400	13				1		2					
Cyprinus carpio (eggs)									1				
Leiostomus xanthurus													
Notropis hudsonius						1							
Cyprinus carpio													
Menidia aberyllina													
Unidentified A				2	2			1					
Anchoa mitchilli											1		1
Gobiosoma bosci				1									
Cyprinus carpio (eggs)	2200											1	
Unidentified A		6	10	4	5			1	1	3	1	5	3
Dorosoma petenense			1									1	
Menidia beryllina			1										
Notropis hudsonius		14	3		3							1	1
Brevoortia tyrannus								1					1
Anchoa mitchilli											1		
Cyprinus carpio			1							1		2	1
Anguilla rostrata		1											
Leiostomus xanthurus			1	3	4	1	2		2	2	1	4	3
Micropogon undulatus				3									
Unidentified (MBR)				1	2								
Membras martinica							1						
Gobiosoma bosci								5	3	4			
Notropis hudsonius	0600		1										
Menidia beryllina													
Dorosoma petenense		1			1		2			1			1
Leiostomus xanthurus								1		1		1	
Micropogon undulatus										1			
Anguilla rostrata													
Anchoa mitchilli													
Cyprinus carpio (eggs)						1	2	1		1	1	6	1
Unidentified A					1	2	2				1	1	2
Cyprinus carpio							2	1					
Brevoortia tyrannus									1				
Gobiosoma bosci											1		

TABLE 5. Species and calculated number of individuals captured per 100 cubic meter during 24 hour station on 14 - 15 May 1975

Species	Station Time	Intake						Discharge					
		Surface		Midwater		Bottom		Surface		Midwater		Bottom	
		Left	Right	Left	Right	Left	Right	Left	Right	Left	Right	Left	Right
Dorosoma petenense	1000	11					4(lar)			3	6		8
Cyprinus carpio			59(e)		4(lar)	64(e)	60(e)		3	8(e)	8(e)	10(e)	8(e)
Leiostomus xanthurus				4									
Notropis hudsonius					8								
Menidia beryllina								3					
Unidentified A											3		
Anchoa mitchilli												2	
Gobiosoma bosci													
Dorosoma petenense	1800	274	202		4					3	3	8	
Unidentified A		4		20	18				3			3	
Cyprinus carpio		4(lar)							3(e)		3(e)	3(lar)	8(e)
Menidia beryllina			4									8(e)	
Notropis hudsonius				4	4						3		
Brevoortia tyrannus									3				
Anchoa mitchilli											3		
Anguilla rostrata													
Leiostomus xanthurus													
Micropogon undulatus													
Unidentified (MBR)													
Membras martinica													
Gobiosoma bosci													
Notropis hudsonius	0200	13		7									
Menidia beryllina		13			5								
Dorosoma petenense		7											
Micropogon undulatus				7									
Leiostomus xanthurus				34	5		6		3	18		5	3
Anguilla rostrata									2				
Anchoa mitchilli											3		
Cyprinus carpio											3(e)		
Unidentified A													
Gobiosoma bosci													

Larvae - lar
Eggs - e

TABLE 5. (continued)

Species	Station Time	Intake						Discharge					
		Surface		Midwater		Bottom		Surface		Midwater		Bottom	
		Left	Right	Left	Right	Left	Right	Left	Right	Left	Right	Left	Right
Dorosoma petenense	1400	90						3		5			
Cyprinus carpio											3(e)		
Leiostomus xanthurus													
Notropis hudsonius								3					
Menidia beryllina													
Unidentified A				18	8					3			
Anchoa mitchilli													
Gobiosoma bosci				9									3
Dorosoma petenense	2200		7									3	
Unidentified A		43	70	34	28			3	3	8	3	15	9
Cyprinus carpio			7							3		[6(lar)	3(lar)
Menidia beryllina			7									[3(e)	
Notropis hudsonius		101	21		17							3	3
Brevoortia tyrannus								3					3
Anchoa mitchilli											3		
Anguilla rostrata		7											
Leiostomus xanthurus			7	26	22	5	11		6	5	3	12	9
Micropogon undulatus				26									
Unidentified (MBR)					11								
Membras martinica							6						
Gobiosoma bosci								16	10	10			
Notropis hudsonius	0600		4										
Menidia beryllina													
Dorosoma petenense		4			4		8			3			3
Micropogon undulatus										3			
Leiostomus xanthurus								3	3	3		3	
Anguilla rostrata													
Anchoa mitchilli							[8 (lar)	[3 (lar)					
Cyprinus carpio						5(e)	[8(e)	[3(e)		3(e)	6(e)	16(e)	3(e)
Unidentified A					4	10	8				3	3	6
Gobiosoma bosci											3		

TABLE 6. Species and number of individuals captured during 24 hour station on 22 - 23 May 1975

Species	Station Time	Intake						Discharge					
		Surface		Midwater		Bottom		Surface		Midwater		Bottom	
		Left	Right	Left	Right	Left	Right	Left	Right	Left	Right	Left	Right
Dorosoma petenense	1000				1								
Clupidae						1							
Leiostomus xanthurus							1						
Menidia menidia								1					
Menidia beryllina								1					
Ictalurus punctatus													1
Dorosoma species													
Gobiosoma bosci													
Leiostomus xanthurus	1800		1			3	1			1	1		
Menidia menidia				1									
Cyprinus carpio							1			1			
Anguilla rostrata							1						
Gobiosoma bosci												1	
Dorosoma petenense													
Micropogon undulatus													
Unidentified B													
Membras martinica													
Dorosoma cepedianum	0200	1		1									
Menidia menidia		2							2				
Brevoortia tyrannus			1							1			
Leiostomus xanthurus				2	1	1	2			1	2		1
Fundulus majalis				1									
Gobiosoma bosci					1				1				
Dorosoma petenense					1		1		1				
Menidia species (MBR)							1					1	
Fundulus diaphanus									1				
Cyprinus carpio											1		
Lepomis macrochirus													
Fundulus heteroclitis													
Dorosoma species					1							1	

TABLE 6. (continued)

Species	Station Time	Intake						Discharge					
		Surface		Midwater		Bottom		Surface		Midwater		Bottom	
		Left	Right	Left	Right	Left	Right	Left	Right	Left	Right	Left	Right
Dorosoma petenense	1400	6	7	9	5	1		1	1	2	2	1	2
Clupidae													
Leiostomus xanthurus						1			1				
Menidia menidia									1			1	1
Menidia beryllina				1									
Ictalurus punctatus													
Dorosoma species				1									
Gobiosoma bosci				1			1						1
Leiostomus xanthurus	2200			2		5	2		1				
Menidia menidia				1		2						3	
Cyprinus carpio													
Anguilla rostrata													
Gobiosoma bosci						1							
Dorosoma petenense					1		1						
Micropogon undulatus													
Unidentified B								1					
Membras martinica											1		
Dorosoma cepedianum	0600									1	1		1
Menidia menidia													
Brevoortia tyrannus													
Leiostomus xanthurus					1				1	1		1	
Fundulus majalis													
Gobiosoma bosci													
Dorosoma petenense							1	2					
Menidia species (MBR)													
Fundulus diaphanus													
Cyprinus carpio											1		
Lepomis macrochirus										1			
Fundulus heteroclitis											1		

TABLE 7. Species and calculated number of individuals per 100 cubic meters during the 24 hour station on 22 - 23 May

Species	Station Time	Intake						Discharge					
		Surface		Midwater		Bottom		Surface		Midwater		Bottom	
		Left	Right	Left	Right	Left	Right	Left	Right	Left	Right	Left	Right
Dorosoma petenense	1000				8								
Unidentified (MBR)						8							
Leiostomus xanthurus							7						
Menidia menidia								6					
Menidia beryllina								6					
Ictalurus punctatus													5
Gobiosoma bosci													
Unidentified A													
Leiostomus xanthurus	1800		11			21	6			5	5		
Menidia menidia				9									
Cyprinus carpio							6			5			
Anguilla rostrata							6						
Gobiosoma bosci												10	
Dorosoma petenense													
Micropogon undulatus													
Membras martinica													
Dorosoma cepedianum	0200	7		6									
Menidia beryllina							8						
Brevoortia tyrannus			5										
Leiostomus xanthurus				11	5	10	15			4	8		6
Fundulus majalis				6									
Gobiosoma bosci					5				5				
Dorosoma petenense					5		8		5			6	
Unidentified A					5								
Menidia menidia		14							9	4			
Fundulus diaphanus									5				
Cyprinus carpio											4		
Unidentified (MBR)												6	
Lepomis macrochirus													
Fundulus heteroclitis													

TABLE 7. (continued)

Species	Station Time	Intake						Discharge					
		Surface		Midwater		Bottom		Surface		Midwater		Bottom	
		Left	Right	Left	Right	Left	Right	Left	Right	Left	Right	Left	Right
Dorosoma petenense	1400	54	56	39	18	4		5	4	7	9	4	9
Unidentified (MBR)													
Leiostomus xanthurus						4			4				
Menidia menidia									4				
Menidia beryllina				4								4	4
Ictalurus punctatus													
Gobiosoma bosci				4			4						4
Unidentified A				4									
Leiostomus xanthurus	2200			15		47	14		6				
Menidia menidia				8		19						21	
Cyprinus carpio													
Anguilla rostrata													
Gobiosoma bosci						9							
Dorosoma petenense					7								
Micropogon undulatus							7						
Membras martinica											5		
Dorosoma cepedianum	0600										4	5	
Menidia beryllina													
Brevoortia tyrannus													
Leiostomus xanthurus					8				6			5	
Fundulus majalis													
Gobiosoma bosci													
Dorosoma petenense							19	11		4			
Unidentified A													
Menidia menidia													
Fundulus diaphanus													
Cyprinus carpio											4		
Unidentified (MBR)													
Lepomis macrochirus										4			
Fundulus heteroclitis											4		

TABLE 8. Species and number of individuals captured during 24 hour station on 29 - 30 May 1979

Species	Station Time	Intake						Discharge					
		Surface		Midwater		Bottom		Surface		Midwater		Bottom	
		Left	Right	Left	Right	Left	Right	Left	Right	Left	Right	Left	Right
Gobiosoma bosci	1000										1		
Menidia beryllina													
Membras martinica													
Anchoa mitchilli													
Dorosoma petenense													
Unidentified (MBR)	1800	2											
Anchoa mitchilli		2											
Dorosoma species		8	2				1						
Menidia beryllina		3	1	1	1		1					1	
Menidia menidia		3				4	2						
Membras martinica				1									
Gobiosoma bosci				1	3	2	1		1	2	2	2	3
Dorosoma petenense					3	1							
Micropogon undulatus						1							
Ictalurus punctatus													
Leiostomus xanthurus													
Cyprinus carpio													
Anguilla rostrata	0200	1											
Menidia menidia				2			1						
Leiostomus xanthurus				2		1				1	1	1	
Gobiosoma bosci				4	1				1	1		1	5
Menidia beryllina					2								
Fundulus diaphanus						1							
Dorosoma species									1				
Brevoortia tyrannus										1			
Fundulus heteroclitis											1		
Alosa species													
Membras martinica													
Dorosoma petenense													
Cyprinus carpio (eggs)													
Anchoa mitchilli													

TABLE 8. (continued)

Species	Station Time	Intake						Discharge					
		Surface		Midwater		Bottom		Surface		Midwater		Bottom	
		Left	Right	Left	Right	Left	Right	Left	Right	Left	Right	Left	Right
Gobiosoma bosci	1400												
Menidia beryllina		5											
Membras martinica							1						
Anchoa mitchilli										1			
Dorosoma petenense											1		
Unidentified (MBR)	2200												
Anchoa mitchilli													
Dorosoma species									1			1	
Menidia beryllina									1				
Menidia menidia								1					
Membras martinica													
Gobiosoma bosci												1	
Dorosoma petenense													
Micropogon undulatus													
Ictalurus punctatus									1	1	3		2
Leiostomus xanthurus										1		1	
Cyprinus carpio													1
Anguilla rostrata	0600												
Menidia menidia							4	1					
Leiostomus xanthurus													
Gobiosoma bosci		2		3	2	2	5	1		1	2	8	7
Menidia beryllina					1								
Fundulus diaphanus													
Dorosoma species													
Brevoortia tyrannus													
Fundulus heteroclitis													
Alosa species					1								
Membras martinica						1							
Dorosoma petenense						1			1				
Cyprinus carpio (eggs)											1	1	
Anchoa mitchilli												1	1

TABLE 9. Species and calculated number of individuals per 100 cubic meter during 24 hour station on 29 - 30 May 1975

Species	Station Time	Intake						Discharge					
		Surface		Midwater		Bottom		Surface		Midwater		Bottom	
		Left	Right	Left	Right	Left	Right	Left	Right	Left	Right	Left	Right
Gobiosoma bosci	1000										6		
Menidia beryllina													
Membras martinica													
Anchoa mitchilli													
Dorosoma petenense													
Anchoa mitchilli	1800	13											
Dorosoma petenense		50	13		21	4	4						
Menidia beryllina		19	6	9	7		4					5	
Menidia menidia		19				18	9						
Unidentified (MBR)		13											
Membras martinica				9									
Gobiosoma bosci				9		9	4		5	10	10	10	14
Micropogon undulatus						4							
Ictalurus punctatus													
Leiostomus xanthurus													
Cyprinus carpio													
Anguilla rostrata	0200	9											
Menidia menidia				14			9						
Brevoortia tyrannus				14						5			
Gobiosoma bosci				28	7				5	5		*	37
Menidia beryllina					7								
Fundulus diaphanus						10							
Leiostomus xanthurus						10				5	6	*	
Dorosoma petenense									5				
Fundulus heteroclitis											6		
Alosa species													
Membras martinica													
Cyprinus carpio													
Anchoa mitchilli													

* No Meter Reading

TABLE 9. (Continued)

Species	Station Time	Intake						Discharge					
		Surface		Midwater		Bottom		Surface		Midwater		Bottom	
		Left	Right	Left	Right	Left	Right	Left	Right	Left	Right	Left	Right
Gobiosoma bosci	1400												
Menidia beryllina		53											
Membras martinica							7						
Anchoa mitchilli										6			
Dorosoma petenense											6		
Anchoa mitchilli	2200								6			10	
Dorosoma petenense													
Menidia beryllina								6	6				
Menidia menidia													
Unidentified (MBR)													
Membras martinica												10	
Gobiosoma bosci													
Micropogon undulatus									6	6	12	10	15
Ictalurus punctatus										6			
Leiostomus xanthurus													7
Cyprinus carpio													
Anguilla rostrata	0600												
Menidia menidia							18	5					
Brevoortia tyrannus													
Gobiosoma bosci		27		48	14	10	22	5		8	13	51	*
Menidia beryllina					7								
Fundulus diaphanus													
Leiostomus xanthurus													
Dorosoma petenense						5			27				
Fundulus heteroclitis													
Alosa species					7								
Membras martinica						5							
Cyprinus carpio												6(e)	6(e)
Anchoa mitchilli												6	*

28

* No Meter Reading
Eggs - e

TABLE 10. Species and number of individuals captured during 24 hour station on 4 - 5 June 1973

Species	Station Time	Intake						Discharge					
		Surface		Midwater		Bottom		Surface		Midwater		Bottom	
		Left	Right	Left	Right	Left	Right	Left	Right	Left	Right	Left	Right
Anchoa mitchilli	1000	2		6	2	3	5		1	3	3	6	7
Gobiosoma bosci		1		19	15	18	25	2	1	20	19	22	26
Dorosoma petenense				1									
Unidentified (MBR)										1	1		
Membras martinica													
Cyprinus carpio													
Dorosoma cepedianum													
Anchoa mitchilli	1800			1			1	1	1	3		7	5
Gobiosoma bosci		1	1	22	6	1	2	7	7	10	9	26	38
Membras martinica		2											
Dorosoma petenense			1							1			
Menidia menidia													
Syngnathus fuscus													
Alosa aestivalis													
Leiostomus xanthurus													
Menidia beryllina													
Menidia menidia	0200	25	18	5	1	3	1	2	3	1	1	1	
Gobiosoma bosci		6	8	14	8	14	18	1	3	1	9	10	14
Dorosoma petenense		1				1	4				2		
Anchoa mitchilli			1	1	2	2	4		1	2	2	2	
Membras martinica				1		1		2		1			
Notropis species													
Menidia beryllina													
Syngnathus fuscus													

TABLE 10. (continued)

Species	Station Time	Intake						Discharge					
		Surface		Midwater		Bottom		Surface		Midwater		Bottom	
		Left	Right	Left	Right	Left	Right	Left	Right	Left	Right	Left	Right
Anchoa mitchilli	1400							1	1	2	1	1	1
Gobiosoma bosci			1	1	4		2	4	2	13	7	9	13
Dorosoma petenense										1			
Unidentified (MBR)													
Membras martinica		1	1										
Cyprinus carpio										1			
Dorosoma cepedianum											1		
Anchoa mitchilli	2200	1	2	3	13	10	11	4	6	11	10	15	18
Gobiosoma bosci		20	33	38	40	39	60	10	15	61	59	102	114
Membras martinica						1							
Dorosoma petenense										1		1	1
Menidia menidia		2	10	4	2		2	1	1		3	3	4
Syngnathus fuscus					1	2							
Alosa aestivalis						1							
Leiostomus xanthurus													1
Menidia beryllina			1	1									
Menidia menidia	0600												1
Gobiosoma bosci		5	3	27	12	194	172	9	27	19	23	220	228
Dorosoma petenense													
Anchoa mitchilli				3	1	71	56	7	6	6	4	24	23
Membras martinica												1	1
Notropis species								1	2				
Menidia beryllina										1		1	
Syngnathus fuscus													1

TABLE 11. (continued)

Species	Station Time	Intake						Discharge					
		Surface		Midwater		Bottom		Surface		Midwater		Bottom	
		Left	Right	Left	Right	Left	Right	Left	Right	Left	Right	Left	Right
Anchoa mitchilli	1400							7	6	10	5	5	5
Gobiosoma bosci			200	23	133		26	27	13	5	35	46	66
Dorosoma petenense										5	5		
Unidentified (MBR)													
Membras martinica		143	200										
Cyprinus carpio										5			
Gobiosoma bosci	2200	164	228	185	179	197	300	48	74	271	267	446	485
Anchoa mitchilli		8	14	15	45	66	55	19	30	44	45	65	77
Membras martinica						5							
Dorosoma petenence										4		4	4
Menidia menidia		16	69	20	9		10	5	5		14	13	17
Menidia beryllina			7	5									
Syngnathus fuscus					4	10							
Alosa aestivalis						5						4	4
Leiostomus xanthurus													
Gobiosoma bosci	0600	68	29	300	104	855	676	533	160	104	126	1164	1260
Anchoa mitchilli				33	9	313	219	133	36	33	22	127	127
Dorosoma petenense													
Menidia menidia													6
Membras martinica													6
Menidia beryllina										5			
Syngnathus fuscus													6

TABLE

11. Species and calculated number of individuals per 100 cubic meters during 24 hour station on 4 - 5 June 1975

Species	Station Time	Intake						Discharge					
		Surface		Midwater		Bottom		Surface		Midwater		Bottom	
		Left	Right	Left	Right	Left	Right	Left	Right	Left	Right	Left	Right
Anchoa mitchilli	1000	29		38	20	81	161		6	14	15	28	34
Gobiosoma bosci		15		121	143	316	806	12	6	96	94	103	127
Dorosoma petenense				6									
Unidentified (MBR)										5	5		
Membras martinica													
Cyprinus carpio													
Gobiosoma bosci	1800	16	8	105	23	4	9	48	43	78	64	198	252
Anchoa mitchilli				5			4	7	6	23		53	33
Membras martinica		33											
Dorosoma petenense			8							8			
Menidia menidia													
Menidia beryllina													
Syngnathus fuscus													
Alosa aestivalis													
Leiostomus xanthurus													
Gobiosoma bosci	0200	140	90	107	58	130	101	5	16	5	43	46	64
Anchoa mitchilli			11	8	14	18	22		5	9	10	9	
Dorosoma petenense		23				9	22				15		
Menidia menidia		488	205	38	7	18	6	11	16	5	5	5	
Membras martinica				8		9		11		5			
Menidia beryllina													
Syngnathus fuscus													

TABLE 12. Species and number of individuals captured during 24 hour station on 11 - 12 June 1975

Species	Station Time	Intake						Discharge					
		Surface		Midwater		Bottom		Surface		Midwater		Bottom	
		Left	Right	Left	Right	Left	Right	Left	Right	Left	Right	Left	Right
Menidia menidia	1000	12	4	1									
Anchoa mitchilli		3	2	11	1	4	1	13	4	35	41	31	40
Gobiosoma bosci		1		99	59	3	1	2	1	53	33	69	53
Anchoa mitchilli(eggs)		3	6	44	44	90	84	42	39	44	47	76	60
Unidentified (MBR)			1										
Syngnathus fuscus				1	1				1	1			
Leiostomus xanthurus					1								
Menidia menidia											1		
Menbras martinica													
Unidentified A													
Anchoa mitchilli	1800	4		9	12	264	272	15	20	32	50	38	38
Gobiosoma bosci		1		9	15	31	31	5	1	10	6	13	9
Menidia menidia		4		1	1								
Anchoa mitchilli(eggs)		4		14	7	10	11	7	10	13	6	8	7
Membras martinica			1										
Leiostomus xanthurus						1							
Menidia beryllina							1			3	1		1
Ictalurus punctatus													1
Anguilla rostrata													
Unidentified (MBR)													
Brevoortia tyrannus													
Alosa aestivalis													
Gobiosoma bosci	0200	12	13	92	103	117	109	24	13	52	58	57	66
Anchoa mitchilli		6	9	69	61	234	263	38	16	46	34	55	54
Anchoa mitchilli (eggs)		4	3	3	8	8	13	5	4	5	11	9	8
Leiostomus xanthurus			1							1			
Syngnathus fuscus				1		2		1		1	1		
Menidia menidia				1			1	5	1				
Menidia beryllina							1						1
Alosa aestivalis										1			
Micropogon undulatus													

TABLE 12. (continued)

Species	Station Time	Intake						Discharge					
		Surface		Midwater		Bottom		Surface		Midwater			
		Left	Right	Left	Right	Left	Right	Left	Right	Left	Right	Left	Right
Menidia menidia	1400												
Anchoa mitchilli		1		6		6	15	10	4	70	53	94	77
Gobiosoma bosci						14	19		7	40	35	54	62
Anchoa mitchilli(eggs)				10	7	25	31	15	27	29	20	6	20
Unidentified (MBR)													
Syngnathus fuscus													
Leiostomus xanthurus													
Menidia menidia		20	33										
Menbras martinica				1									
Unidentified A								1					
Menidia beryllina					1	2	1		1			2	
Anchoa mitchilli	2200	1	1	26	35	9	15	4	4	11	12	20	16
Gobiosoma bosci			3	25	23	8	10	2		9	14	31	34
Menidia menidia						1			2	1	1		
Anchoa mitchilli		43	27	38	57	11	25	10	11	15	19	35	15
Membras martinica													
Leiostomus xanthurus											1		
Menidia beryllina													1
Ictalurus punctatus													
Anguilla rostrata			1								1		
Unidentified (MBR)									1			4	
Brevoortia tyrannus									1				
Alosa aestivalis													1
Gobiosoma bosci	0600	11	8	17	8	17	30	4	5	16	18	15	11
Anchoa mitchilli		23	14	24	20	41	28	7	5	18	8	15	17
Anchoa mitchilli (eggs)		9	6	4	4	31	40		4	3	1		1
Leiostomus xanthurus						1							
Syngnathus fuscus													1
Menidia menidia											1		
Menidia beryllina		1						1					
Alosa aestivalis													
Micropogon undulatus						1					1		

TABLE 13. Species and calculated number of individuals per 100 cubic meter during 24 hour station on 11 - 12 June 1975

Species	Station Time	Intake						Discharge					
		Surface		Midwater		Bottom		Surface		Midwater		Bottom	
		Left	Right	Left	Right	Left	Right	Left	Right	Left	Right	Left	Right
Gobiosoma bosci	1000	8		892	431	32	9	8	4	195	123	327	245
Anchoa mitchilli		15	13	99	7	42	9	51	16	127	152	147	185
Anchoa mitchilli (eggs)		15	38	396	321	947	730	163	154	162	175	360	278
Unidentified(MBR)			6										
Syngnathus fuscus				9	7				4	4			
Leiostomus xanthurus					7								
Membras martinica													
Menidia beryllina													
Menidia menidia		930	25	9							4		
Unidentified													
Anchoa mitchilli	1800	114		130	121	1526	1101	51	71	103	168	121	127
Gobiosoma bosci		29		130	152	179	125	17	3	32	20	41	30
Anchoa mitchilli (eggs)		114		202	70	58	45	23	35	42	20	3	23
Unidentified (MBR)													
Menidia menidia		114											
Membras martinica			36	14	10								
Brevoortia tyrannus						5							
Menidia beryllina							4			10	3		3
Ictalurus punctatus													
Anguilla rostrata													
Leiostomus xanthurus													
Syngnathus fuscus													
Anchoa mitchilli	0200	118	110	413	332	748	799	158	65	158	115	233	236
Gobiosoma bosci		235	156	550	560	374	332	100	53	177	196	242	288
Anchoa mitchilli (eggs)		78	37	18	43	26	40		16	17	37	38	35
Unidentified													
Menidia menidia				6			3	25	4				
Leiostomus xanthurus			12							3			
Syngnathus fuscus				6		6		4		3	3		
Menidia beryllina							3						4
Alosa aestivalis										3			
Micropogon undulatus													

TABLE 13. (continued)

Species	Station Time	Intake						Discharge					
		Surface		Midwater		Bottom		Surface		Midwater		Bottom	
		Left	Right	Left	Right	Left	Right	Left	Right	Left	Right	Left	Right
Gobiosoma bosci	1400					194	164		24	145	128	242	268
Anchoa mitchilli		29		83		83	129	35	14	255	193	421	333
Anchoa mitchilli (eggs)				183	80	347	267	52	93	105	73	27	87
Unidentified(MBR)													
Syngnathus fuscus													
Leiostomus xanthurus													
Membras martinica				14								9	
Menidia beryllina					11	28	9		7				
Menidia menidia		571	471										
Unidentified								3					
Anchoa mitchilli	2200	8	8	243	330	225	231	15	15	36	40	82	62
Gobiosoma bosci			23	234	217	200	154	8		30	47	127	139
Anchoa mitchilli (eggs)			205	355	538	400	385	38	42	49	64	143	61
Unidentified (MBR)									12			16	
Menidia menidia				9		25			8	3	3		
Membras martinica													
Brevoortia tyrannus									4	3		4	
Menidia beryllina												4	
Ictalurus punctatus													
Anguilla rostrata			8	9							3		
Leiostomus xanthurus					9						3		
Syngnathus fuscus					9								
Anchoa mitchilli	0600	151	88	113	87	188	105	27	20	50	31	59	67
Gobiosoma bosci		72	50	85	35	78	113	115	20	62	69	59	43
Anchoa mitchilli (eggs)		59	38	19	17	142	150		16	12	4		4
Unidentified													
Menidia menidia											4		
Leiostomus xanthurus						9							
Syngnathus fuscus													4
Menidia beryllina		7						4					
Alosa aestivalis													
Micropogon undulatus						5					4		

TABLE 14. Species and number of individuals captured during 24 hour station on 17 - 18 June 1975

Species	Station Time	Intake						Discharge					
		Surface		Midwater		Bottom		Surface		Midwater		Bottom	
		Left	Right	Left	Right	Left	Right	Left	Right	Left	Right	Left	Right
Anchoa mitchilli	1000	1	1	46	46	25	15	2	1	9	5	14	18
Anchoa mitchilli (eggs)		7	8	14	24	283	276	88	74	93	75	71	81
Gobiosoma bosci				17	13	21	21	3	4	16	10	21	24
Anchoa mitchilli	1800	2	1	3	10		5	3	4	6	4	67	50
Anchoa mitchilli (eggs)		1	2	16	10	236	268	3	4	7	11	11	9
Gobiosoma bosci		1		7	6	9	13			4		77	68
Syngnathus fuscus											1		
Menidia menidia													1
Membras martinica													
Brevoortia tyrannus													
Menidia beryllina													
Unidentified (MBR)													
Anchoa mitchilli	0200	22	8	62	51	37	32	13	15	26	22	29	31
Anchoa mitchilli (eggs)		1		2	4	17	17	6	5	6	6	6	1
Gobiosoma bosci		7	14	94	93	114	133	7	12	16	14	93	72
Syngnathus fuscus		2											1
Membras martinica												2	
Leiostomus xanthurus												1	
Alosa pseudoharengus												1	
Anguilla rostrata													1
Dorosoma cepedianum (eggs)													1
Menidia menidia													

TABLE 14. (continued)

Species	Station Time	Intake						Discharge					
		Surface		Midwater		Bottom		Surface		Midwater			
		Left	Right	Left	Right	Left	Right	Left	Right	Left	Right	Left	Right
Anchoa mitchilli	1400	2	1	9	9	24	15	7	4	4	8	21	31
Anchoa mitchilli (eggs)		3	3	52	71	103	128	6	3	5	1	5	10
Gobiosoma bosci				9	7	98	122	8	4	6	3	20	26
Anchoa mitchilli	2200	3	20	71	66	31	34	10	21	26	20	28	31
Anchoa mitchilli (eggs)		16	18	16	16	14	7		1	1	1	2	2
Gobiosoma bosci		26	11	31	32	25	33	3	6	43	24	18	13
Syngnathus fuscus													
Menidia menidia		1	5	2			1	1			1		1
Membras martinica			1										
Brevoortia tyrannus								1					1
Menidia beryllina								2				1	
Unidentified (MBR)											1	1	
Anchoa mitchilli	0600	3		7	1	32	30	5	17	15	31	85	80
Anchoa mitchilli (eggs)		1		3	2	4	3				1	1	2
Gobiosoma bosci		6		10	10	20	26	6	10	23	20	278	307
Syngnathus fuscus					1					1			
Membras martinica													
Leiostomus xanthurus													
Alosa pseudoharengus													
Anguilla rostrata													
Dorosoma cepedianum (eggs)													
Menidia menidia							1						

TABLE 15. Species and calculated number of individuals per 100 cubic meters during 24 hour station on 17 - 18 June 1975

Species	Station Time	Intake						Discharge					
		Surface		Midwater		Bottom		Surface		Midwater		Bottom	
		Left	Right	Left	Right	Left	Right	Left	Right	Left	Right	Left	Right
Anchoa mitchilli	1000	4	4	193	164	543	469	6	3	28	16	40	55
Gobiosoma bosci				67	46	457	656	10	13	50	32	61	74
Anchoa mitchilli (eggs)		29	33	55	86	6152	8625	283	241	288	238	205	249
Anchoa mitchilli	1800	16	6	22	57		17	10	14	20	13	199	262
Gobiosoma bosci		8		52	34	28	43			13		271	301
Anchoa mitchilli (eggs)		8	12	119	57	742	884	10	14	23	36	36	43
Syngnathus fuscus											3		
Menidia menidia												4	
Membras martinica													
Menidia species													
Leiostomus xanthurus													
Menidia beryllina													
Brevoortia tyrannus													
Anchoa mitchilli	0200	163	43	2696	1214	1027	299	40	37	85	73	88	93
Gobiosoma bosci		52	74	4087	2214	4000	1243	22	47	52	47	281	217
Anchoa mitchilli (eggs)		7		87	95	472	159	19	16	20	20	18	
Syngnathus fuscus		15											3
Leiostomus xanthurus												3	
Membras martinica												6	
Alosa pseudoharengus												3	
Anguilla rostrata													3
Dorosoma cepedium													3

TABLE 15. (continued)

Species	Station Time	Intake						Discharge					
		Surface		Midwater		Bottom		Surface		Midwater		Bottom	
		Left	Right	Left	Right	Left	Right	Left	Right	Left	Right	Left	Right
Anchoa mitchilli	1400	20	8	106	69	101	558	25	14	14	28	62	94
Gobiosoma bosci				106	54	412	454	28	14	20	10	59	79
Anchoa mitchilli (eggs)				612	546	433	476	21	11	17	3	15	30
Anchoa mitchilli	2200	26	97	302	262	136	157	29	62	75	75	77	89
Gobiosoma bosci		228	53	132	127	110	152	9	18	124	124	50	37
Anchoa mitchilli (eggs)		140	87	68	63	61	32		3	3	3	6	6
Syngnathus fuscus													
Menidia menidia			24				5	3					3
Membras martinica			5										
Menidia species				9									
Leiostomus xanthurus								3					
Menidia beryllina								6				3	
Brevoortia tyrannus													3
Anchoa mitchilli	0600	30		139	51	46	95	263	258	43	29	314	1111
Gobiosoma bosci		61		97	30	70	62	861	990	35	14	1529	5000
Anchoa mitchilli (eggs)		10		42			3	3	6	397	286	4490	11889
Syngnathus fuscus						3						20	
Leiostomus xanthurus													
Membras martinica										7			
Alosa pseudoharengus													
Anguilla rostrata													
Dorosoma cepedium													

TABLE 16. Species and number of individuals captured during 24 hour station on 24 - 25 June 1975

Species	Station Time	Intake						Discharge					
		Surface		Midwater		Bottom		Surface		Midwater		Bottom	
		Left	Right	Left	Right	Left	Right	Left	Right	Left	Right	Left	Right
Anchoa mitchilli	1000	6	6	16	20	5	1	2	6	30	22	28	32
Anchoa mitchilli (eggs)		56	60	229	214	64	90	162	183	212	173	179	140
Gobiosoma bosci		5	3	78	90	12	14	14	9	87	116	402	252
Membras martinica		1										1	
Syngnathus fuscus				1									
Unidentified (MBR)							1						
Menidia beryllina													
Menidia menidia													
Anchoa mitchilli	1800		1	49	44	14	6	9	9	24	30	13	21
Anchoa mitchilli(eggs)		6	5	9	12	11	3		9	9	9		8
Gobiosoma bosci		3	10	78	85	31	20	42	53	81	65	76	80
Unidentified (MBR)									1				
Notropis hudsonius										1			
Menidia menidia													
Syngnathus fuscus													
Menidia beryllina													
Alosa aestivalis													
Anchoa mitchilli	0200	1	6	29	36	18	21	9	7	19	37	12	16
Anchoa mitchilli (eggs)		1		99	95	128	88	4	15	17	15	19	27
Gobiosoma bosci		3	11	113	133	78	161	16	47	129	131	146	160
Menidia menidia		1		1	1					3	2	1	
Menidia beryllina			1										
Membras martinica							1						
Unidentified (MBR)													

TABLE 16. (continued)

Species	Station Time	Intake						Discharge					
		Surface		Midwater		Bottom		Surface		Midwater		Bottom	
		Left	Right	Left	Right	Left	Right	Left	Right	Left	Right	Left	Right
Anchoa mitchilli	1400	2	2	11	3	84	94	16	15	28	17	24	22
Anchoa mitchilli (eggs)		58	73	10	7	45	61	77	76	77	55	50	54
Gobiosoma bosci		3	3	85	57	169	165	37	49	156	109	144	142
Membras martinica		2											
Syngnathus fuscus													
Unidentified (MBR)			1								3		2
Menidia beryllina						1							
Menidia menidia												1	
Anchoa mitchilli	2200	2	2	29	23	10	10	8	12	51	32	12	17
Anchoa mitchilli (eggs)			2	6	12	14	27	3	11	11	6	3	2
Gobiosoma bosci		24	25	13	21	54	38	38	36	127	100	101	86
Unidentified (MBR)													
Notropis hudsonius													
Menidia menidia			1					1					2
Syngnathus fuscus					1	1							
Menidia beryllina									1		1	1	
Alosa aestivalis													2
Anchoa mitchilli	0600	6	2	93	93	28	16	3	2	11	12	19	11
Anchoa mitchilli (eggs)		5	6	7	3	16	15	2	3	2	4	5	4
Gobisoma bosci		12	6	113	123	43	33	8	5	39	25	53	20
Menidia menidia													
Menidia beryllina													
Membras martinica								1					
Unidentified (MBR)					1	1						2	

TABLE 17. Species and calculated number of individuals per 100 cubic meter during 24 hour station on 24 - 25 June 1975

Species	Station Time	Intake						Discharge					
		Surface		Midwater		Bottom		Surface		Midwater		Bottom	
		Left	Right	Left	Right	Left	Right	Left	Right	Left	Right	Left	Right
Anchoa mitchilli	1000	43	29	314	1111	28	5	6	18	84	61	108	121
Gobiosoma bosci		35	14	1529	5000	67	76	42	27	243	324	1546	955
Syngnathus fuscus				20									
Anchoa mitchilli (eggs)		397	286	4490	11889	356	489	75	550	592	483	688	530
Membras martinica		7						3				4	
Unidentified													
Menidia beryllina													
Unidentified (MBR)													
Menidia menidia													
Gobiosoma bosci	1800	500	2000	494	720	260	127	100	128	214	163	264	250
Anchoa mitchilli			200	310	373	118	38	21	22	69	81	45	66
Anchoa mitchilli (eggs)		1000	1000	57	102	92	19		22	24	24		25
Unidentified (MBR)									2				
Notropis hudsonius										3			
Menidia menidia													
Syngnathus fuscus													
Menidia beryllina													
Alosa aestivalis													
Anchoa mitchilli	0200	7	162	139	273	178	189	23	18	58	114	44	53
Anchoa mitchilli (eggs)		7		474	720	772	793	10	39	52	46	69	89
Gobiosoma bosci		22	297	541	1008	1267	1450	41	122	397	404	533	530
Menidia menidia		7		5	8					9	6	4	
Menidia beryllina			27										
Membras martinica							9						
Unidentified (MBR)													

TABLE 17. (continued)

Species	Station Time	Intake						Discharge					
		Surface		Midwater		Bottom		Surface		Midwater		Bottom	
		Left	Right	Left	Right	Left	Right	Left	Right	Left	Right	Left	Right
Anchoa mitchilli	1400	22	19	58	16	382	427	41	40	75	45	96	79
Gobiosoma bosci		34	29	445	297	745	750	96	131	416	285	578	507
Syngnathus fuscus													
Anchoa mitchilli (eggs)		652	702	52	37	205	277	199	203	205	139	201	193
Membras martinica		22											
Unidentified			10										
Menidia beryllina						5							
Unidentified (MBR)											8		7
Menidia menidia												4	
Gobiosoma bosci	2200	146	147	191	236	482	469	101	98	353	272	321	272
Anchoa mitchilli		12	12	426	258	89	123	21	33	142	87	38	54
Anchoa mitchilli (eggs)			12	882	135	125	333	8	30	31		10	6
Unidentified (MBR)													
Notropis hudsonius			6										
Menidia menidia												3	6
Syngnathus fuscus					11	9							
Menidia beryllina								3	3		3		
Alosa aestivalis													6
Anchoa mitchilli	0600	41	15	306	302	237	115	9	6	31	37	34	54
Anchoa mitchilli (eggs)		34	44	23	10	136	107	6	9	6	12	12	14
Gobiosoma bosci		82	44	372	399	364	345	23	14	111	76	61	150
Menidia menidia													
Menidia beryllina								3					
Membras martinica													
Unidentified (MBR)											3		6

TABLE 18. Species and number of individuals captured during 24 hour station on 9 - 10 July 1975

Species	Station Time	Intake						Discharge					
		Surface		Midwater		Bottom		Surface		Midwater		Bottom	
		Left	Right	Left	Right	Left	Right	Left	Right	Left	Right	Left	Right
Anchoa mitchilli	1000	1		3		5	2	8	5	42	10	83	71
Gobiosoma bosci				3	2	4	9	1		25	14	129	91
Anchoa mitchilli (eggs)					3	5	4		1	3	2	1	
Unidentified (MBR)						1				2	1	2	
Menidia menidia												1	
Lepomis gibbosus													
Anchoa mitchilli	1800	2		49	51	26	24	11	12	16	10	23	14
Gobiosoma bosci		6	5	42	44	21	26	16	17	20	29	61	65
Anchoa mitchilli (eggs)				2		3	2	2	2		1		3
Unidentified (MBR)								2	1	1			
Menidia menidia													
Alosa aestivalis													
Anchoa mitchilli	0200	1	1	63	35	52	69	38	12	40	39	53	51
Gobiosoma bosci		8	11	53	36	90	185	41	4	112	82	162	177
Unidentified (MBR)				2									
Anchoa mitchilli (eggs)									2				1
Membras martinica												1	

TABLE 18. (continued)

Species	Station Time	Intake						Discharge					
		Surface		Midwater		Bottom		Surface		Midwater		Bottom	
		Left	Right	Left	Right	Left	Right	Left	Right	Left	Right	Left	Right
Anchoa mitchilli	1400			2		69	74	16	34	25	19	44	31
Gobiosoma bosci				9	6	10	10	7	6	27	20	56	63
Anchoa mitchilli (eggs)			3	17	16	8	4	17	15	18	18	17	23
Unidentified (MBR)							1		1				
Menidia menidia													
Lepomis gibbosus											1		
Anchoa mitchilli	2200	2	3	5	2	4	1	6	1	15	10	18	17
Gobiosoma bosci		1	3	26	37	10	4	4	3	38	17	144	88
Anchoa mitchilli (eggs)								1	1		1	2	1
Unidentified (MBR)					3							1	
Menidia menidia												1	
Alosa aestivalis													1
Anchoa mitchilli	0600	2		6	4	16	4	1	3	10	5	14	24
Gobiosoma bosci		14		8	8	11	8		3	11	15	23	23
Unidentified (MBR)						1							
Anchoa mitchilli (eggs)													
Membras martinica													

TABLE 19. Species and calculated number of individuals per 100 cubic meters captured during 24 hour station on July 9 - 10 1975

Species	Station Time	Intake						Discharge					
		Surface		Midwater		Bottom		Surface		Midwater		Bottom	
		Left	Right	Left	Right	Left	Right	Left	Right	Left	Right	Left	Right
Anchoa mitchilli	1000	15		8		2500	50	35	22	175	42	395	296
Gobiosoma bosci				8	19	2000	100	4		104	58	586	380
Anchoa mitchilli (eggs)					29	2500	225		4	13	8	5	
Menidia menidia												5	
Lepomis gibbosus													
Anchoa mitchilli	1800	13	1000	280	463	130	421	46	52	37	66	201	52
Gobiosoma bosci		40		240	400	105	456	67	74	107	83	540	93
Anchoa mitchilli (eggs)				11			35	8	9	4			10
Menidia menidia													
Alosa aestivalis													
Anchoa mitchilli	2000	7	8	650	282	289	885	163	55	174	174	346	300
Gobiosoma bosci		56	88	546	290	500	2371	184	18	487	366	1058	1054
Anchoa mitchilli (eggs)									9				6
Membras martinica												7	

TABLE 19. (continued)

Species	Station Time	Intake						Discharge					
		Surface		Midwater		Bottom		Surface		Midwater		Bottom	
		Left	Right	Left	Right	Left	Right	Left	Right	Left	Right	Left	Right
Anchoa mitchilli	1400		23	74		1061	389	70	133	89	70	142	103
Gobiosoma bosci				333	43	154	52	30	24	100	74	55	210
Anchoa mitchilli (eggs)				629	114	123	21	74	59	68	67	181	67
Menidia menidia													
Lepomis gibbosus											4		
Anchoa mitchilli	2200	35	375	116	91	182	59	32	6	82	56	104	97
Gobiosoma bosci		18	375	604	168	454	235	21	19	206	96	828	500
Anchoa mitchilli (eggs)								5	6			12	6
Menidia menidia												6	
Alosa aestivalis													6
Anchoa mitchilli	0600	74	130	121	270	143	142	5	15	49	24	77	133
Gobiosoma bosci		518	174	242	177	177	285		15	52	72	127	128
Anchoa mitchilli (eggs)													
Membras martinica													

TABLE 20. Species and number of individuals captured during 24 hour station on 29 - 30 July 1975

Species	Station Time	Intake						Discharge					
		Surface		Midwater		Bottom		Surface		Midwater		Bottom	
		Left	Right	Left	Right	Left	Right	Left	Right	Left	Right	Left	Right
Anchoa mitchilli	1000			22	10	3	3	3	2	5	6	5	4
Gobiosoma bosci				147	151	11	12	7	8	9	24	40	26
Menidia menidia													
Cyprinus carpio													
Unidentified (MBR)								1					
Menidia beryllina													
Anchoa mitchilli	1800	17	2	110	80	152	154	8	12	14	20	56	61
Menidia beryllina		1											
Gobiosoma bosci				5	5	33	30	17	14	25	36	38	51
Menidia menidia				1									
Unidentified (MBR)								2					
Micropogon undulatus													
Anchoa mitchilli	0200	5	2	32	53	4	5	9	12	41	56	19	29
Gobiosoma bosci		2	3	64	61	19	23	42	39	96	95	351	250
Alosa aestivalis				1							1		1
Micropogon undulatus									1				
Menidia beryllina										1			
Unidentified (MBR)													1
Anguilla rostrata													1

TABLE 20. (continued)

Species	Station Time	Intake						Discharge					
		Surface		Midwater		Bottom		Surface		Midwater			
		Left	Right	Left	Right	Left	Right	Left	Right	Left	Right	Left	Right
Anchoa mitchilli	1400	1		11	25	2	2	6	1	26	17	17	31
Gobiosoma bosci		1	1	65	66	3	3	8	22	39	37	92	169
Menidia menidia													
Cyprinus carpio													
Unidentified (MBR)													
Menidia beryllina					1								
Anchoa mitchilli	2200			40	61	14	27	11	9	36	29	22	25
Menidia beryllina													
Gobiosoma bosci				97	106	8	8	11	12	47	35	48	54
Menidia menidia													
Unidentified (MBR)													
Micropogon undulatus											1		
Anchoa mitchilli	0600	6	5	170	125	77	92	18	6	84	70	36	28
Gobiosoma bosci			2	107	135	84	95	20	27	122	131	48	54
Alosa aestivalis													
Micropogon undulatus				1						1			
Menidia beryllina													
Unidentified (MBR)									1				
Anguilla rostrata													

Table 21. Species and calculated number of individuals captured per 100 cubic meters during 24 hour station on 29-30 July, 1975

Species	Station Time	Intake						Discharge					
		Surface		Midwater		Bottom		Surface		Midwater		Bottom	
		Left	Right	Left	Right	Left	Right	Left	Right	Left	Right	Left	Right
Anchoa mitchilli	1000		4	85	141	13	13	8	5	17	15	22	18
Gobiosoma bosci				568	2127	47	50	18	21	67	26	171	117
Anchoa mitchilli	1800	72	8	340	258	553	592	20	30	38	51	221	250
Gobiosoma bosci					16	120	115	43	35	68	93	150	209
Menidia beryllina		4											
Menidia menidia				3									
Anchoa mitchilli	0200	26	9	137	241	100	79	102	30	113	159	8	140
Gobiosoma bosci		11	13	274	278	302	365	107	98	265	270	1500	1208
Anchoa mitchilli	1400	8		41	98	20	18	18	3	75	48	73	124
Gobiosoma bosci		8		241	260	29	27	24	65	112	105	394	676
Menidia beryllina					4								
Anchoa mitchilli	2200			1053	212	292	509	31	26	104	79	70	86
Gobiosoma bosci				2553	368	167	151	31	35	136	95	64	171
Menidia menidia			7										
Anchoa mitchilli	0600	29	25	545	374	291	349	47	14	258	210	131	123
Gobiosoma bosci			10	343	404	317	360	52	64	374	393	175	234

Table 22. Species and number of individuals captured during 24 hour station on 13-14 August 1975.

Species	Station Time	Intake						Discharge					
		Surface		Midwater		Bottom		Surface		Midwater		Bottom	
		Left	Right	Left	Right	Left	Right	Left	Right	Left	Right	Left	Right
Anchoa mitchilli	1000	7	11	37	40	13	14	6	5	4	8	13	9
Menidia beryllina		11		1	1	2	1						
Gobiosoma bosci				19	27	47	45	9	6	16	10	32	28
Membras martinica													
Anchoa mitchilli (eggs)							1						
Menidia menidia									1				
MBR													
Anchoa mitchilli	1800		7	25	27	20	30	18	12	12	30	56	38
Gobiosoma bosci		2	11	30	29	20	16	34	25	40		47	42
Anchoa mitchilli (eggs)		4	2		3	1	1		1				
Micropogon undulatus									1				
MBR												1	
Unidentified (egg)													1
Cynoscion regalis													
Trinectes maculatus													
Anchoa mitchilli	0200	1		44	67	27	32	18	22	25	32	30	32
Gobiosoma bosci				30	44	32	39	42	30	51	52	114	118
Micropogon undulatus								1	1	1	2	1	
Anchoa mitchilli (eggs)									1				
Alosa aestivalis													1
Syngnathus fuscus													
MBR													
Menidia beryllina													
Gobiosoma bosci(eggs)													

Table 22. (continued)

Species	Station Time	Intake						Discharge					
		Surface		Midwater		Bottom		Surface		Midwater		Bottom	
		Left	Right	Left	Right	Left	Right	Left	Right	Left	Right	Left	Right
Anchoa mitchilli	1400			9	3		2	5	9	16	11	7	19
Menidia beryllina						1							
Gobiosoma bosci				20	9		3	10	5	22	16	19	27
Membras martinica													
Anchoa mitchilli (eggs)													
Menidia menidia													
MBR					2								
Anchoa mitchilli	2200	1		27	41	20	49	17	16	18	24	28	21
Gobiosoma bosci				9	46	6	38	11	20	15	12	23	24
Anchoa mitchilli (eggs)			1	2	58		67	1					1
Micropogon undulatus					2		2	2	2	6	2	5	3
MBR								1					
Unidentified (egg)													
Cynoscion regalis								1					
Trinectes maculatus											1		
Anchoa mitchilli	0600	6	10	37	20	22	26	15	18	15	16	32	22
Gobiosoma bosci		2	3	65	56	22	27	16	26	22	16	32	35
Micropogon undulatus								1	1	1	1		
Anchoa mitchilli (eggs)				2			1						
Alosa aestivalis													
Syngnathus fuscus								2					
MBR										1			
Menidia beryllina												1	
Gobiosoma bosci (eggs)													2

Table 23. Species and calculated number of individuals per 100 cubic meter captured during 24 hour station on 13-14 August, 1975.

Species	Station Time	Intake						Discharge					
		Surface		Midwater		Bottom		Surface		Midwater		Bottom	
		Left	Right	Left	Right	Left	Right	Left	Right	Left	Right	Left	Right
Anchoa mitchilli	1000	24		31	101	109	65	91*	16	14	12	21	43	31
								6+						
Menidia beryllina		38			3	3	10							
Gobiosoma bosci					52	74	235	292	25	17	38	26	105	97
Membras martinica								6						
Menidia menidia										3				
Anchoa mitchilli	1800	18+		27*	71	76*	152*	246*	51	36*	32	83	210	145
				8+		8+	8+	8+		3+				
Gobiosoma bosci		9		43	85	82	152	131	97	77	106	69	176	160
Micropogon undulatus										3				
MBR														4+
Cynoscion regalis														
Trinectes maculatus														
Anchoa mitchilli	0200	11			224	349	1929	2750	66	84*	71	94*	99	115
										4+		6+		
Gobiosoma bosci					153	229	2286	3250	154	115	147	152	375	424
Micropogon undulatus								83	4	4	3		3	
Alosa aestivalis														4
Syngnathus fuscus														
Menidia beryllina														
MBR														

* Larvae
\+ Eggs

Table 23. (continued)

Species	Station Time	Intake						Discharge					
		Surface		Midwater		Bottom		Surface		Midwater			
		Left	Right	Left	Right	Left	Right	Left	Right	Left	Right	Left	Right
Anchoa mitchilli	1400				57	16	29	125	15	27	48	52	23	63
Menidia beryllina														
Gobiosoma bosci					127	49		188	31	15	66	76	64	90
Membras martinica														
Menidia menidia														
MBR						10								
Anchoa mitchilli	2200	7	24+		79*	121*	53	135*	50*	47	50	70	112	82*
					6+	171+		184+	3+					4+
Gobiosoma bosci					26	136	16	104	32	59	41	35	92	94
Micropogon undulatus						6		5	6	6	17	6	20	12
MBR														
Cynoscion regalis									3					
Trinectes maculatus												3		
Anchoa mitchilli	0600	37	833		118*	72	101	123*	45	56	42	47*	102	72
					7+			5+				3+		
Gobiosoma bosci		12	250		212	202	101	128	48	82	62	47	102	115*
														7+
Micropogon undulatus									3	3	3	3		
Alosa aestivalis														
Syngnathus fuscus									6					
Menidia beryllina													3	
MBR											3			

* Larvae
\+ Eggs

55

Table 24. Species and number of individuals captured during 24 hour station on 3-4 September, 1975.

Species	Station Time	Intake						Discharge					
		Surface		Midwater		Bottom		Surface		Midwater			
		Left	Right	Left	Right	Left	Right	Left	Right	Left	Right	Left	Right
Anchoa mitchilli	1000					5	4	1	1	1	1	8	2
Gobiosoma bosci						1	1	2	1		1	5	2
MBR											1		
Menidia menidia													1
Syngnathus fuscus													
Anchoa mitchilli	1800	12	7	2		3	1	2	4	9	6	6	6
Gobiosoma bosci				1	1	1		2		1	1	5	1
Gobiosoma bosci(eggs)											1		
Menidia species													
Membras martinica													
Menidia beryllina													
Micropogon undulatus													
MBR													
Menidia menidia													
Anguilla rostrata													
Anchoa mitchilli	0200	2	3	21	14	25	10	7	7	11	7	17	18
Notropis bifrenatus			1										
Gobiosoma bosci				1	2	3	1	1	1	2	2	1	4
Menidia menidia				1		1							
Trinectes maculatus					1					2			
Menidia beryllina												1	
Alosa aestivalis										1	1		
Micropogon undulatus													1

Table 24. (continued)

Species	Station Time	Intake						Discharge					
		Surface		Midwater		Bottom		Surface		Midwater		Bottom	
		Left	Right	Left	Right	Left	Right	Left	Right	Left	Right	Left	Right
Anchoa mitchilli	1400	9	6	1	3			1		1	1	4	6
Gobiosoma bosci			1	2		1		2	3			2	4
MBR													
Menidia menidia				2		2	1	1					
Syngnathus fuscus				1									
Anchoa mitchilli	2200			36	21	5	2	7	15	13	18	21	21
Gobiosoma bosci				9	4	6	2	3	1	4	2	12	13
Gobiosoma bosci(eggs)													
Menidia species		1											
Membras martinica					1		1						
Menidia beryllina									1				1
Micropogon undulatus									1		1	1	
MBR										1			
Menidia menidia												1	
Anguilla rostrata													1
Anchoa mitchilli	0600			3	5	17	10	5	3	5	11	12	8
Notropis bifrenatus													
Gobiosoma bosci				4	2	4	3	2				9	3
Menidia menidia													
Trinectes maculatus													
Menidia beryllina		1											
Alosa aestivalis													
Micropogon undulatus													

Table 25. Species and calculated number of individuals per 100 cubic meters captured during 24 hour station on 3-4 September 1975

Species	Station Time	Intake						Discharge					
		Surface		Midwater		Bottom		Surface		Midwater		Bottom	
		Left	Right	Left	Right	Left	Right	Left	Right	Left	Right	Left	Right
Anchoa mitchilli	1000					151	69	3	3	3	3	33	8
Gobiosoma bosci						30	17	6	3		3	21	8
Anchoa mitchilli (eggs)													
Menidia beryllina													4
Syngnathus fuscus													
Menidia menidia													
Anchoa mitchilli	1800	64	34	9		59	20	6	13	24	20	19	15
Gobiosoma bosci				5	5			6		3	3	16	2
Menidia menidia						20							
Menidia species													
Membras martinica													
Menidia beryllina													
Micropogon undulatus													
MBR													
Anguilla rostrata													
Anchoa mitchilli	0200	11	16	66	43	93	25	17	19	31	19	58	58
Gobiosoma bosci				3		11	3	3	3	6	6	34	13
Notropis bifrenatus			5										
Menidia menidia				3	6	3							
Trinectes maculatus					3					3			
Menidia beryllina										6		34	
Alosa aestivalis										3	3		
Micropogon undulatus													3

Table 25. (continued)

Species	Station Time	Intake						Discharge					
		Surface		Midwater		Bottom		Surface		Midwater			
		Left	Right	Left	Right	Left	Right	Left	Right	Left	Right	Left	Right
Anchoa mitchilli	1400		31	18	4	10			3		3	1	14	21
Gobiosoma bosci				3	8		21		6	9			7	14
Anchoa mitchilli (eggs)														
Menidia beryllina														
Syngnathus fuscus					4									3
Menidia menidia					8		43	18	3					
Anchoa mitchilli	2200				240	112	143	53	22	44	42	56	62	59
Gobiosoma bosci					60	21	171	53	9	3	13	6	37	37
Menidia menidia													3	3
Menidia species			7											
Membras martinica								26						
Menidia beryllina										3				
Micropogon undulatus										3		3	3	
MBR											3			
Anguilla rostrata														3
Anchoa mitchilli	0600				15	22	189	80	17	10	16	33	52	34
Gobiosoma bosci					20	9	45	24	7				39	13
Notropis bifrenatus														
Menidia menidia														
Trinectes maculatus														
Menidia beryllina			5											
Alosa aestivalis														
Micropogon undulatus														

Table 26. Species and number of individuals captured during 24 hour station on 15-16 October, 1975

Species	Station Time	Intake						Discharge					
		Surface		Midwater		Bottom		Surface		Midwater			
		Left	Right	Left	Right	Left	Right	Left	Right	Left	Right	Left	Right
Anchoa mitchilli	1000		1			1	1						
Gobiosoma bosci													1
Micropogon undulatus													1
Alosa aestivalis													
Menidia beryllina													
Micropogon undulatus	1800				2			1			1		1	1
Alosa aestivalis									5	12	2	3	1	6
Anchoa mitchilli									2	2		2		
Gobiosoma bosci												1		
Micropogon undulatus	0200		1			2	5	9			19	16	5	6
Menidia beryllina			4	2										
Anchoa mitchilli					3		2	3				1		1
Alosa aestivalis								1				1		
Gobiosoma bosci														
Etheostoma olmstedi														

Table 26. (continued)

Species	Station Time	Intake						Discharge					
		Surface		Midwater		Bottom		Surface		Midwater			
		Left	Right	Left	Right	Left	Right	Left	Right	Left	Right	Left	Right
Anchoa mitchilli	1400				1		1				1		1		
Gobiosoma bosci					1			1							
Micropogon undulatus															
Alosa aestivalis									1		1		1		
Menidia beryllina											1			2	
Micropogon undulatus	2200						1					21	28	9	6
Alosa aestivalis															
Anchoa mitchilli					4	4		2				2	1	1	1
Gobiosoma bosci															
Micropogon undulatus	0600				25	18	6	4				17	38	24	32
Menidia beryllina			1												
Anchoa mitchilli					8	11	1	1				3	3	1	5
Alosa aestivalis					1			1	2						1
Gobiosoma bosci						1								1	
Etheostoma olmstedi												1			

Table 27. Species and calculated number of individuals per 100 cubic meters captured during 24 hour station on 15-16 October, 1975

Species	Station Time	Intake						Discharge					
		Surface		Midwater		Bottom		Surface		Midwater		Bottom	
		Left	Right	Left	Right	Left	Right	Left	Right	Left	Right	Left	Right
Anchoa mitchilli	1000	6			6	8							
Gobiosoma bosci													4
Menidia beryllina													
Micropogon undulatus													4
Anchoa mitchilli	1800							10	10		12		6
Gobiosoma bosci											6		
Micropogon undulatus				14			15			6		6	
Alosa aestivalis								24	59	12	19	6	37
Anchoa mitchilli	0200			16		9	14				2		3
Gobiosoma bosci													
Micropogon undulatus		4			11	24	42			45	38	17	21
Menidia beryllina		16	8										
Alosa aestivalis							5				2		
Etheostoma olmstedi													
Anchoa mitchilli	1400			5		4				4	4		
Gobiosoma bosci				5			4						
Menidia beryllina									4				
Micropogon undulatus												7	
Alosa aestivalis								4	4		4		
Anchoa mitchilli	2200			13	53		44			87	4	4	4
Gobiosoma bosci													
Micropogon undulatus						22				8	115	39	26
Alosa aestivalis													
Anchoa mitchilli	0600			11	15	4	4			14	14	4	20
Gobiosoma bosci					1							4	
Micropogon undulatus				34	24	26	17			80	178	92	127
Menidia beryllina		4											
Alosa aestivalis				1			4	9					4
Etheostoma olmstedi										5			

Table 28. Extremes of water temperature (°C) taken during the 24 hour stations from May through October, 1975

DATE		INTAKE			DISCHARGE		
		Surface	Midwater	Bottom	Surface	Midwater	Bottom
May 7-8	HIGH	20	20	20	25	25	25
	LOW	18	17	18	23	23	22
May 14-15	HIGH	23	23	23	26	26	26
	LOW	20	20	20	23	24	23
May 22-23	HIGH	28	28	26	31	31	31
	LOW	24	24	24	29	29	29
May 29-30	HIGH	27	27	27	30	31	32
	LOW	24	24	24	28	29	30
June 4-5	HIGH	30	29	28	35	35	33
	LOW	24	24	24	31	30	30
June 11-12	HIGH	25	25	25	29	28	27
	LOW	23	22	22	27	26	27
June 17-18	HIGH	30	29	28	33	32	32
	LOW	22	26	26	31	30	30
June 24-25	HIGH	30	28	29	33	32	32
	LOW	26	26	26	30	30	30
July 9-10	HIGH	29	29	28	33	33	33
	LOW	24	26	26	32	30	30
July 29-30	HIGH	30	28	29	33	33	32
	LOW	27	27	27	30	31	30
Aug 13-14	HIGH	31	30	30	38	37	37
	LOW	26	26	27	36	34	33
Sept 3-4	HIGH	27	27	27	35	35	34
	LOW	25	25	25	32	32	32
Oct 15-16	HIGH	24	23	22	27	26	26
	LOW	20	21	20	22	23	22

Table 29. Extremes of dissolved oxygen (PPM) taken during the 24 hour stations from May through October, 1975

DATE		INTAKE Surface	INTAKE Midwater	INTAKE Bottom	DISCHARGE Surface	DISCHARGE Midwater	DISCHARGE Bottom
May 7-8	HIGH	8.9	8.9	8.6	8.5	8.6	8.9
	LOW	7.8	7.6	8.0	7.8	7.9	7.9
May 14-15	HIGH	9.3	9.6	9.8	9.2	8.2	9.2
	LOW	8.3	6.8	8.2	7.7	7.7	7.7
May 22-23	HIGH	8.3	7.9	8.3	7.2	7.6	8.1
	LOW	6.7	6.9	7.2	6.8	6.7	6.8
May 29-30	HIGH	9.3*	8.3	9.8	7.0	7.5	7.7
	LOW	7.0	6.1*	7.0	6.8	6.8	6.7
June 4-5	HIGH	10.0	8.2	8.3	8.2	7.6	7.9
	LOW	6.8	6.9	6.9	6.4	6.8	6.9
June 11-12	HIGH	8.1	8.3	9.4	7.6	7.8	7.6
	LOW	7.1	6.9	7.4	7.1	7.2	5.2
June 17-18	HIGH	7.7	8.0	7.9	7.8	7.6	7.3
	LOW	6.3	6.6	6.7	6.6	6.8	6.6
June 24-25	HIGH	9.1	8.4	8.5	8.5	7.7	11.6
	LOW	7.1	7.3	7.2	3.6	7.1	7.0
July 9-10	HIGH	7.9	9.1	9.3	6.9	7.3	7.3
	LOW	5.7	6.5	6.6	5.9	2.7	6.2
July 29-30	HIGH	9.1	8.4	8.0	7.1	8.5	8.5
	LOW	5.8	6.5	6.4	6.0	6.2	5.7
Aug 13-14	HIGH	8.2	7.9	7.3	7.1	6.9	7.1
	LOW	4.9	5.3	4.9	5.4	5.4	5.7
Sept 3-4	HIGH	7.3	7.6	7.9	7.4	7.3	7.3
	LOW	6.1	5.8	6.0	5.3	5.3	5.3
Oct 15-16	HIGH	9.6	8.5	9.0	9.4	7.7	7.9
	LOW	6.8	7.4	6.6	6.8	6.2	7.2

* Overran

Table 30. Extremes of salinity (PPT) taken during the 24 hour stations from May through October, 1975

DATE		INTAKE			DISCHARGE		
		Surface	Midwater	Bottom	Surface	Midwater	Bottom
May 7-8	HIGH	1.2	1.2	1.2	1.2	1.2	1.2
	LOW	0.7	0.9	0.8	0.8	0.8	0.8
May 14-15	HIGH	0.6	0.7	0.7	0.7	0.7	0.6
	LOW	0.3	0.4	0.4	0.4	0.3	0.4
May 22-23	HIGH	0.5	0.5	0.6	0.5	0.5	0.5
	LOW	0.4	0.4	0.4	0.4	0.4	0.4
May 29-30	HIGH	1.3	1.4	1.5	1.0	1.0	1.0
	LOW	0.6	0.6	0.8	0.7	0.7	0.7
June 4-5	HIGH	1.9	2.4	2.5	2.0	2.0	2.0
	LOW	0.8	1.0	1.0	1.0	1.0	1.0
June 11-12	HIGH	5.1	6.7	5.4	5.1	5.2	5.1
	LOW	4.5	4.6	4.7	4.6	4.5	4.6
June 17-18	HIGH	3.9	3.8	3.9	4.0	3.9	3.9
	LOW	3.3	3.3	3.5	3.3	3.4	3.4
June 24-25	HIGH	3.7	3.8	3.8	3.6	3.6	3.7
	LOW	3.2	3.2	3.2	3.3	3.2	3.2
July 9-10	HIGH	6.4	6.6	6.6	6.5	6.5	6.5
	LOW	6.0	6.1	6.1	6.0	6.0	6.0
July 29-30	HIGH	1.1	1.2	1.2	1.2	1.1	1.2
	LOW	0.8	0.7	0.8	0.8	0.8	0.8
Aug 13-14	HIGH	4.9	4.9	6.0	5.8	5.7	5.9
	LOW	3.7	4.0	4.2	4.0	4.0	4.0
Sept 3-4	HIGH	5.8	5.9	6.0	5.8	5.7	5.9
	LOW	5.2	5.3	5.1	5.2	5.1	5.1
Oct 15-16	HIGH	2.3	2.2	2.2	2.0	2.0	2.0
	LOW	1.2	1.3	1.6	1.6	1.6	1.6

3.4.4 THERMAL PLUME ENTRAINMENT OF ICHTHYOPLANKTON

Refer to the following report by the Virginia Institute of Marine Science for preliminary results and conclusions.

Thermal Plume Entrainment of Ichthyoplankton at the VEPCO Surry Nuclear Power Station

Progress Report No. 2

January 1976

by John V. Merriner and

A. Deane Estes

Virginia Institute of Marine Science

Ichthyoplankton entrainment in the heated effluent plume from the Surry Nuclear Power Plant is being evaluated by the Ichthyology Department at VIMS. The studies were initiated in August, 1975 as an extension of the existing plant entrainment study and sampling will continue through June, 1976.

The study is designed to assess entrainment of ichthyoplankton in the water of Cobham Bay by the heated effluent. As the effluent and existing river water mix, some portion of the ichthyoplankton in the existing river water will be swept into the mixing area. Larger fish, i.e. juveniles and adults, that have better swimming capabilities can negotiate the currents and avoid the elevated temperatures or select the warmer water and maintain their position in the plume, but fish eggs and larvae cannot. These small fish are then caught in the mixing zone (entrained) and swept along in the plume.

Kinds and numbers of eggs, larvae, and juvenile fish captured in and near the thermal plume through the December sampling periods are presented in this report.

Materials and Methods

Field methods and sampling design used in the evaluation of plume entrainment were detailed in the progress report submitted to VEPCO in October, 1975[1].

[1] Merriner, J. V. and A. D. Estes. Thermal Plume Entrainment of Ichthyoplankton at the VEPCO Surry Nuclear Power Station, Progress Report - October 1975, 12 p.

This study will provide a measurement of the abundance and kinds of fishes being entrained by the heated water plume from the power station. One sampling station is in the discharge canal to provide documentation of organisms in the heated water from the plant. Two stations are in an area of ambient water temperature to provide documentation of organisms in the river proper. Two stations are in the thermal plume to document the organisms present after mixing has occurred. Comparison of catches from the three areas provides information on organisms that are being entrained by the heated water plume.

Results and Discussion

Results from plume entrainment samples taken from August through September were discussed in the October, 1975 Progress Report[1]. Numbers of fishes were generally low but data from replicate tows were rather variable. An average of four species were captured per station during August and three species per station in September.

Bay anchovy, *Anchoa mitchilli* and the naked goby, *Gobisoma bosci* were the most abundant species during August and September (90 percent of the total catches). Other species included tidewater silverside (*Menidia beryllina*), Atlantic silverside (*Menidia menidia*), blueback herring (*Alosa aestivalis*), threadfin shad (*Dorosoma petenense*), and Atlantic croaker (*Micropogon undulatus*).

Sampling during August and September was conducted only during daylight hours (J. White - personal communication).

These samples yielded few fish and examination of earlier as well as concurrent plant entrainment data showed a significant increase in catch at night. We therefore sampled the plume during night and day on a trial basis. The number of species generally doubled during the night (Tables 1 and 2). Concentrations at night were sometimes 50 times those in daylight when based as number of fish caught per 100 cubic meters of water strained (Table 2). After consultation with VEPCO personnel (see Appendices), it was decided that night sampling should be incorporated into the program. Day and night samples are now taken for evaluation of plume entrainment.

Dominant species in the October samples were the Atlantic croaker and blueback herring (Table 1). Most of these were caught in the nighttime sample on 23 October. This sample contained only two tows since thick fog caused cancellation. The station was not repeated since it was experimental. Data from these two tows were adequate to show the day-night difference. Only two species were captured in five tows during the day, whereas at night, six species were captured in two tows (Table 1). Concentrations of fish also increased significantly at night (two individuals versus 67 individuals).

November and December yielded similar results. Very few, if any fish were captured during the daylight sampling and at night the number of species and number of organisms captured increased significantly. Croaker and blueback herring were still the dominant species. Several additional species were captured; channel catfish (*Ictalurus punctatus*), banded

killifish (Fundulus diaphanus), and a larval goby. The goby has been tentatively placed in the genus Gobinellus, which is a rare find in estuarine waters. We are presently attempting to obtain a positive identification on the specimen. The remaining species were represented by juvenile and adult individuals.

Only one nighttime sample was collected in December due to high winds and rough water conditions in Cobham Bay. Attempts were made through the first week of January to get this sample, but inclement weather prevailed.

Most of the fish captured in our samples since September are not being entrained into the thermal plume. Except for croaker, which are in the early juvenile stages, practically all of the fish captured in the thermal plume were assumed large enough to negotiate the currents and avoid the plume if they so desired. Some of the postlarval croaker might possibly be entrained, but our data do not indicate large numbers of croakers in the plume.

Catches of fish are low and variability of catch high, making statistical analysis of the data impractical. Only nighttime samples have produced consistent data. Since these were only begun in November, data are insufficient for statistical analysis at this time.

A summary of the hydrographic data is shown in Table 3. Data for the plume is taken at the end of tow 1 which is the most distant point from the discharge canal groin. Mixing has usually occurred at this point. Therefore temperature and

salinity data do not indicate sampling directly in the 5° plume. Also, the heated effluent sometimes travels out from the groin and "dives", creating variability in the data profile taken in the plume.

Table 1. Species and number of individuals captured in Plume Study Survey (Stepped oblique tows)

SPECIES	Disch. Canal		Tow #1		Tow #2		Tow #3		Tow #4	
22 OCT 75 1022 Hrs.	LT	RT	LT	RT	LT	RT	LT	RT	LT	RT
Alosa aestivalis	1									
Gobisoma bosci							1			
23 OCT 75 2255 Hrs.										
Micropogon undulatus	6	5	16	24						
Gobisoma bosci		1								
Menidia beryllina		1		(STUDY NOT COMPLETED)						
Anchoa mitchilli			1	3						
Alosa aestivalis			8	1						
Notropis hudsonius				1						
19 NOV 75 0801 Hrs.										
Anchoa mitchilli										1
19 NOV 75 2025 Hrs.										
Micropogon undulatus		1	1	1	1	1	1			
Alosa aestivalis										1
25 NOV 75 1222 Hrs.										
--	NO CATCH									
26 NOV 75 0130 Hrs.										
Micropogon undulatus	1	1	1					1	1	
Alosa aestivalis			1	3		1				1
Gobinellus shufelti*				1						
Menidia beryllina				1	1	1				
Ictalurus punctatus				1						
Fundulus diaphanus						1				
Anchoa mitchilli								1		

* Tentative identification

Table 1 (continued)

SPECIES	Disch. Canal		Tow #1		Tow #2		Tow #3		Tow #4	
4 DEC 75 0841 Hrs.	LT	RT	LT	RT	LT	RT	LT	RT	LT	RT
Anchoa mitchilli	1		1						1	
Micropogon undulatus						1				
4 DEC 75 2100 Hrs.										
Micropogon undulatus		3			1			2	3	
Ictalurus punctatus				1				1		
Alosa aestivalis							1			
Anchoa mitchilli										1
9 DEC 75 1134 Hrs.										
Anchoa mitchilli								1		1

Table 2. Species and calculated number of individuals per 100 cubic meters captured in Plume Study Survey (stepped oblique tows)

SPECIES	Disch. Canal		Tow #1		Tow #2		Tow #3		Tow #4	
22 OCT 75 1022 Hrs.	LT	RT	LT	RT	LT	RT	LT	RT	LT	RT
Alosa aestivalis	4									
Gobisoma bosci							1			
23 OCT 75 2255 Hrs.										
Micropogon undulatus	26	24	29	44						
Gobisoma bosci		5								
Menidia beryllina		5		(STUDY NOT COMPLETED)						
Anchoa mitchilli			2	6						
Alosa aestivalis			14	2						
Notropis hudsonius				2						
19 NOV 75 0801 Hrs.										
Anchoa mitchilli										2
19 NOV 75 2025 Hrs.										
Micropogon undulatus		4	2	2	2	2	2			
Alosa aestivalis										2
25 NOV 75 1222 Hrs.										
--	NO CATCH									
26 NOV 75 0130 Hrs.										
Micropogon undulatus	6	6	2					2	2	
Alosa aestivalis			2	7		4				2
Gobinellus shufelti*				2						
Menidia beryllina				2	5	2				
Ictalurus punctatus				2						
Fundulus diaphanus						2				
Anchoa mitchilli								2		

* Tentative identification

Table 2 (continued)

SPECIES	Disch. Canal		Tow #1		Tow #2		Tow #3		Tow #4	
4 DEC 75 0841 Hrs.	LT	RT	LT	RT	LT	RT	LT	RT	LT	RT
Anchoa mitchilli	4		3						2	
Micropogon undulatus						3				
4 DEC 75 2100 Hrs.										
Micropogon undulatus		10			3			5	14	
Ictalurus punctatus				3				3		
Alosa aestivalis							3			
Anchoa mitchilli										3
9 DEC 75 1134 Hrs.										
Anchoa mitchilli								3		2

Table 3. Hydrographic data for plume entrainment stations (October through December 1975).

Date	Discharge Canal Surface	Discharge Canal Midwater	Discharge Canal Bottom	Plume Surface	Plume Midwater	Plume Bottom	Ambient River Water Surface	Ambient River Water Midwater	Ambient River Water Bottom
TEMPERATURE									
22 Oct. 75	25.0	24.5	25.0	22.0	21.0	21.0	21.0	+	21.0
23 Oct. 75	24.5	24.0	23.0	Study Not Completed					
19 Nov. 75	19.0	18.0	18.1	12.8	14.0	15.0	13.2	+	13.5
19 Nov. 75	19.0	19.0	19.0	16.0	17.0	17.5	14.0	+	14.0
25 Nov. 75	17.0	17.0	17.0	15.5	-	16.0	11.5	+	11.5
26 Nov. 75	17.0	15.0	16.2	11.0*	11.0*	12.0*	11.0	+	11.5
4 Dec. 75	13.0	13.0	13.0	10.5	10.8	11.0	9.5	+	9.0
4 Dec. 75	13.2	13.0	14.0	10.0	11.0	11.0	9.5	+	10.0
9 Dec. 75	16.2	16.6	16.6	14.2	-	13.5	9.8	+	10.0
DISSOLVED OXYGEN									
22 Oct 75	7.6	7.9	7.9	8.1	7.5	6.2	8.9	+	7.8
23 Oct 75	7.9	8.9	8.3	Study Not Completed					
19 Nov 75	7.8	7.0	7.8	6.7	7.4	6.6	7.6	+	7.7
19 Nov 75	8.7	7.6	7.4	9.2	8.9	9.1	9.2	+	7.0
25 Nov 75	=	=	=	=	=	=	=	=	=
26 Nov 75	=	=	=	=	=	=	=	=	=
4 Dec 75	9.8	9.9	9.8	9.8	9.0	9.8	9.8	+	9.8
4 Dec 75	10.5	7.3	8.4	9.9	9.7	9.5	11.0	+	9.7
9 Dec 75	9.9	10.0	9.8	-	-	-	-	-	-
SALINITY									
22 Oct 75	0.6	0.6	0.6	0.4	0.3	0.3	0.3	+	0.3
23 Oct 75	0.5	0.5	0.5	0.3	Study Not Completed				
19 Nov 75	2.6	2.6	2.6	0.2	1.0	1.4	0.3	+	0.9
19 Nov 75	2.9	2.9	2.9	1.4	1.7	1.8	0.5	+	0.6
25 Nov 75	4.0	4.0	4.0	3.0	-	3.3	-	+	-
26 Nov 75	4.7	4.7	4.8	0.9*	1.2*	1.8*	1.0	+	1.4
4 Dec 75	2.7	2.7	2.7	1.8	2.0	2.2	0.7	+	0.9
4 Dec 75	2.8	2.8	2.9	0.9	1.7	2.3	1.0	+	1.6
9 Dec 75	4.4	4.3	4.3	-	-	-	-		-

- Sample not taken
= Sample taken incorrectly
+ Midwater samples not taken due to shallow water
* Boat blown inshore before hydro could be taken in plume

Appendix 1

COMMONWEALTH of VIRGINIA
Virginia Institute of Marine Science
Gloucester Point, Virginia 23062

WILLIAM J. HARGIS, JR
DIRECTOR

Phone: (804) 642-2111

December 2, 1975

Mr. John C. White
Virginia Electric & Power Co.
Box 26666
Richmond, Virginia 23261

Dear John,

Our 24 hour plant entrainment station in October showed that few fish larvae and eggs were captured during daylight hours while their occurrence in nighttime samples increased significantly. We decided to expand the plume entrainment stations to include a sample during the night to see if this situation continued. Enclosed are two tables compiled from samples taken during November. We believe these tables indicate the necessity of sampling the plume at night and the possible deletion of sampling during daylight hours.

The proposal addendum, which concerns the plume entrainment study, specified sampling during daylight hours. We would appreciate your views on continued night sampling and whether or not daylight sampling should be continued.

We will continue to sample during both the day and night until a decision has been reached.

Yours,

J. V. Merriner
Associate Marine Scientist

JVM/das

Enclosures

Species and number of individuals captured in plume entrainment samples on November 19, 1975

Station Location	Day		Species	Night	
	Left	Right		Left	Right
Discharge Canal	--	--	*Micropogon undulatus*	--	1
Tow #1 (Plume)	--	--	*Micropogon undulatus*	1	1
Tow #2 (Plume)	--	--	*Micropogon undulatus*	1	1
Tow #3 (Ambient)	--	--	*Micropogon undulatus*	1	--
Tow #4 (Ambient)	--	1	*Anchoa mitchilli*	--	--
			Alosa aestivalis	--	1

Appendix 1 (continued)

Species and number of individuals captured in plume entrainment samples on November 25-26, 1975

Station Location	Day Left	Day Right	Species	Night Left	Night Right
Discharge Canal	--	--	*Micropogon undulatus*	1	1
Tow #1 (Plume)	--	--	*Menidia beryllina*	--	1
			Alosa aestivalis	1	3
			Micropogon undulatus	1	--
			Ictalurus punctatus	--	1
			**Gobinellus* species	--	1
Tow #2 (Plume)	--	--	*Menidia beryllina*	3	1
			Alosa aestivalis	--	2
			Fundulus diaphanus	--	1
Tow #3 (Ambient)	--	--	*Micropogon undulatus*	--	1
			Anchoa mitchilli	--	1
Tow #4 (Ambient)	--	--	*Alosa aestivalis*	--	1
	--	--	*Micropogon undulatus*	1	--

* - Tentative I.D.

3.6 FISH MORTALITIES

Fish impingement estimates for the low-level screens for the time period of January 5, 1975 to June 28, 1975 are reported. These estimates are based on two five-minute replicates taken daily Monday through Friday and extrapolated to reflect weekly values.

The low-level screens, which were specifically designed to reduce fish impingement mortality, stopped an estimated 3,482,664 fish from entering the high level canal during this time period. Of this total, an estimated 3,264,888 individuals were returned to the river alive. The average 6 month survival was 93.8% with a range of 82% to 99%.

SURRY POWER STATION
LOW LEVEL WEEKLY REPORT

AVE. NO. CIRC. PUMPS : 7
TEMPERATURE MIN.-MAX. : 24.4-26.2
SALINITY MIN.-MAX. : 3.4-5.8
Survival Percentage 99 %

Week Of June 29 Through July 5, 1975

VIMS CODE	COMMON NAME	SCIENTIFIC NAME	MODAL SIZE (mm)	ALIVE	DEAD
040	Channel catfish	Ictalurus punctatus			
039	White catfish	Ictalurus catus	140-199,300-399	288	0
116	Brown bullhead	Ictalurus nebulosus	200-299	432	0
108	Golden shiner	Notemigonus crysoleucas			
110	Spottail shiner	Notropis hudsonius			
060	American eel	Anguilla rostrata			
051	Gizzard shad	Dorosoma cepedianum	60-79	432	0
275	Threadfin shad	Dorosoma petenense	80-99	288	0
026	Alewife	Alosa pseudoharengus	40-59	720	432
027	Blueback herring	Alosa aestivalis			
037	Atlantic menhaden	Brevoortia tyrannus	60-79	21,024	432
103	Bay anchovy	Anchoa mitchilli	60-79	1,152	0
149	Tidewater silverside	Menidia beryllina			
150	Atlantic silverside	Menidia menidia	100-119	144	0
135	Pumpkinseed	Lepomis gibbosus	100-119	288	0
032	White perch	Morone americana			
033	Spot	Leiostomus xanthurus	60-79	34,272	0
005	Atlantic croaker	Micropogon undulatus	80-99,140-199	2,880	0
151	Hogchoker	Trinectes maculatus			
121	Banded killifish	Fundulus diaphanus	60-79	432	0
			TOTAL	62,352	864

SURRY POWER STATION
LOW LEVEL WEEKLY REPORT

AVE. NO. CIRC. PUMPS : 7
TEMPERATURE MIN.-MAX. : 25.6-28.1
SALINITY MIN.-MAX. : 5.4-6.8
Survival Percentage 99 %

Week Of July 6 Through July 12, 1975

VIMS CODE	COMMON NAME	SCIENTIFIC NAME	MODAL SIZE (mm)	ALIVE	DEAD
040	Channel catfish	Ictalurus punctatus	200-299	576	0
039	White catfish	Ictalurus catus	200-299	576	0
116	Brown bullhead	Ictalurus nebulosus			
108	Golden shiner	Notemigonus crysoleucas			
110	Spottail shiner	Notropis hudsonius	80-99	576	0
060	American eel	Anguilla rostrata	200-299	144	0
051	Gizzard shad	Dorosoma cepedianum	400-499	288	0
275	Threadfin shad	Dorosoma petenense	100-119,120-139	432	0
026	Alewife	Alosa pseudoharengus	40-59	432	0
027	Blueback herring	Alosa aestivalis			
037	Atlantic menhaden	Brevoortia tyrannus	60-79	4,464	144
103	Bay anchovy	Anchoa mitchilli	60-79	864	0
149	Tidewater silverside	Menidia beryllina	60-79	288	0
150	Atlantic silverside	Menidia menidia	100-119	288	0
135	Pumpkinseed	Lepomis gibbosus			
032	White perch	Morone americana	60-79	144	0
033	Spot	Leiostomus xanthurus	60-79	42,768	432
005	Atlantic croaker	Micropogon undulatus	80-99	1,584	0
151	Hogchoker	Trinectes maculatus			
121	Banded killifish	Fundulus diaphanus	80-99	288	0
009	Bluefish	Pomatomus saltatrix	100-119,120-139	432	0
136	Bluegill	Lepomis macrochirus	140-199	288	0
			TOTAL	54,432	576

SURRY POWER STATION
LOW LEVEL WEEKLY REPORT

AVE. NO. CIRC. PUMPS : 8
TEMPERATURE MIN.-MAX. : 25.4-28.6
SALINITY MIN.-MAX. : 0.6-4.3
Survival Percentage 96 %

Week Of July 13 Through July 19, 1975

VIMS CODE	COMMON NAME	SCIENTIFIC NAME	MODAL SIZE (mm)	ALIVE	DEAD
040	Channel catfish	Ictalurus punctatus	80-99,140-199	288	0
039	White catfish	Ictalurus catus	100-119	3,024	0
116	Brown bullhead	Ictalurus nebulosus	100-119	5,616	0
108	Golden shiner	Notemigonus crysoleucas	120-139	720	0
110	Spottail shiner	Notropis hudsonius	80-99	2,592	144
060	American eel	Anguilla rostrata	200-299	576	0
051	Gizzard shad	Dorosoma cepedianum	80-99	1,152	0
275	Threadfin shad	Dorosoma petenense	60-79	1,584	720
026	Alewife	Alosa pseudoharengus	60-79	2,304	432
027	Blueback herring	Alosa aestivalis	20-39	576	0
037	Atlantic menhaden	Brevoortia tyrannus	60-79	63,216	3,168
103	Bay anchovy	Anchoa mitchilli	60-79	1,872	288
149	Tidewater silverside	Menidia beryllina			
150	Atlantic silverside	Menidia menidia	40-59	144	0
135	Pumpkinseed	Lepomis gibbosus	120-139	288	0
032	White perch	Morone americana	40-59	13,392	0
033	Spot	Leiostomus xanthurus	60-79	74,448	2,880
005	Atlantic croaker	Micropogon undulatus	80-99	6,048	0
151	Hogchoker	Trinectes maculatus			
052	Carp	Cyprinus carpio	80-99	144	0
030	American shad	Alosa sapidissima	60-79	144	0
121	Banded killifish	Fundulus diaphanus	60-79	576	0
120	Sheepshead minnow	Cyprinodon variegatus	20-39	144	0
144	Naked goby	Gobiosoma bosci	20-39	288	0
003	Summer flounder	Paralichthys dentatus	60-79	288	0
324	Marsh killifish	Fundulus confluentus	60-79	144	0
			TOTAL	179,568	7,632

SURRY POWER STATION
LOW LEVEL WEEKLY REPORT

AVE. NO. CIRC. PUMPS : 7
TEMPERATURE MIN.-MAX. : 27.5-30.1
SALINITY MIN.-MAX. : 0.1-0.6
Survival Percentage 94 %

Week Of July 20 Through July 26, 1975

VIMS CODE	COMMON NAME	SCIENTIFIC NAME	MODAL SIZE (mm)	ALIVE	DEAD
040	Channel catfish	Ictalurus punctatus	200-299	2,304	288
039	White catfish	Ictalurus catus	100-119	1,008	0
116	Brown bullhead	Ictalurus nebulosus	100-119	7,920	432
108	Golden shiner	Notemigonus crysoleucas	80-99	6,192	0
110	Spottail shiner	Notropis hudsonius	80-99	7,488	144
060	American eel	Anguilla rostrata	300-399	288	0
051	Gizzard shad	Dorosoma cepedianum	60-79	3,168	1,584
275	Threadfin shad	Dorosoma petenense	60-79	6,048	432
026	Alewife	Alosa pseudoharengus	60-79	6,192	1,296
027	Blueback herring	Alosa aestivalis			
037	Atlantic menhaden	Brevoortia tyrannus	60-79	7,920	1,152
103	Bay anchovy	Anchoa mitchilli	60-79	1,728	432
149	Tidewater silverside	Menidia beryllina			
150	Atlantic silverside	Menidia menidia			
135	Pumpkinseed	Lepomis gibbosus	40-59,80-99	1,152	0
032	White perch	Morone americana	40-59	14,832	0
033	Spot	Leiostomus xanthurus	60-79	88,272	3,456
005	Atlantic croaker	Micropogon undulatus	100-119	2,880	288
151	Hogchoker	Trinectes maculatus			
052	Carp	Cyprinus carpio	60-79	576	0
030	American shad	Alosa sapidissima	60-79	144	0
121	Banded killifish	Fundulus diaphanus	60-79	288	0
274	Bluespotted sunfish	Enneacanthus gloriosus	40-59,60-79	432	0
133	Flier	Centrarchus macropterus	140-199	144	0
			TOTAL	158,976	9,504

SURRY POWER STATION
LOW LEVEL WEEKLY REPORT

AVE. NO. CIRC. PUMPS : 7
TEMPERATURE MIN.-MAX. : 26.2-28.8
SALINITY MIN.-MAX. : 0.7-2.2
Survival Percentage 93 %

Week Of July 27 Through August 2, 1975

VIMS CODE	COMMON NAME	SCIENTIFIC NAME	MODAL SIZE (mm)	ALIVE	DEAD
040	Channel catfish	Ictalurus punctatus	200-299	720	0
039	White catfish	Ictalurus catus	140-199	864	0
116	Brown bullhead	Ictalurus nebulosus	100-119	720	432
108	Golden shiner	Notemigonus crysoleucas	80-99	864	0
110	Spottail shiner	Notropis hudsonius	80-99	1,728	432
060	American eel	Anguilla rostrata	200-299	720	0
051	Gizzard shad	Dorosoma cepedianum	80-99	1,728	864
275	Threadfin shad	Dorosoma petenense	60-79	2,016	0
026	Alewife	Alosa pseudoharengus	60-79	24,768	2,016
027	Blueback herring	Alosa aestivalis	40-59	720	0
037	Atlantic menhaden	Brevoortia tyrannus	60-79	6,336	288
103	Bay anchovy	Anchoa mitchilli	60-79	1,728	0
149	Tidewater silverside	Menidia beryllina			
150	Atlantic silverside	Menidia menidia	40-59	0	288
135	Pumpkinseed	Lepomis gibbosus			
032	White perch	Morone americana	60-79	3,888	0
033	Spot	Leiostomus xanthurus	60-79	13,968	288
005	Atlantic croaker	Micropogon undulatus	100-119	5,472	144
151	Hogchoker	Trinectes maculatus			
030	American shad	Alosa sapidissima	80-99	1,296	0
			TOTAL	67,536	4,752

SURRY POWER STATION
LOW LEVEL WEEKLY REPORT

AVE. NO. CIRC. PUMPS : 7
TEMPERATURE MIN.-MAX. : 26.7-29.9
SALINITY MIN.-MAX. : 3.8-5.1
Survival Percentage 93 %

Week Of August 3 Through August 9, 1975

VIMS CODE	COMMON NAME	SCIENTIFIC NAME	MODAL SIZE (mm)	ALIVE	DEAD
040	Channel catfish	Ictalurus punctatus	200-299	432	0
039	White catfish	Ictalurus catus	140-199, 200-299	576	0
116	Brown bullhead	Ictalurus nebulosus			
108	Golden shiner	Notemigonus crysoleucas	80-99	144	0
110	Spottail shiner	Notropis hudsonius	80-99	288	0
060	American eel	Anguilla rostrata	200-299	576	0
051	Gizzard shad	Dorosoma cepedianum	120-139,300-399	576	0
275	Threadfin shad	Dorosoma petenense	40-59,140-199	432	0
026	Alewife	Alosa pseudoharengus	60-79	3,600	0
027	Blueback herring	Alosa aestivalis			
037	Atlantic menhaden	Brevoortia tyrannus	60-79	2,592	288
103	Bay anchovy	Anchoa mitchilli	60-79	2,736	144
149	Tidewater silverside	Menidia beryllina			
150	Atlantic silverside	Menidia menidia			
135	Pumpkinseed	Lepomis gibbosus			
032	White perch	Morone americana	60-79	1,008	0
033	Spot	Leiostomus xanthurus	80-99	7,488	864
005	Atlantic croaker	Micropogon undulatus	100-119,120-139	1,008	288
151	Hogchoker	Trinectes maculatus			
030	American shad	Alosa sapidissima	60-79	1,296	0
042	Spanish mackerel	Scomberomorus maculatus	40-59,140-199	288	288
009	Bluefish	Pomatomus saltatrix	120-139	144	0
144	Naked goby	Gobiosoma bosci	20-39	576	0
			TOTAL	23,760	1,872

SURRY POWER STATION
LOW LEVEL WEEKLY REPORT

AVE. NO. CIRC. PUMPS : 7
TEMPERATURE MIN.-MAX. : 27.0-28.5
SALINITY MIN.-MAX. : 4.0-5.1
Survival Percentage 93 %

Week Of August 10 Through August 16, 1975

VIMS CODE	COMMON NAME	SCIENTIFIC NAME	MODAL SIZE (mm)	ALIVE	DEAD
040	Channel catfish	Ictalurus punctatus	140-199	720	0
039	White catfish	Ictalurus catus	120-139	1,008	0
116	Brown bullhead	Ictalurus nebulosus	200-299	288	144
108	Golden shiner	Notemigonus crysoleucas			
110	Spottail shiner	Notropis hudsonius	80-99	720	0
060	American eel	Anguilla rostrata	200-299	576	0
051	Gizzard shad	Dorosoma cepedianum	80-99	1,584	288
275	Threadfin shad	Dorosoma petenense	80-99	1,440	0
026	Alewife	Alosa pseudoharengus	60-79	7,056	432
027	Blueback herring	Alosa aestivalis	40-59	144	0
037	Atlantic menhaden	Brevoortia tyrannus	120-139	4,464	720
103	Bay anchovy	Anchoa mitchilli	60-79	3,312	720
149	Tidewater silverside	Menidia beryllina			
150	Atlantic silverside	Menidia menidia			
135	Pumpkinseed	Lepomis gibbosus			
032	White perch	Morone americana			
033	Spot	Leiostomus xanthurus	60-79	9,504	288
005	Atlantic croaker	Micropogon undulatus	100-119,140-199	1,152	0
151	Hogchoker	Trinectes maculatus			
030	American shad	Alosa sapidissima	60-79	1,728	0
042	Spanish mackerel	Scomberomorus maculatus	80-99	288	0
009	Bluefish	Pomatomus saltatrix	140-199	864	0
007	Weakfish	Cynoscion regalis	200-299	288	0
			TOTAL	35,136	2,592

SURRY POWER STATION
LOW LEVEL WEEKLY REPORT

AVE. NO. CIRC. PUMPS : 7
TEMPERATURE MIN.-MAX. : 28.5-30.6
SALINITY MIN.-MAX. : 5.1-5.8
Survival Percentage 97 %

Week Of August 17 Through August 23, 1975

VIMS CODE	COMMON NAME	SCIENTIFIC NAME	MODAL SIZE (mm)	ALIVE	DEAD
040	Channel catfish	Ictalurus punctatus	200-299	2,880	0
039	White catfish	Ictalurus catus	140-199,200-299	432	0
116	Brown bullhead	Ictalurus nebulosus			
108	Golden shiner	Notemigonus crysoleucas			
110	Spottail shiner	Notropis hudsonius	40-59,80-99	432	0
060	American eel	Anguilla rostrata			
051	Gizzard shad	Dorosoma cepedianum	140-199	144	0
275	Threadfin shad	Dorosoma petenense	80-99	720	288
026	Alewife	Alosa pseudoharengus	60-79	144	144
027	Blueback herring	Alosa aestivalis	40-59	288	0
037	Atlantic menhaden	Brevoortia tyrannus	120-139	13,248	288
103	Bay anchovy	Anchoa mitchilli	80-99	288	0
149	Tidewater silverside	Menidia beryllina			
150	Atlantic silverside	Menidia menidia			
135	Pumpkinseed	Lepomis gibbosus	40-59	720	0
032	White perch	Morone americana	60-79	1,152	0
033	Spot	Leiostomus xanthurus	60-79,80-99	22,608	0
005	Atlantic croaker	Micropogon undulatus	140-199	1,296	144
151	Hogchoker	Trinectes maculatus			
052	Carp	Cyprinus carpio	140-199,400-499	288	0
030	American shad	Alosa sapidissima	60-79,120-139	288	144
042	Spanish mackerel	Scomberomorus maculatus	80-99	0	144
009	Bluefish	Pomatomus saltatrix	140-199	720	288
			TOTAL	45,648	1,440

SURRY POWER STATION
LOW LEVEL WEEKLY REPORT

Ave. No. Circ. Pumps: 7
Temperature Min-Max: 27.7 - 30.1
Salinity Min-Max: 5.2 - 6.1
Survival Percentage: 97 %

Week Of August 24 Through August 30, 1975

VIMS CODE	COMMON NAME	SCIENTIFIC NAME	MODAL SIZE (mm)	ALIVE	DEAD
040	Channel catfish	Ictalurus punctatus	200-299	3,312	0
039	White catfish	Ictalurus catus	140-199	720	0
116	Brown bullhead	Ictalurus nebulosus	60-79,80-99	288	0
108	Golden shiner	Notemigonus crysoleucas	120-139	288	0
110	Spottail shiner	Notropis hudsonius	80-99	864	0
060	American eel	Anguilla rostrata			
051	Gizzard shad	Dorosoma cepedianum	140-199,300-399	720	0
275	Threadfin shad	Dorosoma petenense	80-99	1,872	0
026	Alewife	Alosa pseudoharengus	60-79	9,072	1,152
027	Blueback herring	Alosa aestivalis	40-59	0	288
037	Atlantic menhaden	Brevoortia tyrannus	100-119,120-139	21,024	288
103	Bay anchovy	Anchoa mitchilli	60-79	4,176	0
149	Tidewater silverside	Menidia beryllina	60-79	288	0
150	Atlantic silverside	Menidia menidia			
135	Pumpkinseed	Lepomis gibbosus	40-59	2,592	0
032	White perch	Morone americana	60-79	1,296	0
033	Spot	Leiostomus xanthurus	60-79	20,592	144
005	Atlantic croaker	Micropogon undulatus	100-119	1,008	0
151	Hogchoker	Trinectes maculatus	140-199	288	0
030	American shad	Alosa sapidissima	80-99	576	144
042	Spanish mackerel	Scomberomorus maculatus	140-199,200-299	432	0
144	Naked goby	Gobiosoma bosci	40-59	288	0
007	Weakfish	Cynoscion regalis	60-79	0	144
			TOTAL	69,696	2,160

SURRY POWER STATION
LOW LEVEL WEEKLY REPORT

Ave. No. Circ. Pumps: 7
Temperature Min-Max: 25.6 - 26.3
Salinity Min-Max: 3.2 - 7.7
Survival Percentage: 98 %

Week Of August 31 Through September 6, 1975

VIMS CODE	COMMON NAME	SCIENTIFIC NAME	MODAL SIZE (mm)	ALIVE	DEAD
040	Channel catfish	Ictalurus punctatus	200-299	6,624	0
039	White catfish	Ictalurus catus	120-139	1,584	0
116	Brown bullhead	Ictalurus nebulosus	200-299	432	0
108	Golden shiner	Notemigonus crysoleucas	80-99,100-119	288	0
110	Spottail shiner	Notropis hudsonius			
060	American eel	Anguilla rostrata			
051	Gizzard shad	Dorosoma cepedianum	140-199	1,008	0
275	Threadfin shad	Dorosoma petenense	80-99	3,600	144
026	Alewife	Alosa pseudoharengus	60-79	7,632	1,008
027	Blueback herring	Alosa aestivalis	40-59	1,152	0
037	Atlantic menhaden	Brevoortia tyrannus	120-139	9,072	0
103	Bay anchovy	Anchoa mitchilli	40-59	5,616	0
149	Tidewater silverside	Menidia beryllina	40-59	144	0
150	Atlantic silverside	Menidia menidia	60-79	1,440	0
135	Pumpkinseed	Lepomis gibbosus	40-59	3,168	0
032	White perch	Morone americana	60-79	1,296	0
033	Spot	Leiostomus xanthurus	60-79	41,328	432
005	Atlantic croaker	Micropogon undulatus	140-199	720	0
151	Hogchoker	Trinectes maculatus			
120	Sheepshead minnow	Cyprinodon variegatus	60-79	432	0
042	Spanish mackerel	Scomberomorus maculatus	140-199,200-299	576	0
136	Bluegill	Lepomis macrochirus	40-59,60-79	288	0
144	Naked goby	Gobiosoma bosci	40-59	1,008	0
			TOTAL	87,408	1,584

SURRY POWER STATION
LOW LEVEL WEEKLY REPORT

Ave. No. Circ. Pumps: 7
Temperature Min-Max: 24.9 - 27.5
Salinity Min-Max: 2.0 - 4.1
Survival Percentage: 96 %

Week Of September 7 Through September 13, 1975

VIMS CODE	COMMON NAME	SCIENTIFIC NAME	MODAL SIZE (mm)	ALIVE	DEAD
040	Channel catfish	Ictalurus punctatus	200-299	576	0
039	White catfish	Ictalurus catus	80-99	1,152	0
116	Brown bullhead	Ictalurus nebulosus	60-79	144	0
108	Golden shiner	Notemigonus crysoleucas	100-119	144	0
110	Spottail shiner	Notropis hudsonius	80-99	720	0
060	American eel	Anguilla rostrata			
051	Gizzard shad	Dorosoma cepedianum	140-199	1,008	0
275	Threadfin shad	Dorosoma petenense	80-99	4,320	0
026	Alewife	Alosa pseudoharengus	60-79	9,072	432
027	Blueback herring	Alosa aestivalis			
037	Atlantic menhaden	Brevoortia tyrannus	100-119	32,976	864
103	Bay anchovy	Anchoa mitchilli	40-59,60-79	5,616	288
149	Tidewater silverside	Menidia beryllina	60-79	288	0
150	Atlantic silverside	Menidia menidia	60-79	432	0
135	Pumpkinseed	Lepomis gibbosus	40-59,60-79	2,016	288
032	White perch	Morone americana	80-99	1,872	0
033	Spot	Leiostomus xanthurus	60-79	34,848	1,440
005	Atlantic croaker	Micropogon undulatus	120-139	2,160	0
151	Hogchoker	Trinectes maculatus	120-139	144	0
030	American shad	Alosa sapidissima	80-99	432	288
144	Naked goby	Gobiosoma bosci	40-59	576	0
204	Crevalle jack	Caranx hippos	40-59	144	0
138	Black crappie	Pomoxis nigromaculatus	140-199	144	0
			TOTAL	98,784	3,600

SURRY POWER STATION
LOW LEVEL WEEKLY REPORT

Ave. No. Circ. Pumps: 7
Temperature Min-Max: 21.7 22.5
Salinity Min-Max: 3.9 4.8
Survival Percentage: 98 %

Week Of September 14 Through September 20, 1975

VIMS CODE	COMMON NAME	SCIENTIFIC NAME	MODAL SIZE (mm)	ALIVE	DEAD
040	Channel catfish	Ictalurus punctatus	140-199	288	0
039	White catfish	Ictalurus catus	140-199	576	0
116	Brown bullhead	Ictalurus nebulosus			
108	Golden shiner	Notemigonus crysoleucas	140-199	288	0
110	Spottail shiner	Notropis hudsonius	80-99	720	0
060	American eel	Anguilla rostrata	120-139,400-499	144	144
051	Gizzard shad	Dorosoma cepedianum	140-199	576	144
275	Threadfin shad	Dorosoma petenense	80-99	5,616	144
026	Alewife	Alosa pseudoharengus	60-79	5,328	144
027	Blueback herring	Alosa aestivalis	40-59	720	0
037	Atlantic menhaden	Brevoortia tyrannus	120-139	40,752	432
103	Bay anchovy	Anchoa mitchilli	60-79	8,352	432
149	Tidewater silverside	Menidia beryllina			
150	Atlantic silverside	Menidia menidia	60-79	576	0
135	Pumpkinseed	Lepomis gibbosus	40-59	720	0
032	White perch	Morone americana	80-99	432	0
033	Spot	Leiostomus xanthurus	80-99	11,664	288
005	Atlantic croaker	Micropogon undulatus	120-139	1,008	0
151	Hogchoker	Trinectes maculatus	80-99,120-139	720	0
030	American shad	Alosa sapidissima	60-79	1,152	0
148	Rough silverside	Membras martinica	40-59,80-99	432	0
204	Crevalle jack	Caranx hippos	20-39	144	0
009	Bluefish	Pomatomus saltatrix	200-299	864	0
144	Naked goby	Gobiosoma bosci	20-39	3,024	0
			TOTAL	84,096	1,728

SURRY POWER STATION
LOW LEVEL WEEKLY REPORT

Ave No. Circ. Pumps: 7
Temperature Min-Max: 22.6 - 25.5
Salinity Min-Max: 1.6 - 3.9
Survival Percentage: 98 %

Week Of September 21 Through September 27, 1975

VIMS CODE	COMMON NAME	SCIENTIFIC NAME	MODAL SIZE (mm)	ALIVE	DEAD
040	Channel catfish	Ictalurus punctatus	140-199	1,296	0
039	White catfish	Ictalurus catus	80-99	1,584	0
116	Brown bullhead	Ictalurus nebulosus			
108	Golden shiner	Notemigonus crysoleucas	120-139,140-199	288	0
110	Spottail shiner	Notropis hudsonius			
060	American eel	Anguilla rostrata	200-299	144	0
051	Gizzard shad	Dorosoma cepedianum	140-199	2,304	576
275	Threadfin shad	Dorosoma petenense	80-99	5,040	0
026	Alewife	Alosa pseudoharengus	60-79	3,744	288
027	Blueback herring	Alosa aestivalis	40-59	720	0
037	Atlantic menhaden	Brevoortia tyrannus	120-139	46,512	288
103	Bay anchovy	Anchoa mitchilli	60-79	2,592	432
149	Tidewater silverside	Menidia beryllina			
150	Atlantic silverside	Menidia menidia	60-79	288	0
135	Pumpkinseed	Lepomis gibbosus			
032	White perch	Morone americana	80-99,100-119	288	0
033	Spot	Leiostomus xanthurus	60-79	20,448	576
005	Atlantic croaker	Micropogon undulatus	140-199	1,872	0
151	Hogchoker	Trinectes maculatus	80-99,100-119	576	0
030	American shad	Alosa sapidissima	60-79	576	0
148	Rough silverside	Membras martinica	40-59	144	0
009	Bluefish	Pomatomus saltatrix	300-399	144	0
144	Naked goby	Gobiosoma bosci	20-39,40-59	1,152	0
			TOTAL	89,712	2,160

SURRY POWER STATION
LOW LEVEL WEEKLY REPORT

Ave. No. Circ. Pumps: 6
Temperature Min-Max: 18.2 - 24.1
Salinity Min-Max: 0.1 - 0.2
Survival Percentage: 95 %

Week Of September 28 Through October 4, 1975

VIMS CODE	COMMON NAME	SCIENTIFIC NAME	MODAL SIZE (mm)	ALIVE	DEAD
040	Channel catfish	Ictalurus punctatus	200-299	432	0
039	White catfish	Ictalurus catus	60-79,140-199	576	0
116	Brown bullhead	Ictalurus nebulosus	140-199	144	0
108	Golden shiner	Notemigonus crysoleucas			
110	Spottail shiner	Notropis hudsonius	80-99	4,032	0
060	American eel	Anguilla rostrata	200-299	144	0
051	Gizzard shad	Dorosoma cepedianum	140-199	1,152	288
275	Threadfin shad	Dorosoma petenense	80-99	4,608	288
026	Alewife	Alosa pseudoharengus	60-79	15,840	1,584
027	Blueback herring	Alosa aestivalis	40-59	1,440	144
037	Atlantic menhaden	Brevoortia tyrannus	120-139	4,464	144
103	Bay anchovy	Anchoa mitchilli	60-79	2,448	288
149	Tidewater silverside	Menidia beryllina			
150	Atlantic silverside	Menidia menidia			
135	Pumpkinseed	Lepomis gibbosus	140-199	720	0
032	White perch	Morone americana	80-99	2,880	0
033	Spot	Leiostomus xanthurus	60-79	14,256	288
005	Atlantic croaker	Micropogon undulatus	120-139	3,744	0
151	Hogchoker	Trinectes maculatus	120-139	1,008	0
107	Silvery minnow	Hybognathus nuchalis	80-99	576	0
030	American shad	Alosa sapidissima	80-99	2,304	144
122	Mummichog	Fundulus heteroclitus	40-59	4,176	0
121	Banded killifish	Fundulus diaphanus	40-59	576	0
138	Black crappie	Pomoxis nigromaculatus	140-199	144	0
144	Naked goby	Gobiosoma bosci	20-39	1,152	0
003	Summer flounder	Paralichthys dentatus	300-399	288	0
			TOTAL	67,104	3,168

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SURRY POWER STATION
LOW LEVEL WEEKLY REPORT

Ave. No. Circ. Pumps: 5
Temperature Min-Max: 19.1 - 20.7
Salinity Min-Max: 0.0 - 0.4
Survival Percentage: 95 %

Week Of October 5 Through October 11, 1975

VIMS CODE	COMMON NAME	SCIENTIFIC NAME	MODAL SIZE (mm)	ALIVE	DEAD
040	Channel catfish	Ictalurus punctatus	200-299	720	0
039	White catfish	Ictalurus catus	60-79	5,904	0
116	Brown bullhead	Ictalurus nebulosus			
108	Golden shiner	Notemigonus crysoleucas	120-139	144	0
110	Spottail shiner	Notropis hudsonius	80-99	5,904	144
060	American eel	Anguilla rostrata	200-299,300-399	288	0
051	Gizzard shad	Dorosoma cepedianum	140-199	2,304	0
275	Threadfin shad	Dorosoma petenense	80-99	8,784	864
026	Alewife	Alosa pseudoharengus	60-79	40,608	5,328
027	Blueback herring	Alosa aestivalis	40-59	31,968	1,728
037	Atlantic menhaden	Brevoortia tyrannus	120-139	4,464	0
103	Bay anchovy	Anchoa mitchilli	60-79	6,624	432
149	Tidewater silverside	Menidia beryllina	60-79	1,296	0
150	Atlantic silverside	Menidia menidia	60-79	144	0
135	Pumpkinseed	Lepomis gibbosus	120-139	720	0
032	White perch	Morone americana	80-99	5,328	0
033	Spot	Leiostomus xanthurus	60-79	61,056	1,008
005	Atlantic croaker	Micropogon undulatus	40-59,120-139	3,024	0
151	Hogchoker	Trinectes maculatus	40-59	2,592	0
107	Silvery minnow	Hybognathus nuchalis	80-99	576	0
030	American shad	Alosa sapidissima	80-99	1,584	144
121	Banded killifish	Fundulus diaphanus	60-79	144	0
148	Rough silverside	Membras martinica	60-79	288	0
351	Gray snapper	Lutjanus griseus	80-99	288	0
			TOTAL	184,752	9,648

SURRY POWER STATION
LOW LEVEL WEEKLY REPORT

Ave. No. Circ. Pumps: 5
Temperature Min-Max: 19.5 - 21.8
Salinity Min-Max: 0.4 - 2.5
Survival Percentage: 98 %

Week Of October 12 Through October 18, 1975

VIMS CODE	COMMON NAME	SCIENTIFIC NAME	MODAL SIZE (mm)	ALIVE	DEAD
040	Channel catfish	Ictalurus punctatus	140-199	720	0
039	White catfish	Ictalurus catus	60-79	1,008	0
116	Brown bullhead	Ictalurus nebulosus			
108	Golden shiner	Notemigonus crysoleucas	80-99,140-199	288	0
110	Spottail shiner	Notropis hudsonius	80-99	3,456	0
060	American eel	Anguilla rostrata	300-399	288	0
051	Gizzard shad	Dorosoma cepedianum	120-139,140-199	432	288
275	Threadfin shad	Dorosoma petenense	80-99	8,928	144
026	Alewife	Alosa pseudoharengus	60-79	4,608	144
027	Blueback herring	Alosa aestivalis	40-59	2,016	288
037	Atlantic menhaden	Brevoortia tyrannus	120-139	25,488	288
103	Bay anchovy	Anchoa mitchilli	60-79	1,440	0
149	Tidewater silverside	Menidia beryllina			
150	Atlantic silverside	Menidia menidia			
135	Pumpkinseed	Lepomis gibbosus	140-199	576	0
032	White perch	Morone americana	80-99	2,016	0
033	Spot	Leiostomus xanthurus	60-79	14,688	288
005	Atlantic croaker	Micropogon undulatus	120-139	2,736	0
151	Hogchoker	Trinectes maculatus	20-39	288	0
107	Silvery minnow	Hybognathus nuchalis	100-119,120-139	576	0
030	American shad	Alosa sapidissima	80-99	2,304	144
148	Rough silverside	Membras martinica	80-99	288	0
351	Gray snapper	Lutjanus griseus	60-79	864	0
204	Crevalle jack	Caranx hippos	20-39	144	0
			TOTAL	73,152	1,584

SURRY POWER STATION
LOW LEVEL WEEKLY REPORT

Ave. No. Circ. Pumps: 5
Temperature Min-Max: 17.0 - 18.7
Salinity Min-Max: 0.6 - 2.8
Survival Percentage: 96 %

Week Of October 19 Through October 25, 1975

VIMS CODE	COMMON NAME	SCIENTIFIC NAME	MODAL SIZE (mm)	ALIVE	DEAD
040	Channel catfish	Ictalurus punctatus	140-199	1,728	0
039	White catfish	Ictalurus catus	60-79	4,032	0
116	Brown bullhead	Ictalurus nebulosus	140-199	2,016	0
108	Golden shiner	Notemigonus crysoleucas			
110	Spottail shiner	Notropis hudsonius	80-99	720	0
060	American eel	Anguilla rostrata			
051	Gizzard shad	Dorosoma cepedianum	140-199	576	288
275	Threadfin shad	Dorosoma petenense	80-99	7,632	0
026	Alewife	Alosa pseudoharengus	60-79	8,928	576
027	Blueback herring	Alosa aestivalis	40-59	18,864	1,728
037	Atlantic menhaden	Brevoortia tyrannus	120-139	27,648	288
103	Bay anchovy	Anchoa mitchilli	60-79	2,160	432
149	Tidewater silverside	Menidia beryllina	40-59	288	0
150	Atlantic silverside	Menidia menidia	60-79	1,152	0
135	Pumpkinseed	Lepomis gibbosus	140-199	144	0
032	White perch	Morone americana	60-79	2,304	0
033	Spot	Leiostomus xanthurus	80-99	21,888	576
005	Atlantic croaker	Micropogon undulatus	40-59	288	0
151	Hogchoker	Trinectes maculatus			
030	American shad	Alosa sapidissima	80-99	3,600	144
148	Rough silverside	Membras martinica	80-99	0	288
028	Hickory shad	Alosa mediocris	140-199	288	0
122	Mummichog	Fundulus heteroclitus	60-79	3,888	0
120	Sheepshead minnow	Cyprinodon variegatus	40-59	144	0
351	Gray snapper	Lutjanus griseus	100-119	144	0
144	Naked goby	Gobiosoma bosci	40-59	144	0
			TOTAL	108,576	4,320

SURRY POWER STATION
LOW LEVEL WEEKLY REPORT

Ave. No. Circ. Pumps: 5
Temperature Min-Max: 15.3 - 18.4
Salinity Min-Max: 1.2 - 2.5
Survival Percentage: 98 %

Week Of October 26 Through November 1, 1975

VIMS CODE	COMMON NAME	SCIENTIFIC NAME	MODAL SIZE (mm)	ALIVE	DEAD
040	Channel catfish	Ictalurus punctatus	140-199,200-299	4,464	0
039	White catfish	Ictalurus catus	60-79	576	0
116	Brown bullhead	Ictalurus nebulosus			
108	Golden shiner	Notemigonus crysoleucas	120-139	288	0
110	Spottail shiner	Notropis hudsonius	80-99	864	0
060	American eel	Anguilla rostrata			
051	Gizzard shad	Dorosoma cepedianum	140-199	720	0
275	Threadfin shad	Dorosoma petenense	80-99	5,904	0
026	Alewife	Alosa pseudoharengus	60-79	10,656	864
027	Blueback herring	Alosa aestivalis	40-59	6,912	288
037	Atlantic menhaden	Brevoortia tyrannus	120-139	64,512	0
103	Bay anchovy	Anchoa mitchilli	60-79	9,792	720
149	Tidewater silverside	Menidia beryllina	60-79	432	0
150	Atlantic silverside	Menidia menidia	60-79	144	0
135	Pumpkinseed	Lepomis gibbosus			
032	White perch	Morone americana	80-99	1,008	0
033	Spot	Leiostomus xanthurus	80-99	5,184	0
005	Atlantic croaker	Micropogon undulatus			
151	Hogchoker	Trinectes maculatus	40-59	288	0
030	American shad	Alosa sapidissima	80-99	1,728	0
122	Mummichog	Fundulus heteroclitus	60-79	5,328	0
204	Crevalle jack	Caranx hippos	100-119,140-199	864	0
			TOTAL	119,664	1,872

SURRY POWER STATION
LOW LEVEL WEEKLY REPORT

Ave. No. Circ. Pumps: 5
Temperature Min-Max: 15.8 - 16.7
Salinity Min-Max: 1.8 - 2.4
Survival Percentage: 98 %

Week Of November 2 Through November 8, 1975

VIMS CODE	COMMON NAME	SCIENTIFIC NAME	MODAL SIZE (mm)	ALIVE	DEAD
040	Channel catfish	Ictalurus punctatus	140-199	1,008	0
039	White catfish	Ictalurus catus	80-99	2,448	0
116	Brown bullhead	Ictalurus nebulosus			
108	Golden shiner	Notemigonus crysoleucas			
110	Spottail shiner	Notropis hudsonius	80-99	432	0
060	American eel	Anguilla rostrata	200-299	144	0
051	Gizzard shad	Dorosoma cepedianum	140-199	4,464	0
275	Threadfin shad	Dorosoma petenense	80-99	13,824	288
026	Alewife	Alosa pseudoharengus	60-79	37,872	2,016
027	Blueback herring	Alosa aestivalis	40-59	53,424	576
037	Atlantic menhaden	Brevoortia tyrannus	120-139	47,376	288
103	Bay anchovy	Anchoa mitchilli	60-79	6,624	0
149	Tidewater silverside	Menidia beryllina	40-59	720	0
150	Atlantic silverside	Menidia menidia			
135	Pumpkinseed	Lepomis gibbosus	60-79	1,008	0
032	White perch	Morone americana	80-99	2,160	0
033	Spot	Leiostomus xanthurus	80-99	15,408	864
005	Atlantic croaker	Micropogon undulatus	120-139	864	0
151	Hogchoker	Trinectes maculatus			
107	Silvery minnow	Hybognatus nuchalis	100-119	144	0
030	American shad	Alosa sapidissima	80-99	1,008	288
122	Mummichog	Fundulus heteroclitus	60-79	5,904	0
121	Banded killfish	Fundulus diaphanus	60-79	144	0
120	Sheepshead minnow	Cyprinodon variegatus	40-59	576	0
148	Rough silverside	Membras martinica	60-79	1,296	144
351	Gray snapper	Lutjanus griseus	60-79	288	0
144	Naked goby	Gobiosoma bosci	40-59	288	0
			TOTAL	197,424	4,464

SURRY POWER STATION
LOW LEVEL WEEKLY REPORT

Ave. No. Circ. Pumps: 5
Temperature Min-Max: 14.0-18.3
Salinity Min-Max: 2.2- 3.9
Survival Percentage: 98 %

Week Of November 9 Through November 15, 1975

VIMS CODE	COMMON NAME	SCIENTIFIC NAME	MODAL SIZE (mm)	ALIVE	DEAD
040	Channel catfish	Ictalurus punctatus	200-299	576	0
039	White catfish	Ictalurus catus	80-99	576	0
116	Brown bullhead	Ictalurus nebulosus			
108	Golden shiner	Notemigonus crysoleucas	80-99	288	0
110	Spottail shiner	Notropis hudsonius	80-99	288	288
060	American eel	Anguilla rostrata			
051	Gizzard shad	Dorosoma cepedianum	140-199	1,440	0
275	Threadfin shad	Dorosoma petenense	80-99	4,032	0
026	Alewife	Alosa pseudoharengus	60-79	14,688	720
027	Blueback herring	Alosa aestivalis	40-59	14,256	1,152
037	Atlantic menhaden	Brevoortia tyrannus	120-139	100,944	432
103	Bay anchovy	Anchoa mitchilli	60-79	16,272	1,008
149	Tidewater silverside	Menidia beryllina	60-79	144	0
150	Atlantic silverside	Menidia menidia	80-99	144	0
135	Pumpkinseed	Lepomis gibbosus	60-79	432	0
032	White perch	Morone americana	80-99	432	0
033	Spot	Leiostomus xanthurus	80-99	7,200	0
005	Atlantic croaker	Micropogon undulatus	120-139	720	0
151	Hogchoker	Trinectes maculatus	120-139	1,008	0
030	American shad	Alosa sapidissima	100-119	288	0
			TOTAL	163,278	3,600

SURRY POWER STATION
LOW LEVEL WEEKLY REPORT

Ave. No. Circ. Pumps: 5
Temperature Min-Max: 12.7 - 13.8
Salinity Min-Max: 2.5 - 3.6
Survival Percentage: 98 %

Week Of November 16 Through November 22, 1975

VIMS CODE	COMMON NAME	SCIENTIFIC NAME	MODAL SIZE (mm)	ALIVE	DEAD
040	Channel catfish	Ictalurus punctatus	140-199,200-299	288	0
039	White catfish	Ictalurus catus	80-99	2,736	0
116	Brown bullhead	Ictalurus nebulosus			
108	Golden shiner	Notemigonus crysoleucas			
110	Spottail shiner	Notropis hudsonius	80-99	864	0
060	American eel	Anguilla rostrata			
051	Gizzard shad	Dorosoma cepedianum	140-199	1,584	0
275	Threadfin shad	Dorosoma petenense	80-99	9,072	0
026	Alewife	Alosa pseudoharengus	60-79	9,216	432
027	Blueback herring	Alosa aestivalis	40-59	14,832	432
037	Atlantic menhaden	Brevoortia tyrannus	120-139	13,248	288
103	Bay anchovy	Anchoa mitchilli	60-79	4,896	432
149	Tidewater silverside	Menidia beryllina			
150	Atlantic silverside	Menidia menidia			
135	Pumpkinseed	Lepomis gibbosus	60-79	2,592	0
032	White perch	Morone americana	80-99	3,312	288
033	Spot	Leiostomus xanthurus	60-79	10,944	0
005	Atlantic croaker	Micropogon undulatus	140-199	1,296	0
151	Hogchoker	Trinectes maculatus	40-59,100-119	432	0
107	Silvery minnow	Hybognathus nuchalis	80-99	288	0
122	Mummichog	Fundulus heteroclitus	40-59	1,584	0
121	Banded killifish	Fundulus diaphanus	60-79	144	0
030	American shad	Alosa sapidissima	80-99	1,296	0
			TOTAL	78,624	1,872

SURRY POWER STATION
LOW LEVEL WEEKLY REPORT

Ave. No. Circ. Pumps: 5
Temperature Min-Max: 10.2 - 11.4
Salinity Min-Max: 3.8 - 4.6
Survival Percentage: 94 %

Week Of November 23 Through November 29, 1975

VIMS CODE	COMMON NAME	SCIENTIFIC NAME	MODAL SIZE (mm)	ALIVE	DEAD
040	Channel catfish	Ictalurus punctatus	140-199	720	0
039	White catfish	Ictalurus catus	80-99	1,584	0
116	Brown bullhead	Ictalurus nebulosus			
108	Golden shiner	Notemigonus crysoleucas	100-119	288	0
110	Spottail shiner	Notropis hudsonius	80-99	576	0
060	American eel	Anguilla rostrata	200-299	288	0
051	Gizzard shad	Dorosoma cepedianum	120-139	1,440	0
275	Threadfin shad	Dorosoma petenense	80-99	1,584	0
026	Alewife	Alosa pseudoharengus	60-79	5,184	576
027	Blueback herring	Alosa aestivalis	40-59	21,888	2,592
037	Atlantic menhaden	Brevoortia tyrannus	120-139	4,032	0
103	Bay anchovy	Anchoa mitchilli	40-59	576	288
149	Tidewater silverside	Menidia beryllina	60-79	576	0
150	Atlantic silverside	Menidia menidia			
135	Pumpkinseed	Lepomis gibbosus	60-79	2,592	0
032	White perch	Morone americana	80-99,200-299	576	0
033	Spot	Leiostomus xanthurus	60-79	10,800	288
005	Atlantic croaker	Micropogon undulatus	40-59	576	0
151	Hogchoker	Trinectes maculatus	120-139	864	0
030	American shad	Alosa sapidissima	80-99	1,296	288
122	Mummichog	Fundulus heteroclitus	60-79	2,736	0
120	Sheepshead minnow	Cyprinodon variegatus	40-59	144	0
144	Naked goby	Gobiosoma bosci	20-39	576	0
			TOTAL	58,896	4,032

SURRY POWER STATION
LOW LEVEL WEEKLY REPORT

Ave. No. Circ. Pumps: 6
Temperature Min-Max: 7.9 - 11.8
Salinity Min-Max: 3.1 - 3.9
Survival Percentage: 96 %

Week Of November 30 Through December 6, 1975

VIMS CODE	COMMON NAME	SCIENTIFIC NAME	MODAL SIZE (mm)	ALIVE	DEAD
040	Channel catfish	Ictalurus punctatus	140-199	432	0
039	White catfish	Ictalurus catus	80-99	720	0
116	Brown bullhead	Ictalurus nebulosus	100-119	864	0
108	Golden shiner	Notemigonus crysoleucas	100-119	144	0
110	Spottail shiner	Notropis hudsonius	80-99	1,296	0
060	American eel	Anguilla rostrata	300-399,500+	1,008	0
051	Gizzard shad	Dorosoma cepedianum	140-199	1,152	0
275	Threadfin shad	Dorosoma petenense	80-99	8,064	288
026	Alewife	Alosa pseudoharengus	60-79	12,096	0
027	Blueback herring	Alosa aestivalis	40-59	31,824	3,312
037	Atlantic menhaden	Brevoortia tyrannus	120-139	8,064	0
103	Bay anchovy	Anchoa mitchilli	80-99	1,728	288
149	Tidewater silverside	Menidia beryllina			
150	Atlantic silverside	Menidia menidia	60-79,80-99	576	0
135	Pumpkinseed	Lepomis gibbosus	60-79	1,728	0
032	White perch	Morone americana	80-99	5,040	0
033	Spot	Leiostomus xanthurus	60-79,80-99	22,896	144
005	Atlantic croaker	Micropogon undulatus	120-139	2,880	288
151	Hogchoker	Trinectes maculatus	120-139	864	0
107	Silvery minnow	Hybognathus nuchalis	80-99	432	0
030	American shad	Alosa sapidissima	80-99	2,448	144
231	Striped mullet	Mugil cephalus	200-299	288	0
144	Naked goby	Gobiosoma bosci	20-39	144	0
			TOTAL	104,688	4,464

SURRY POWER STATION
LOW LEVEL WEEKLY REPORT

Ave. No. Circ. Pumps: 6
Temperature Min-Max: 7.9 - 8.9
Salinity Min-Max: 3.6 - 5.2
Survival Percentage: 88 %

Week Of December 7 Through December 13, 1975

VIMS CODE	COMMON NAME	SCIENTIFIC NAME	MODAL SIZE (mm)	ALIVE	DEAD
040	Channel catfish	Ictalurus punctatus			
039	White catfish	Ictalurus catus			
116	Brown bullhead	Ictalurus nebulosus			
108	Golden shiner	Notemigonus crysoleucas	80-99	432	0
110	Spottail shiner	Notropis hudsonius	80-99,100-119	432	0
060	American eel	Anguilla rostrata	140-199,200-299	432	0
051	Gizzard shad	Dorosoma cepedianum	140-199,300-399	864	0
275	Threadfin shad	Dorosoma petenense			
026	Alewife	Alosa pseudoharengus	60-79,80-99	432	288
027	Blueback herring	Alosa aestivalis	40-59	6,192	1,008
037	Atlantic menhaden	Brevoortia tyrannus	120-139	576	0
103	Bay anchovy	Anchoa mitchilli	40-59	2,160	288
149	Tidewater silverside	Menidia beryllina			
150	Atlantic silverside	Menidia menidia	60-79	864	0
135	Pumpkinseed	Lepomis gibbosus	60-79,80-99	288	144
032	White perch	Morone americana	60-79	720	0
033	Spot	Leiostomus xanthurus	60-79	4,608	720
005	Atlantic croaker	Micropogon undulatus	60-79	288	0
151	Hogchoker	Trinectes maculatus			
052	Carp	Cyprinus carpio	120-139	288	0
			TOTAL	18,576	2,448

SURRY POWER STATION
LOW LEVEL WEEKLY REPORT

Ave. No. Circ. Pumps: 7
Temperature Min-Max: 7.1 - 10.8
Salinity Min-Max: 2.5 - 5.2
Survival Percentage: 99 %

Week Of December 14 Through December 20, 1975

VIMS CODE	COMMON NAME	SCIENTIFIC NAME	MODAL SIZE (mm)	ALIVE	DEAD
040	Channel catfish	Ictalurus punctatus	140-199	144	0
039	White catfish	Ictalurus catus	120-139	288	0
116	Brown bullhead	Ictalurus nebulosus	80-99	1,008	0
108	Golden shiner	Notemigonus crysoleucas	80-99	576	0
110	Spottail shiner	Notropis hudsonius	80-99	2,160	0
060	American eel	Anguilla rostrata	200-299,400-499	1,152	0
051	Gizzard shad	Dorosoma cepedianum	140-199	8,352	0
275	Threadfin shad	Dorosoma petenense	80-99	864	0
026	Alewife	Alosa pseudoharengus	60-79	4,320	0
027	Blueback herring	Alosa aestivalis	40-59	50,832	864
037	Atlantic menhaden	Brevoortia tyrannus	120-139	11,088	0
103	Bay anchovy	Anchoa mitchilli	40-59	8,352	288
149	Tidewater silverside	Menidia beryllina	60-79	144	288
150	Atlantic silverside	Menidia menidia	80-99	432	0
135	Pumpkinseed	Lepomis gibbosus			
032	White perch	Morone americana	80-99	15,408	0
033	Spot	Leiostomus xanthurus	80-99	28,656	432
005	Atlantic croaker	Micropogon undulatus	40-59	2,880	0
151	Hogchoker	Trinectes maculatus	100-119,120-139	288	0
107	Silvery minnow	Hybognathus nuchalis	100-119	2,448	0
030	American shad	Alosa sapidissima	80-99	4,464	0
231	Striped mullet	Mugil cephalus	140-199	288	0
			TOTAL	144,144	1,872

SURRY POWER STATION
LOW LEVEL WEEKLY REPORT

Ave. No. Circ. Pumps: 7
Temperature Min-Max: 4.3 - 5.5
Salinity Min-Max: 3.8 - 6.0
Survival Percentage: 94 %

Week Of December 21 Through December 27, 1975

VIMS CODE	COMMON NAME	SCIENTIFIC NAME	MODAL SIZE (mm)	ALIVE	DEAD
040	Channel catfish	Ictalurus punctatus	140-199	288	0
039	White catfish	Ictalurus catus	80-99	288	288
116	Brown bullhead	Ictalurus nebulosus			
108	Golden shiner	Notemigonus crysoleucas			
110	Spottail shiner	Notropis hudsonius	80-99	576	0
060	American eel	Anguilla rostrata	300-399	432	0
051	Gizzard shad	Dorosoma cepedianum	140-199	4,032	0
275	Threadfin shad	Dorosoma petenense	60-79	2,160	0
026	Alewife	Alosa pseudoharengus	60-79	2,304	0
027	Blueback herring	Alosa aestivalis	40-59	16,416	1,728
037	Atlantic menhaden	Brevoortia tyrannus	100-119	1,296	0
103	Bay anchovy	Anchoa mitchilli			
149	Tidewater silverside	Menidia beryllina	60-79	0	720
150	Atlantic silverside	Menidia menidia	80-99	3,024	432
135	Pumpkinseed	Lepomis gibbosus	60-79	288	0
032	White perch	Morone americana	80-99	9,504	0
033	Spot	Leiostomus xanthurus	80-99	4,464	0
005	Atlantic croaker	Micropogon undulatus	40-59	4,032	0
151	Hogchoker	Trinectes maculatus			
107	Silvery minnow	Hybognathus nuchalis	100-119	288	0
122	Mummichog	Fundulus heteroclitus	40-59	288	0
			TOTAL	49,680	3,168

SURRY POWER STATION
LOW LEVEL WEEKLY REPORT

Ave. No. Circ. Pumps: 7
Temperature Min-Max: 4.5 - 7.6
Salinity Min-Max: 2.2 - 3.9
Survival Percentage: 91 %

Week Of December 28, 1975 Through January 3, 1976

VIMS CODE	COMMON NAME	SCIENTIFIC NAME	MODAL SIZE (mm)	ALIVE	DEAD
040	Channel catfish	Ictalurus punctatus	140-199,200-299	576	0
039	White catfish	Ictalurus catus	40-59	288	0
116	Brown bullhead	Ictalurus nebulosus	40-59	0	288
108	Golden shiner	Notemigonus crysoleucas	80-99	288	0
110	Spottail shiner	Notropis hudsonius	80-99	288	0
060	American eel	Anguilla rostrata	200-299	1,152	0
051	Gizzard shad	Dorosoma cepedianum	140-199	3,600	0
275	Threadfin shad	Dorosoma petenense	60-79	3,600	576
026	Alewife	Alosa pseudoharengus	60-79	1,140	0
027	Blueback herring	Alosa aestivalis	40-59	13,536	2,592
037	Atlantic menhaden	Brevoortia tyrannus	80-99,100-119	1,296	0
103	Bay anchovy	Anchoa mitchilli	40-59	288	0
149	Tidewater silverside	Menidia beryllina			
150	Atlantic silverside	Menidia menidia	80-99	15,120	2,160
135	Pumpkinseed	Lepomis gibbosus			
032	White perch	Morone americana	80-99	2,304	0
033	Spot	Leiostomus xanthurus	60-79,80-99	15,408	0
005	Atlantic croaker	Micropogon undulatus	60-79	2,592	288
151	Hogchoker	Trinectes maculatus			
101	Longnose gar	Lepisosteus osseus	300-399	144	0
			TOTAL	61,920	5,904

VEPCO Surry Power Plant Study

River Biota and Phytoplankton Entrainment Sections

Progress Report January 1976

by

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Introduction

This report presents in tabular form the biological data collected from July through December 1975 in the river and phytoplankton entrainment portions of the VEPCO Surry Power Plant Study. In addition, certain data from entrainment studies and from special river studies conducted prior to July 1975, but which were not available for presentation in the July progress report, are included in this report.

Methods

Station Locations

Table 1 and Figure 1 show the locations of the phytoplankton and zooplankton sampling stations used in the river study. The first twelve stations listed in Table 1 were sampled each month during the study. The last six stations were used only during the zooplankton sampling run conducted on August 21. The benthos and fouling plate stations are shown in Table 2 and Figure 2.

Sampling and Sample Analysis Methods

For detailed descriptions of these methods, refer to the July progress report.

Sampling Design

The sampling dates and biological parameters sampled in the second half of 1975 are shown in Table 3. The monthly river and entrainment sampling runs have followed the same procedures employed during the first half of the 1975 study. Diel plankton distribution surveys at station CBC were performed on July 22-23 and October 22-23. Vertical plankton

distribution surveys at all stations were conducted on July 17 and November 3. Phytoplankton entrainment sampling runs will continue through March 1976 to provide data for a full year period.

Results and Discussion

Phytoplankton River Study

Phytoplankton cell counts (Table 4) at all stations declined approximately one order of magnitude from mid-summer to mid-winter. Counts for the discharge samples were low relative to counts for the other stations in the summer months.

Flagellates of the cryptophyte genus *Chroomonas* were abundant at most stations during the summer and fall months (Table 5). The chained centric diatom *Skeletonema costatum* was a dominant member of the summer community, but was replaced by *Melosira* sp. in the fall.

The chlorophyll *a* and primary productivity results appear in Tables 6 and 7. The magnitudes of these parameters declined seasonally in a pattern similar to that exhibited by total cell counts. A discussion of differences among stations will be deferred until the final report, when results of statistical analyses of these data and of the data from the special river surveys will be available.

Zooplankton River Study

Tables 8-13 present the river zooplankton data for the period July - December, 1975. The influence of salinity gradients on the spatial distribution of zooplankton is evident in the July samples (Table 8), which showed rotifers and cladocerans, including *Bosmina* sp.,

present at the low salinity stations while copepod nauplii and Acartia adults were most abundant at the high salinity stations. The tide was ebbing during the sampling run, and the distribution of Acartia sp. followed the path of power plant cooling water from the vicinity of the plant intake to the downstream end of the discharge plume.

In the August sampling run (Table 9), six extra stations were added to provide more comparisons among stations within and outside the plume. Samples from one of these stations (HPW 1.5), located on the outer edge of the plume, showed reduced numbers of most species and species groups, relative to the numbers found elsewhere on this date. Generally, however, stations within the plume showed greater zooplankton abundance than did stations outside the plume. An expanded presentation of these data will appear in the final report.

The abundance of copepod nauplii declined sharply from August to September, and was lowest in the December samples. Very few Acartia adults were observed after September, while rotifers and polychaete larvae became more abundant.

Benthos

The benthos data are presented in Tables 14-16. Rangia cuneata was most numerous at stations 2, 4, 6, 8, 11 and 16, and its abundance was relatively constant among the three sampling runs. Hydrobia sp. was most abundant in July, while only one individual was found in the September 30 samples. Scolecolepides viridis and Nereis succinea were the most numerous polychaetes collected. Leptocheirus plumulosus,

Lepidactylus dytiscus, and Corophium lacustre accounted for the majority of the amphipods observed.

Fouling Plates

The data from the fouling plate analyses for July-December, 1975 appear in Tables 17-19. The densest colonization by barnacles occurred on the plates recovered in October, while no barnacles colonized the plates introduced at that time. The densities of bivalves and amphipods at a given station varied little between the August and October plates, then declined to almost zero on the December plates. Examination of periphyton samples from the fouling plate stations showed the presence of species of the pennate diatom Nitzschia and of the filamentous bluegreen genera Oscillatoria and Lyngbya at all stations on all three sampling dates.

Phytoplankton Entrainment

The data from all the phytoplankton entrainment runs conducted to date are presented in Tables 20-29. Cell counts are to be obtained for all the April samples, while for subsequent runs composite samples are being processed. During sampling, two vertical series of three samples each are obtained. Compositing of these groups of three yields two samples per station per sampling time, and a total of 16 samples per run. Samples through the August run have been processed. In only the July and August data are there strong indications of reductions in cell numbers in cooling water passing through the power plant. Further discussion of these results will appear in the final report, when the

data for all months will be complete.

Vertical and Diel Distribution Studies

Three of each of these runs were performed, yielding sets of chlorophyll a, phytoplankton, and zooplankton samples. Tables 30-35 present the hydrographic, chlorophyll a, and phytoplankton cell count data available at this time. The remaining phytoplankton samples and the zooplankton samples are in progress.

TABLE 1

Plankton Sampling Station Locations

Station	Depth (m)	Location
DWS	2	Adjacent to tower (QK FI Lt "A")
Intake	1 8	Outside intake forebay - zooplankton sampling Within intake forebay - phytoplankton sampling
HPE 1	5	Adjacent to black & white buoy "J29"
HPE 2	4	Between black & white buoys "J29" and "J35"
HPS	5	Adjacent to tower (QK FI Lt "C")
HPN	2	Between tower (QK FI Lt "B") and north bank of river
HPW 1	1	Off west shore of Hog Point, midway between HPS and discharge
HPW 2	3	Tower (QK FI Lt "E")
Discharge	3 2.5	Outside discharge canal mouth - zooplankton sampling In discharge canal mouth - phytoplankton sampling
CBE	1	Off west shore of Gravel Neck, south of discharge
CBC	3	Midway between discharge and range markers near Cobham Wharf
JI	8	Tower (QK FI Lt "G")
CBS 1(8-21)	3	Midway between tower (QK FI Lt "F") and shore
CBS 2(8-21)	4	Adjacent to tower (QK FI Lt "F")
CBS 3(8-21)	3.5	Offshore from tower (QK FI Lt "F"), at a distance similar to that between CBS 1 and CBS 2
HPW 1.5 (8-21)	4	Midway between HPW 1 and HPW 2
HPM (8-21)	5.5	Midway between HPS and black and white buoy J28
J28 (8-21)	7	Adjacent to black and white buoy J28

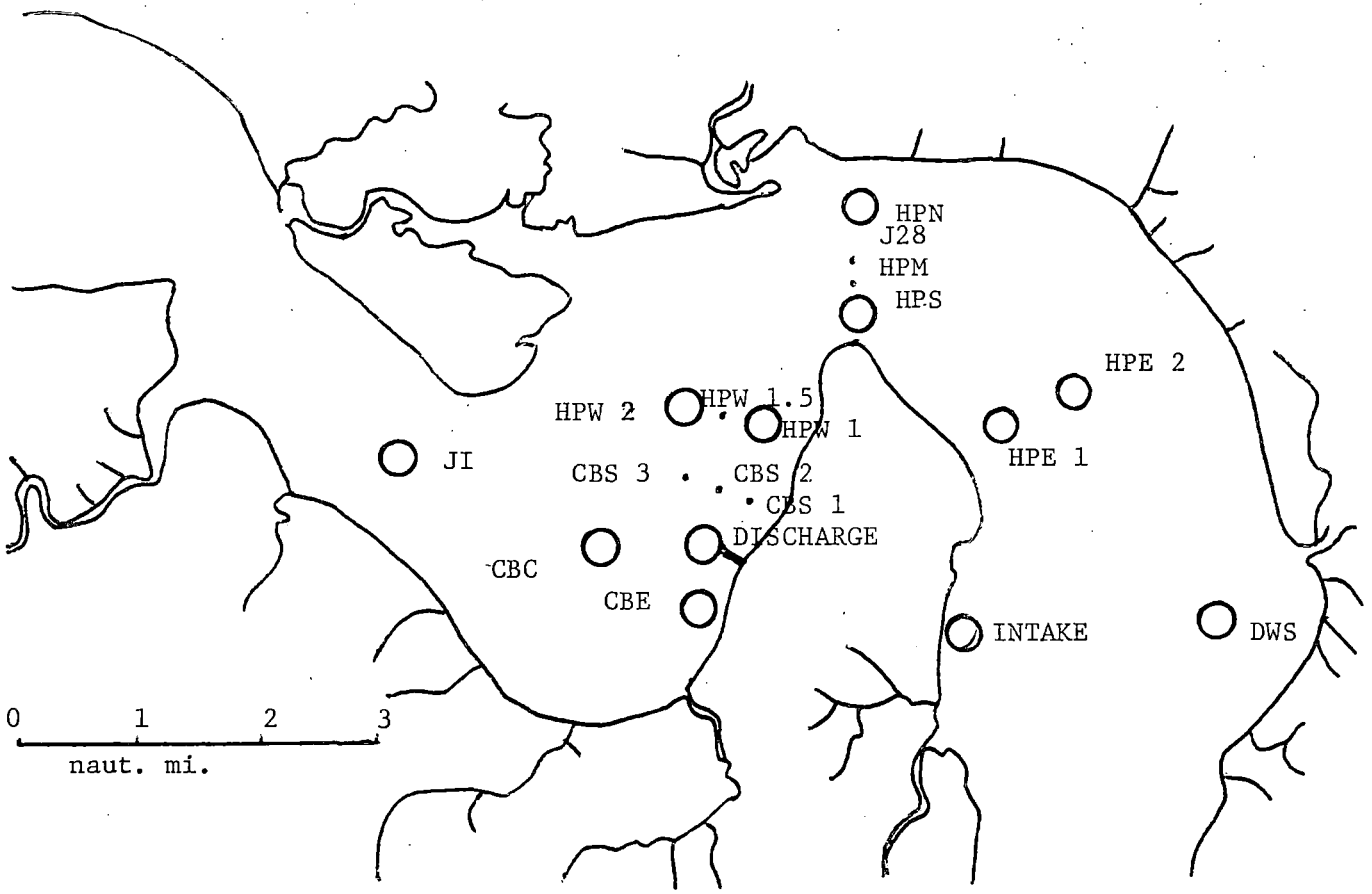

Figure 1. Plankton Sampling Stations

TABLE 2

Benthos and Fouling Plate Station Locations

Station	Depth (cm)	Location
1	1.5	Off tower (QK Fl 38 ft.) near Cobham Wharf
2	2.5	Cobham Bay, off Chestnut Bluffs
3	1	Cobham Bay, between mouths of College Run and Lower Chippokes Creek
4	3	Center of Cobham Bay
5	3	Tower (QK Fl Lt "E")
6	1	In Thorofare, off marker tower R "4"
7	1	Cobham Bay, off Gravel Neck
8	4	Tower (QK Fl Lt "F")
9	1	West of Hog Point
10	4	Between station 9 and black buoy "45"
11	5	Tower (QK Fl Lt "C")
12	.5	Off mouth of College Creek
13	1	East of Hog Point, on line with black and white buoy "J29"
14	6	Black and white buoy "J35"
15	1	Off power plant intake
16	2	Tower (QK Fl Lt "A")
DWS	2	Tower (QK Fl Lt "A")
CBN	2.5	Tower (QK Fl Lt "D")
CBS	3	Tower (QK Fl Lt "F")

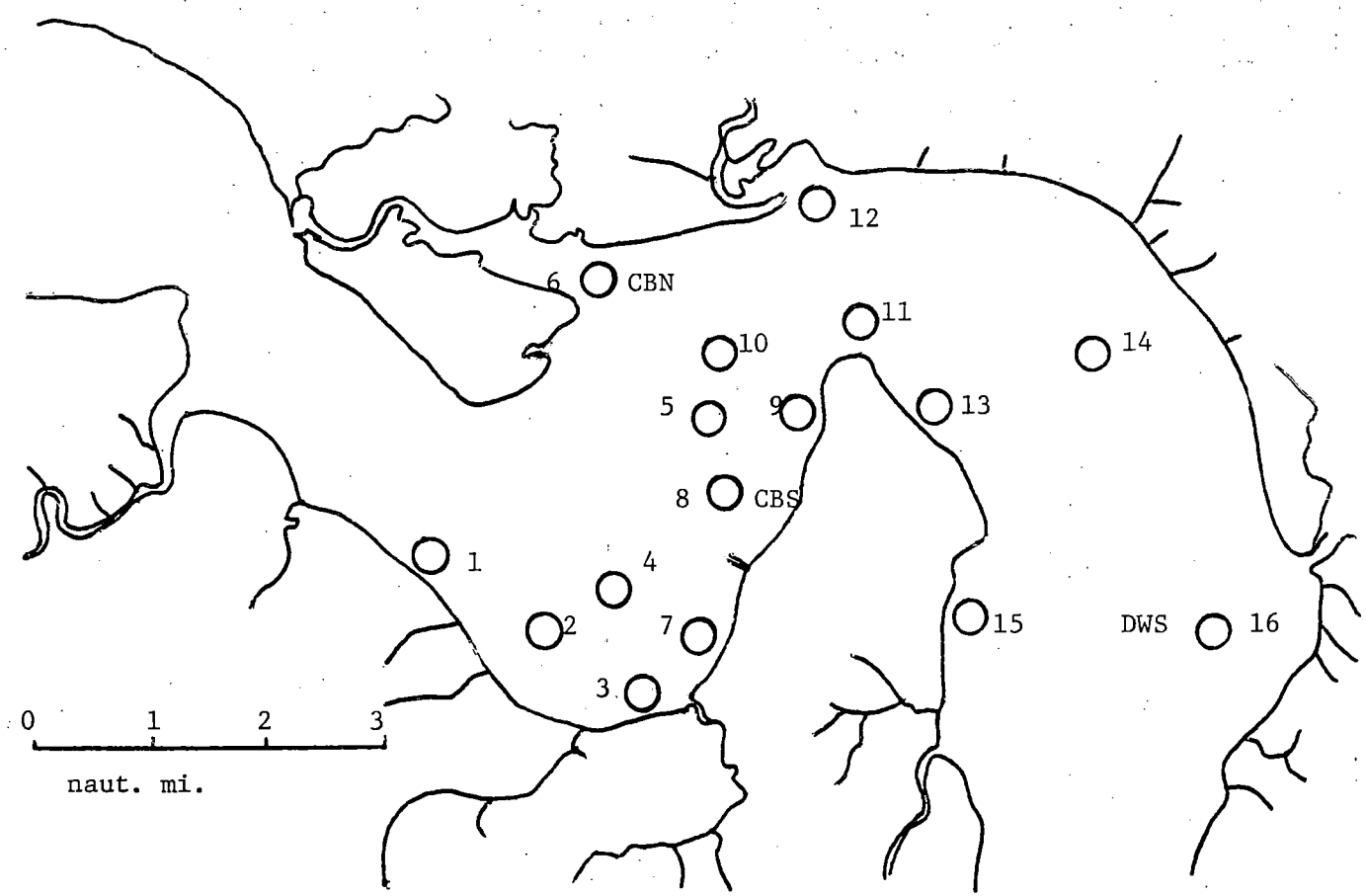

Figure 2. Benthos and fouling plate stations

TABLE 3

Summary of Biological Sampling Effort: Sampling Dates, Station Sampled, and Types of Samples Taken (Ph = Phytoplankton, Pr = Productivity, C = Chlorophyll a, Z = Zooplankton, B = Benthos, F = Fouling Organisms).

River Plankton Stations	Date (1975) 7-10	7-17	7-22, 7-23	8-12	8-21	9-8	9-26
DWS	Ph, Pr, C	Z, Ph, C		Ph, Pr, C	Z	Ph, Pr, C	Z
Intake	Ph, Pr, C	Z, Ph, C		Ph, Pr, C	Z	Ph, Pr, C	Z
HPE 1	Ph, Pr, C	Z, Ph, C		Ph, Pr, C	Z	Ph, Pr, C	Z
HPE 2	Ph, Pr, C	Z, Ph, C		Ph, Pr, C	Z	Ph, Pr, C	Z
HPS	Ph, Pr, C	Z, Ph, C		Ph, Pr, C	Z	Ph, Pr, C	Z
HPN	Ph, Pr, C	Z, Ph, C		Ph, Pr, C	Z	Ph, Pr, C	Z
HPW2	Ph, Pr, C	Z, Ph, C		Ph, Pr, C	Z	Ph, Pr, C	Z
HPW1	Ph, Pr, C	Z, Ph, C		Ph, Pr, C	Z	Ph, Pr, C	Z
Discharge	Ph, Pr, C	Z, Ph, C		Ph, Pr, C	Z	Ph, Pr, C	Z
CBE	Ph, Pr, C	Z, Ph, C		Ph, Pr, C	Z	Ph, Pr, C	Z
CBC	Ph, Pr, C	Z, Ph, C	Z, Ph, C	Ph, Pr, C	Z	Ph, Pr, C	Z
JI	Ph, Pr, C	Z, Ph, C		Ph, Pr, C	Z	Ph, Pr, C	Z

River Benthos Stations	7-9	8-7
1	B	B
2	B	B
3	B	B
4	B	B
5	B	B
6	B	B
7	B	B
8	B	B
9	B	B
10	B	B
11	B	B
12	B	B
13	B	B

Table 3 -2-

River Benthos Stations	7-9	8-7
14	B	B
15	B	B
16	B	B

Fouling Plate Stations	8-7
DWS	F
CBN	F
CBS	F

Phytoplankton Entrainment Stations	7-15 7-16	8-18 8-19	9-17 9-18
Intake	Ph, C	Ph, C	Ph, C
Discharge	Ph, C	Ph, C	Ph, C

Table 3 -3-

River Plankton Stations	10-7	10-22, 10-23	11-3	11-5	11-18	12-2	12-29
DWS	Ph, Pr, C		Z, Ph, C	Ph, Pr, C	Z	Ph, Pr, C	Z
Intake	Ph, Pr, C		Z, Ph, C	Ph, Pr, C	Z	Ph, Pr, C	Z
HPE 1	Ph, Pr, C		Z, Ph, C	Ph, Pr, C	Z	Ph, Pr, C	Z
HPE 2	Ph, Pr, C		Z, Ph, C	Ph, Pr, C	Z	Ph, Pr, C	Z
HPS	Ph, Pr, C		Z, Ph, C	Ph, Pr, C	Z	Ph, Pr, C	Z
HPN	Ph, Pr, C		Z, Ph, C	Ph, Pr, C	Z	Ph, Pr, C	Z
HPW 2	Ph, Pr, C		Z, Ph, C	Ph, Pr, C	Z	Ph, Pr, C	Z
HPW 1	Ph, Pr, C		Z, Ph, C	Ph, Pr, C	Z	Ph, Pr, C	Z
Discharge	Ph, Pr, C		Z, Ph, C	Ph, Pr, C	Z	Ph, Pr, C	Z
CBE	Ph, Pr, C		Z, Ph, C	Ph, Pr, C	Z	Ph, Pr, C	Z
CBC	Ph, Pr, C	Z, Ph, C	Z, Ph, C	Ph, Pr, C	Z	Ph, Pr, C	Z
JI	Ph, Pr, C		Z, Ph, C	Ph, Pr, C	Z	Ph, Pr, C	Z

River Benthos Stations	9-30
1	B
2	B
3	B
4	B
5	B
6	B
7	B
8	B
9	B
10	B
11	B
12	B
13	B
14	B
15	B
16	B

Table 3 -4-

Fouling Plate Stations	9-30			12-29
DWS	F			F
CBN	F			F
CBS	F			F
Phytoplankton Entrainment Stations		10-16 10-17	11-19 11-20	12-17 12-18
Intake		Ph, C	Ph, C	Ph, C
Discharge		Ph, C	Ph, C	Ph, C

TABLE 4

James River Phytoplankton Cell Counts, July - December 1975
(Total cells per ml, surface samples, two samples per station)

Station	July 10		Aug. 12		Sept. 8		Oct. 7		Nov. 5		Dec. 2	
DWS	2250	3550	1100	1450	1950	1950	1100	1150	700	1250	350	400
Intake	2450	2050	1250	1350	1650	1700	2300	1650	650	950	550	400
HPE 1	3200	3900	1550	900	1550	2650	1600	1600	1100	950	500	300
HPE 2	1850	1800	650	750	2550	2850	1150	1100	850	700	350	300
HPS	1650	1550	650	600	750	950	1150	1300	850	800	300	500
HPN	4100	3950	4000	2300	2250	2150	500	450	1100	900	250	700
HPW 2	2800	2900	550	500	1000	800	1050	850	1250	950	250	350
HPW 1	17950	10900	950	950	1800	1950	5250	4100	1600	1350	400	500
Discharge	800	1000	600	750	650	900	1600	1350	350	350	300	300
CBE	9550	8150	3300	2600	1500	1850	1650	1950	2250	2200	500	800
CBC	2500	3300	1750	1350	1100	1950	1600	1450	750	650	450	300
JI	1250	1400	1050	1100	950	900	1450	1200	500	450	500	700

TABLE 5

James River Dominant Phytoplankton Organisms, July-December, 1975

DATE	ORGANISM	DWS	IN-TAKE	HPE1	HPE2	HPS	HPN	HPW2	HPW1	DIS-CHARGE	CBE	CBC	JI
7-10	Chroomonas sp.	x	x	x	x	x	x	x	x	x	x	x	x
	Katodinium rotundatum	x	x	x	x								
	Skeletonema costatum	x	x	x	x	x	x	x	x	x	x	x	x
	Gyrosigma sp.		x										
	15μ chrysophyte						x						
	Pyramimonas sp						x				x		
8-12	Chroomonas sp.	x	x				x				x	x	x
	15μ chrysophyte	x	x	x	x	x	x	x	x		x	x	x
	Skeletonema costatum	x	x	x	x	x	x	x	x	x	x	x	
	Gyrosigma sp.	x	x	x	x	x			x	x			
	Melosira sp.						x						
9-8	Chroomonas sp.	x	x	x	x	x	x	x	x		x	x	x
	15μ chrysophyte	x		x	x	x	x		x		x	x	x
	Skeletonema costatum	x	x	x	x	x	x	x	x	x	x	x	
	Gyrosigma sp.	x	x	x		x			x	x	x		
	Melosira sp.						x					x	
10-7	Chroomonas sp.	x	x	x	x	x	x	x	x	x	x	x	x
	15μ chrysophyte	x	x	x	x				x	x		x	x
	Melosira sp.	x	x	x	x	x	x	x	x	x	x	x	x
	Cryptomonas sp.								x		x		x
11-5	Chroomonas sp.	x		x	x	x	x	x	x	x	x	x	
	15μ chrysophyte	x	x	x					x				
	Melosira sp.	x	x	x	x	x	x	x	x	x	x	x	x
	Gyrosigma sp.		x							x	x		
	Cryptomonas sp.												
	Nitzschia Kützingiana												x
12-2	Nitzschia Kützingiana	x	x	x	x	x	x	x	x	x	x	x	x
	3μ Flagellate	x	x	x	x	x	x	x	x	x	x	x	x
	Melosira sp.	x	x	x	x	x	x	x	x	x	x	x	x

TABLE 6

James River Chlorophyll Concentrations, July - December 1975
(μg Chl a per liter, surface samples, two samples per station)

Station	July 10		Aug. 12		Sept. 8		Oct. 7		Nov. 5		Dec. 2	
DWS	4.0	5.2	4.1	2.2	5.9	5.6	4.4	5.5	2.4	2.9	1.1	0.9
Intake	9.3	7.8	8.8	9.5	7.3	6.5	8.0	6.9	3.3	3.2	1.0	0.9
HPE 1	5.1	3.9	3.9	3.4	4.7	7.6	6.9	6.3	2.7	3.0	1.4	1.5
HPE 2	4.5	3.7	3.6	5.2	6.4	6.5	4.8	4.4	3.6	3.1	1.1	1.1
HPS	5.2	7.0	3.5	4.2	6.2	5.6	7.6	6.2	3.9	3.5	1.7	1.7
HPN	5.9	5.6	13.8	6.8	8.4	11.6	2.7	3.0	3.2	4.9	1.3	1.4
HPW 2	3.8	5.2	3.0	3.5	4.6	5.4	6.9	6.0	3.8	3.5	1.6	1.4
HPW 1	5.4	8.0	4.4	3.3	4.5	3.8	7.6	6.9	2.5	2.7	1.5	1.2
Discharge	4.3	4.1	4.9	4.4	4.1	3.8	5.0	3.9	3.0	3.1	1.5	1.6
CBE	6.5	5.2	6.7	6.7	4.4	3.5	2.2	4.4	2.8	2.8	1.9	1.8
CBC	4.2	6.3	3.4	3.7	4.5	4.1	3.8	5.0	2.2	3.5	1.9	2.1
JI	4.8	1.9	5.2	4.0	3.9	3.3	3.3	3.2	3.2	4.0	1.7	1.7

TABLE 7

James River Phytoplankton Primary Productivity, July - December 1975
(mg C m^{-3} hr^{-1}, surface samples, two samples per station)

Station	July 10		Aug. 12		Sept. 8		Oct. 7		Nov. 5		Dec. 2	
DWS	15.5	19.3	36.8	43.8	22.9	29.6	3.62	3.48	5.84	5.54	1.04	1.31
Intake	38.5	35.5	68.0	63.2	15.0	21.0	7.21	7.45	6.31	5.32	1.79	2.23
HPE 1	23.7	25.3	36.0	36.9	19.0	35.7	4.15	4.52	5.96	5.34	2.02	1.39
HPE 2	21.3	20.5	36.6	20.4	23.4	33.8	4.39	3.29	3.95	3.98	2.01	2.30
HPS	21.9	16.1	18.1	25.9	13.3	13.1	3.74	3.30	4.01	4.17	1.09	1.11
HPN	38.4	28.8	84.6	58.8	27.8	24.6	1.05	2.12	8.50	8.68	1.03	1.11
HPW 2	26.6	20.6	20.6	14.7	10.7	10.2	2.45	2.22	3.98	3.66	.993	.907
HPW 1	54.9	45.5	30.6	28.5	28.8	23.7	12.2	10.8	9.06	7.38	1.31	1.75
Discharge	12.2	13.0	16.3	17.1	10.2	10.4	4.85	4.08	4.80	4.80	1.62	1.79
CBE	35.9	37.1	41.5	41.0	18.5	27.8	4.69	4.99	6.50	6.23	1.17	1.17
CBC	21.0	34.9	23.0	21.1	17.8	24.2	4.75	3.73	5.45	5.05	1.18	1.05
JI	14.1	15.2	19.7	19.7	10.2	10.2	3.82	2.56	3.85	3.61	1.22	1.09

TABLE 8

James River Zooplankton; July 17, 1975
(Numbers of Organisms per 100 liters, surface samples, two samples per station)

Organism		Station					
		DWS	INTAKE	HPE 1	HPE 2	HPN	HPS
Copepod nauplii	1	454.85	770.40	1606.47	113.41	76.09	57.39
	2	527.51	1059.16	1262.36	241.25	102.56	133.64
	$\bar{x}$	491.18	914.78	1434.42	177.33	89.33	95.52
	s	51.38	204.18	243.32	90.40	18.72	53.92
	$s_{\bar{x}}$	36.33	114.38	172.06	63.92	13.24	38.13
Acartia sp.	1	15.06	63.37	15.53	7.73	-	10.93
	2	8.74	18.00	8.02	-	-	5.94
	$\bar{x}$	11.90	40.69	11.78			8.44
	s	4.47	32.08	5.31			3.53
	$s_{\bar{x}}$	3.16	22.69	3.76			2.50
Barnacle nauplii	1	24.10	28.35	120.79	-	42.27	19.13
	2	18.57	381.06	133.13	-	166.67	38.61
	$\bar{x}$	21.34	204.71	126.96		104.47	28.87
	s	3.91	249.40	8.73		87.96	13.77
	$s_{\bar{x}}$	2.77	176.36	6.17		62.20	9.74
Harpacticoid copepods	1	21.08	15.01	25.88	23.20	-	2.73
	2	18.57	108.02	12.83	40.66	-	2.97
	$\bar{x}$	19.83	61.52	19.36	31.93		2.85
	s	1.77	65.77	9.23	12.35		0.17
	$s_{\bar{x}}$	1.25	46.51	6.53	8.73		0.12
Eurytemora sp.	1	43.18	38.35	65.57	23.20	-	21.86
	2	40.41	117.02	27.27	8.13	-	11.88
	$\bar{x}$	41.80	77.69	46.42	15.67		16.87
	s	1.96	55.63	27.08	10.66		7.06
	$s_{\bar{x}}$	1.38	39.34	19.15	7.53		4.99
Bosmina sp.	1	1.00	-	-	12.89	-	-
	2	-	-	-	40.66	-	-
	$\bar{x}$				26.78		
	s				19.64		
	$s_{\bar{x}}$				13.88		
Cladocerans (unidentified)	1	-	5.00	5.18	-	-	-
	2	-	-	1.60	8.13	-	2.97
	$\bar{x}$			3.39			
	s			2.53			
	$s_{\bar{x}}$			1.79			

TABLE 8 (Cont.)

James River Zooplankton; July 17, 1975

(Numbers of organisms per 100 liters, surface samples, two samples per station)

Organism		Station					
		DWS	INTAKE	HPE 1	HPE 2	HPN	HPS
Gastropod larvae	1	19.08	1.67	12.08	2.58	-	2.73
	2	13.10	-	4.81	2.71	-	2.97
	$\bar{x}$	16.09		8.45	2.65		2.85
	s	4.23		5.14	0.09		0.17
	$s_{\bar{x}}$	2.99		3.64	0.07		0.12
Cyclopoid copepods	1	-	-	18.98	2.58	-	-
	2	1.09	12.00	-	32.53	-	5.94
	$\bar{x}$				17.56		
	s				21.18		
	$s_{\bar{x}}$				14.98		
Rotifers	1	-	-	-	2.58	-	-
	2	-	-	-	21.68	2.56	-
	$\bar{x}$				12.13		
	s				13.51		
	$s_{\bar{x}}$				9.55		
Polychaete larvae	1	2.01	1.67	13.80	-	-	-
	2	1.09	27.00	-	-	-	2.97
	$\bar{x}$	1.55	14.34				
	s	0.65	17.91				
	$s_{\bar{x}}$	0.46	12.66				
Ostracods	1	-	-	1.72	-	-	-
	2	-	-	3.21	2.71		
	$\bar{x}$			2.47			
	s			1.05			
	$s_{\bar{x}}$			0.74			
Pelecypod larvae	1	-	-	1.72	2.58	-	-
	2	-	-	-	-	-	-
Decapod larvae	1	-	-	-	-	-	-
	2	-	-	-	-	2.56	-

TABLE 8 (cont.)

James River Zooplankton; July 17, 1975

(Numbers of organisms per 100 liters, surface samples, two samples per station)

Organism		Station					
		HPW 2	HPW 1	DISCHARGE	CBE	CBC	J.I.
Copepod nauplii	1	246.15	340.72	224.08	42.86	649.04	288.89
	2	166.64	274.40	158.02	9.18	348.30	490.73
	$\bar{x}$	206.40	307.56	191.05	26.02	498.67	389.81
	s	56.22	46.90	46.71	23.82	212.66	142.72
	$s_{\bar{x}}$	39.76	33.16	33.03	16.84	150.37	100.92
Acartia sp.	1	-	32.17	43.72	-	2.26	-
	2	5.21	16.63	37.18	-	-	13.63
	$\bar{x}$		24.67	40.45			
	s		11.37	4.62			
	$s_{\bar{x}}$		8.04	3.27			
Barnacle nauplii	1	-	76.32	81.98	27.07	-	-
	2	-	74.84	41.83	6.12	-	-
	$\bar{x}$		75.58	61.91	16.60		
	s		1.05	28.39	14.81		
	$s_{\bar{x}}$		0.74	20.08	10.47		
Harpacticoid copepods	1	26.76	32.71	5.46	-	-	-
	2	-	8.32	4.65	-	3.11	-
	$\bar{x}$		20.52	5.06			
	s		17.25	0.57			
	$s_{\bar{x}}$		12.19	0.41			
Eurytemora sp.	1	48.16	103.58	43.72	-	113.07	33.33
	2	52.07	58.21	32.53	-	65.31	74.97
	$\bar{x}$	50.12	80.90	38.13		89.19	54.15
	s	2.76	32.08	7.91		33.77	29.44
	$s_{\bar{x}}$	1.95	22.69	5.60		23.88	20.82
Bosmina sp.	1	37.46	8.18	-	2.26	88.20	22.22
	2	10.41	5.54	-	-	99.51	54.53
	$\bar{x}$	23.94	6.86			93.86	38.38
	s	19.13	1.87			8.00	22.85
	$s_{\bar{x}}$	13.52	1.32			5.66	16.16
Cladocerans (unidentified)	1	10.70	-	-	-	52.01	11.11
	2	15.62	-	-	-	34.21	6.82
	$\bar{x}$	13.16				43.11	8.97
	s	3.48				12.59	3.03
	$s_{\bar{x}}$	2.46				8.90	2.15

TABLE 8 (Cont.)

James River Zooplankton; July 17, 1975

(Numbers of organisms per 100 liters, surface samples, two samples per station)

Organism		Station					
		HPW 2	HPW 1	DISCHARGE	CBE	CBC	J.I.
Gastropod larvae	1	-	16.35	-	-	-	-
	2	-	2.77	-	-	-	6.82
	$\bar{x}$		9.56				
	s		9.60				
	$s_{\bar{x}}$		6.79				
Cyclopoid copepods	1	48.16	19.08	16.40	-	11.31	16.67
	2	-	5.54	4.65	-	12.44	81.79
	$\bar{x}$		12.31	10.53		11.88	49.23
	s		9.57	8.31		0.80	46.05
	$s_{\bar{x}}$		6.77	5.88		0.57	32.56
Rotifers	1	246.15	-	-	-	113.07	66.67
	2	93.73	-	-	-	74.64	74.97
	$\bar{x}$	169.94				93.86	70.82
	s	107.78				27.17	5.87
	$s_{\bar{x}}$	76.21				19.21	4.15
Polychaete larvae	1	-	8.18	10.93	-	-	-
	2	5.21	-	-	-	-	-
Ostracods	1	-	-	-	-	-	-
	2	-	-	-	-	-	-
Pelecypod larvae	1	-	-	-	-	-	-
	2	-	-	-	-	-	-
Decapod larvae	1	-	-	-	-	-	-
	2	-	2.77	-	-	-	-

TABLE 9

James River Zooplankton; August 21, 1975

Organism		Station					
		HPN	DWS	INTAKE	HPE 1	HPE 2	J.I.
Copepod nauplii	1	608.32	1825.76	1291.26	560.07	1015.79	2721.28
	2	674.86	1347.37	1295.49	546.50	529.55	2435.24
	$\bar{x}$	641.59	1586.57	1293.38	553.29	772.67	2578.26
	s	47.05	338.27	2.99	9.60	343.82	202.26
	$s_{\bar{x}}$	33.27	239.20	2.11	6.79	243.12	143.02
Acartia sp.	1	19.01	62.39	138.89	51.66	28.95	91.85
	2	-	36.27	30.51	38.43	134.74	100.45
	$\bar{x}$		49.33	84.70	45.05	81.85	96.15
	s		18.47	76.64	9.36	74.80	6.08
	$s_{\bar{x}}$		13.06	54.19	6.62	52.90	4.30
Barnacle nauplii	1	79.21	39.40	120.12	27.19	-	7.78
	2	25.59	24.18	44.59	-	9.40	1.62
	$\bar{x}$	52.40	31.79	82.36			4.70
	s	37.92	10.76	53.41			4.36
	$s_{\bar{x}}$	26.81	7.61	37.77			3.08
Polychaete larvae	1	-	11.49	30.03	13.59	10.53	-
	2	-	1.73	28.16	46.96	1.57	-
	$\bar{x}$		6.61	29.10	30.28	6.05	
	s		6.90	1.32	23.60	6.34	
	$s_{\bar{x}}$		4.88	0.93	16.68	4.48	
Harpacticoid copepods	1	28.51	-	15.01	-	2.63	71.61
	2	15.99	-	7.04	-	3.13	27.54
	$\bar{x}$	22.25		11.03		2.88	49.58
	s	8.85		5.64		0.35	31.16
	$s_{\bar{x}}$	6.26		3.99		0.25	22.03
Pelecypod larvae	1	-	13.13	-	5.44	-	40.48
	2	-	1.73	18.77	21.35	-	3.24
	$\bar{x}$		7.43		13.40		21.86
	s		8.06		11.25		26.33
	$s_{\bar{x}}$		5.70		7.95		18.62
Eurytemora sp.	1	3.71	-	3.75	-	2.63	348.72
	2	-	1.73	-	-	-	139.34
	$\bar{x}$						244.03
	s						148.05
	$s_{\bar{x}}$						104.69

TABLE 9 (cont.)

Organism		Station					
		CBC	CBE	DISCHARGE	CBS 1	CBS 2	CBS 3
Copepod nauplii	1	869.88	3670.14	1580.37	2531.36	2145.56	2878.11
	2	1110.28	2380.68	574.93	4481.23	2392.85	265.72
	$\bar{x}$	990.08	3025.41	1077.65	3506.30	2269.21	1571.92
	s	169.99	911.79	710.95	1378.77	174.86	1847.24
	$s_{\bar{x}}$	120.20	644.73	502.72	974.94	123.65	1306.19
Acartia sp.	1	32.29	58.64	49.08	114.07	36.68	68.17
	2	18.86	47.78	104.24	132.67	19.90	3.24
	$\bar{x}$	25.58	53.21	76.66	123.37	28.29	35.71
	s	9.50	7.68	39.00	13.15	11.87	45.91
	$s_{\bar{x}}$	6.72	5.43	27.58	9.30	8.39	32.47
Barnacle nauplii	1	8.07	161.77	461.35	43.69	103.15	12.62
	2	-	75.89	243.24	78.62	37.31	3.24
	$\bar{x}$		118.83	352.30	61.16	70.23	7.93
	s		60.73	154.23	24.70	46.56	6.63
	$s_{\bar{x}}$		42.94	109.05	17.47	32.92	4.69
Polychaete larvae	1	2.02	8.09	3.27	2.43	2.29	2.52
	2	2.36	-	6.32	4.91	2.49	3.24
	$\bar{x}$	2.19		4.80	3.67	2.39	2.88
	s	0.24		2.16	1.75	0.14	0.51
	$s_{\bar{x}}$	0.17		1.52	1.24	0.10	0.36
Harpacticoid copepods	1	6.05	4.04	13.09	4.85	18.34	-
	2	-	2.81	6.32	78.62	12.44	3.24
	$\bar{x}$		3.43	9.71	41.74	15.39	
	s		0.87	4.79	52.16	4.17	
	$s_{\bar{x}}$		0.62	3.39	36.89	2.95	
Pelecypod larvae	1	2.02	1763.29	-	160.18	309.45	116.13
	2	2.36	8.43	25.27	34.39	248.74	42.13
	$\bar{x}$	2.19	885.86		97.29	279.10	79.13
	s	0.24	1240.87		88.95	42.93	52.33
	$s_{\bar{x}}$	0.17	877.43		62.90	30.36	37.00
Eurytemora sp.	1	2.02	10.11	26.17	2.43	36.68	5.05
	2	-	5.62	3.16	24.57	9.95	-
	$\bar{x}$		7.87	14.67	13.50	23.32	
	s		3.17	16.27	15.66	18.90	
	$s_{\bar{x}}$		2.24	11.51	11.07	13.37	

TABLE 9 (Cont.)

Organism		Station					
		HPW 2	HPW 1.5	HPW 1	HPS	HPM	J28
Copepod nauplii	1	890.86	212.97	2275.12	1823.61	1427.75	210.50
	2	596.89	57.50	2766.03	2788.91	1805.57	1113.51
	$\bar{x}$	743.88	135.24	2520.58	2306.26	1616.66	662.01
	s	207.87	109.93	347.13	682.57	267.16	638.52
	$s_{\bar{x}}$	146.99	77.74	245.46	482.65	188.91	451.51
Acartia sp.	1	32.79	7.34	405.85	327.71	333.85	30.56
	2	70.01	4.42	539.18	387.74	224.26	227.03
	$\bar{x}$	51.40	5.88	472.52	357.73	279.06	128.80
	s	26.32	2.06	94.28	42.45	77.49	138.93
	$s_{\bar{x}}$	18.61	1.46	66.67	30.02	54.80	98.23
Barnacle nauplii	1	10.93	7.34	120.97	204.34	78.13	13.58
	2	7.37	4.42	118.36	266.28	109.25	118.92
	$\bar{x}$	9.15	5.88	119.67	235.31	93.69	66.25
	s	2.52	2.06	1.85	43.80	22.01	74.49
	$s_{\bar{x}}$	1.78	1.46	1.30	30.97	15.56	52.67
Polychaete larvae	1	5.47	-	27.32	7.71	-	13.58
	2	3.68	-	13.15	23.36	5.75	21.62
	$\bar{x}$	4.58		20.24	15.54		17.60
	s	1.27		10.02	11.07		5.69
	$s_{\bar{x}}$	0.89		7.09	7.82		4.02
Harpacticoid copepods	1	60.12	-	97.56	219.76	92.34	33.95
	2	18.42	-	127.12	163.50	80.50	97.30
	$\bar{x}$	39.27		112.34	191.63	86.42	65.63
	s	29.49		20.90	39.78	8.37	44.80
	$s_{\bar{x}}$	20.85		14.78	28.13	5.92	31.68
Pelecypod larvae	1	278.74	14.69	308.29	273.73	305.44	220.69
	2	206.33	13.27	236.71	378.39	264.51	810.81
	$\bar{x}$	242.54	13.98	272.50	326.06	284.98	515.75
	s	51.20	1.00	50.61	74.01	28.94	417.28
	$s_{\bar{x}}$	36.21	0.71	35.79	52.33	20.46	295.06
Eurytemora sp.	1	114.77	7.34	66.34	15.42	35.52	3.39
	2	44.21	4.42	56.99	135.47	28.75	32.43
	$\bar{x}$	79.49	5.88	61.67	75.45	32.14	17.91
	s	49.89	2.06	6.61	84.89	4.79	20.53
	$s_{\bar{x}}$	35.28	1.46	4.68	60.03	3.39	14.52

TABLE (Cont.) 9

Organism		Station					
		HPN	DWS	INTAKE	HPE 1	HPE 2	J.I.
Gastropod larvae	1	-	3.28	-	-	-	4.67
	2	3.20	-	-	-	-	-
	$\bar{x}$						
	s						
	$s_{\bar{x}}$						
Cladocerans	1	-	-	-	-	-	-
	2	-	-	-	-	-	-
	$\bar{x}$						
	s						
	$s_{\bar{x}}$						
Rotifers	1	60.20	-	7.51	-	5.26	-
	2	38.38	-	-	64.04	-	-
	$\bar{x}$	49.29					
	s	15.43					
	$s_{\bar{x}}$	10.91					
Barnacle cyprids	1	3.17	1.64	-	-	-	-
	2	9.59	-	-	-	-	4.86
	$\bar{x}$	6.38					
	s	4.54					
	$s_{\bar{x}}$	3.21					
Decapod larvae	1	-	-	18.77	2.72	-	-
	2	-	1.73	30.51	-	-	-
	$\bar{x}$			24.64			
	s			8.30			
	$s_{\bar{x}}$			5.87			
Corophium lacustre	1	-	-	-	-	-	-
	2	-	-	-	-	-	-
	$\bar{x}$						
	s						
	$s_{\bar{x}}$						
Cyclopoid copepods	1	-	-	-	-	-	14.01
	2	-	-	-	-	1.57	-
Bosmina sp.	1	-	-	-	-	-	6.23
	2	-	-	-	-	-	-
Hydracarinids	1	-	-	-	-	-	-
	2	-	-	-	-	-	-

TABLE (Cont.) 9

Organism		Station					
		CBC	CBE	DISCHARGE	CBS 1	CBS 2	CBS 3
Gastropod larvae	1	-	111.22	-	8.80	13.75	-
	2	2.36	53.40	3.16	31.94	17.41	-
	$\bar{x}$		82.31		20.37	15.58	
	s		40.88		16.36	2.59	
	$s_{\bar{x}}$		20.91		11.57	1.83	
Cladocerans	1	-	50.55	-	-	22.92	7.57
	2	49.50	36.54	-	-	17.41	12.96
	$\bar{x}$		43.55			20.17	10.27
	s		9.91			3.90	3.81
	$s_{\bar{x}}$		7.01			2.76	2.70
Rotifers	1	-	-	-	-	-	-
	2	-	-	-	-	-	-
	$\bar{x}$						
	s						
	$s_{\bar{x}}$						
Barnacle cyprids	1	-	-	-	-	-	-
	2	-	8.43	3.16	-	-	-
	$\bar{x}$						
	s						
	$s_{\bar{x}}$						
Decapod larvae	1	-	-	3.27	2.43	-	-
	2	-	-	12.63	-	-	-
	$\bar{x}$			7.95			
	s			6.62			
	$s_{\bar{x}}$			4.68			
Corophium lacustre	1	-	-	6.54	-	-	-
	2	-	-	6.32	-	-	-
	$\bar{x}$			6.43			
	s			0.16			
	$s_{\bar{x}}$			0.11			
Cyclopoid copepods	1	-	-	-	-	-	-
	2	-	-	-	-	-	-
Bosmina sp.	1	-	-	-	-	-	-
	2	-	-	-	-	-	-
Hydracarinids	1	-	-	-	-	-	-
	2	-	-	3.16	-	-	-

TABLE 9 (Cont.)

Organism		Station					
		HPW 2	HPW 1.5	HPW 1	HPS	HPM	J28
Gastropod larvae	1	-	-	191.22	100.24	106.55	10.19
	2	7.37	-	223.56	135.47	80.50	43.24
	$\bar{x}$			207.39	117.86	93.53	26.72
	s			22.87	24.91	18.42	23.37
	$s_{\bar{x}}$			16.17	17.62	13.03	16.53
Cladocerans	1	-	-	113.17	107.95	-	-
	2	7.37	-	74.52	88.76	-	-
	$\bar{x}$			93.85	98.36		
	s			27.33	13.57		
	$s_{\bar{x}}$			19.32	9.59		
Rotifers	1	-	-	-	-	-	-
	2	-	-	-	-	-	-
Barnacle cyprids	1	-	-	-	3.85	-	3.39
	2	-	-	8.77	-	-	-
	$\bar{x}$						
	s						
	$s_{\bar{x}}$						
Decapod larvae	1	-	-	-	7.71	-	-
	2	-	-	-	-	-	-
	$\bar{x}$						
	s						
	$s_{\bar{x}}$						
Corophium lacustre	1	-	-	-	-	-	-
	2	-	-	-	-	-	-
	$\bar{x}$						
	s						
	$s_{\bar{x}}$						
Cyclopoid copepods	1	-	-	-	-	-	-
	2	-	-	-	-	-	-
Bosmina sp.	1	-	-	-	-	-	-
	2	-	-	-	-	-	-
Hydracarinids	1	-	-	-	-	-	-
	2	-	-	-	-	-	-

TABLE 10

James River Zooplankton; September 26, 1975

Organism		Station					
		DWS	INTAKE	HPE 1	HPE 2	HPS	HPN
Copepod nauplii	1	125.51	188.78	74.18	136.47	424.50	367.51
	2	165.11	227.62	83.63	134.19	385.74	297.84
	$\bar{x}$	145.31	208.20	78.91	135.33	405.12	332.68
	s	28.00	27.46	6.68	1.61	27.41	49.26
	$s_{\bar{x}}$	19.80	19.42	4.73	1.14	19.38	34.84
Eurytemora sp.	1	2.61	18.45	2.97	2.87	93.18	27.56
	2	2.82	22.48	3.74	3.73	97.93	37.75
	$\bar{x}$	2.72	20.47	3.36	3.30	95.56	32.66
	s	0.15	2.85	0.54	0.61	3.36	7.21
	$s_{\bar{x}}$	0.11	2.02	0.39	0.43	2.36	5.10
Barnacle nauplii	1	3.92	95.10	1.48	1.44	2.96	-
	2	7.06	102.57	2.50	2.48	1.19	-
	$\bar{x}$	5.49	98.84	1.99	1.96	2.08	
	s	2.22	5.28	0.72	0.74	1.25	
	$s_{\bar{x}}$	1.57	3.74	0.51	0.52	0.89	
Harpacticoid copepods	1	1.31	8.52	-	1.44	17.75	11.81
	2	2.82	4.21	-	2.48	17.91	2.80
	$\bar{x}$	2.07	6.37		1.96	17.83	7.31
	s	1.07	3.05		0.74	0.11	6.37
	$s_{\bar{x}}$	0.76	2.16		0.52	0.08	4.51
Bosmina sp.	1	1.31	-	2.97	11.49	152.35	11.81
	2	-	-	1.25	7.45	106.29	26.57
	$\bar{x}$			2.11	9.47	129.32	19.19
	s			1.22	2.86	32.57	10.44
	$s_{\bar{x}}$			0.86	2.02	23.03	7.38
Gastropod larvae	1	-	15.61	-	-	4.44	-
	2	1.41	7.03	1.25	-	1.19	1.40
	$\bar{x}$		11.32			2.82	
	s		6.07			2.30	
	$s_{\bar{x}}$		4.29			1.62	
Acartia sp.	1	-	45.42	-	-	17.75	-
	2	-	40.75	-	-	4.78	-
	$\bar{x}$		43.09			11.27	
	s		3.30			9.17	
	$s_{\bar{x}}$		2.34			6.49	

TABLE 10 (Cont.)

James River Zooplankton; September 26, 1975

Organism		Station					
		HPW 2	HPW 1	DISCHARGE	CBE	CBC	J.I.
Copepod nauplii	1	483.89	265.31	188.34	59.77	164.41	241.72
	2	426.78	180.04	201.59	146.03	125.25	115.84
	$\bar{x}$	455.34	222.68	194.97	102.90	144.88	178.78
	s	40.38	60.29	9.37	61.00	27.69	89.01
	$s_{\bar{x}}$	28.56	42.64	6.63	42.13	19.58	62.94
Eurytemora sp.	1	58.00	108.61	17.60	4.07	12.18	78.74
	2	45.91	109.07	16.39	3.36	7.55	28.56
	$\bar{x}$	51.96	108.84	17.00	3.72	9.87	53.65
	s	8.55	0.33	0.86	0.50	3.27	35.48
	$s_{\bar{x}}$	6.05	0.23	0.61	0.36	2.32	25.09
Barnacle nauplii	1	-	26.37	124.97	-	-	-
	2	-	18.40	126.20	1.68	-	-
	$\bar{x}$		22.39	125.59			
	s		5.64	0.87			
	$s_{\bar{x}}$		3.99	0.62			
Harpacticoid copepods	1	-	38.79	3.52	2.72	-	-
	2	3.40	32.85	3.28	-	-	-
	$\bar{x}$		35.82	3.40			
	s		4.20	0.17			
	$s_{\bar{x}}$		2.97	0.12			
Bosmina sp.	1	8.29	52.75	3.52	4.07	62.42	444.98
	2	5.10	35.48	-	1.68	48.29	128.54
	$\bar{x}$	6.70	44.12		2.88	55.36	286.76
	s	2.26	12.21		1.69	9.99	223.76
	$s_{\bar{x}}$	1.59	8.63		1.19	7.07	158.22
Gastropod larvae	1	-	7.76	3.52	-	-	-
	2	1.70	21.03	3.28	1.68	1.51	-
	$\bar{x}$		14.40	3.40			
	s		9.38	0.17			
	$s_{\bar{x}}$		6.64	0.12			
Acartia sp.	1	-	17.07	19.36	-	-	-
	2	-	13.14	16.39	-	-	-
	$\bar{x}$		15.11	17.88			
	s		2.78	2.10			
	$s_{\bar{x}}$		1.97	1.49			

TABLE 10 (Cont.)

James River Zooplankton; September 26, 1975

Organism		Station					
		DWS	INTAKE	HPE 1	HPE 2	HPS	HPN
Rotifers	1	-	-	-	1.44	-	17.06
	2	-	-	-	-	-	6.99
	$\bar{x}$						12.03
	s						7.12
	$s_{\bar{x}}$						5.04
Cyclopoid copepods	1	-	7.10	-	-	31.06	-
	2	-	1.41	1.25	-	15.53	4.19
	$\bar{x}$		4.26			23.30	
	s		4.02			10.98	
	$s_{\bar{x}}$		2.85			7.76	
Pelecypod larvae	1	-	-	-	-	2.96	-
	2	-	2.81	-	-	-	-
	$\bar{x}$						
	s						
	$s_{\bar{x}}$						
Polychaete larvae	1	-	9.93	-	-	-	-
	2	-	5.62	-	-	-	-
	$\bar{x}$		7.78				
	s		3.05				
	$s_{\bar{x}}$		2.16				
Cladocerans (unidentified)	1	-	-	-	1.44	-	-
	2	-	-	-	2.48	-	-
	$\bar{x}$				1.96		
	s				0.74		
	$s_{\bar{x}}$				0.52		
Hydracarinids	1	-	-	-	1.48	-	-
	2	-	-	-	-	-	-

TABLE 10 (Cont.)

James River Zooplankton; September 26, 1975

Organism		Station					
		HPW 2	HPW 1	DISCHARGE	CBE	CBC	J.I.
Rotifers	1	11.60	-	3.52	2.72	-	-
	2	18.70	6.57	6.55	1.68	-	1.59
	$\bar{x}$	15.15		5.04	2.20		
	s	5.02		2.14	0.74		
	$s_{\bar{x}}$	3.55		1.51	0.52		
Cyclopoid copepods	1	3.31	15.51	-	-	-	9.15
	2	1.70	21.03	-	-	-	-
	$\bar{x}$	2.51	18.27				
	s	1.14	3.90				
	$s_{\bar{x}}$	0.81	2.76				
Pelecypod larvae	1	-	3.10	-	-	6.09	5.49
	2	-	6.57	-	-	-	1.59
	$\bar{x}$		4.84				3.54
	s		2.45				2.76
	$s_{\bar{x}}$		1.73				1.95
Polychaete larvae	1	-	-	1.76	-	-	-
	2	-	3.94	-	-	-	-
	$\bar{x}$						
	s						
	$s_{\bar{x}}$						
Cladocerans (unidentified)	1	-	-	-	-	-	-
	2	-	-	-	-	-	-
	$\bar{x}$						
	s						
	$s_{\bar{x}}$						
Hydracarinids	1	-	-	-	-	-	1.83
	2	-	-	-	-	-	-

TABLE 11

James River Zooplankton; November 3, 1975

Organism		Station					
		DWS	INTAKE	HPE 1	HPE 2	HPS	HPN
Copepod nauplii	1	68.84	78.21	88.20	147.47	62.94	106.85
	2	107.86	86.12	161.34	227.54	68.96	42.49
	$\bar{x}$	88.35	82.17	124.77	187.51	65.95	74.67
	s	27.59	5.59	51.72	56.62	4.26	45.51
	$s_{\bar{x}}$	19.51	3.96	36.57	40.04	3.01	32.18
Rotifers	1	88.70	57.81	421.70	48.60	214.57	688.97
	2	94.38	163.17	578.94	99.41	191.96	154.89
	$\bar{x}$	91.54	110.49	500.32	74.01	203.27	421.93
	s	4.02	74.50	119.19	35.93	15.99	377.65
	$s_{\bar{x}}$	2.84	52.68	78.62	25.40	11.31	267.04
Polychaete larvae	1	10.54	40.81	19.29	28.48	22.88	-
	2	5.99	31.73	15.82	48.60	14.91	-
	$\bar{x}$	8.27	36.27	17.56	38.54	18.90	
	s	3.22	6.42	2.45	14.23	5.64	
	$s_{\bar{x}}$	2.27	4.54	1.73	10.06	3.99	
Harpacticoid copepods	1	-	6.80	-	1.68	2.86	1.11
	2	-	4.53	3.16	4.42	3.73	-
	$\bar{x}$		5.67		3.05	3.30	
	s		1.61	.	1.94	0.62	
	$s_{\bar{x}}$		1.14	.	1.37	0.44	
Eurytemora sp.	1	-	3.40	5.51	3.35	-	4.45
	2	-	9.06	3.16	2.21	5.59	-
	$\bar{x}$		6.23	4.34	2.78		
	s		4.00	1.66	0.81		
	$s_{\bar{x}}$		2.83	1.17	0.57		
Cyclopoid copepods	1	-	3.40	2.76	-	5.72	-
	2	-	-	3.16	-	1.86	-
	$\bar{x}$			2.96		3.79	
	s			0.28		2.73	
	$s_{\bar{x}}$			0.20		1.93	
Bosmina sp.	1	-	-	-	-	-	-
	2	-	-	-	-	-	1.37
	$\bar{x}$						
	s						
	$s_{\bar{x}}$						

TABLE 11 (Cont.)

James River Zooplankton; November 3, 1975

Organism		Station					
		HPW 2	HPW 1	DISCHARGE	CBE	CBC	J.I.
Copepod nauplii	1	229.49	26.07	79.89	49.29	190.20	18.94
	2	102.66	26.82	145.34	37.22	68.01	2.93
	$\bar{x}$	166.08	26.45	112.62	43.26	129.11	10.94
	s	89.68	0.53	46.28	8.53	86.40	11.32
	$s_{\bar{x}}$	63.42	0.38	32.73	6.04	61.10	8.00
Rotifers	1	491.31	85.86	25.23	204.86	616.16	5.41
	2	302.11	182.89	55.13	261.85	140.56	2.93
	$\bar{x}$	396.71	134.38	40.18	233.36	378.36	4.17
	s	133.78	68.61	21.14	40.30	336.30	1.75
	$s_{\bar{x}}$	94.60	48.52	14.95	28.50	237.80	1.24
Polychaete larvae	1	-	4.60	25.23	-	-	-
	2	2.93	26.83	20.05	-	-	-
	$\bar{x}$		15.72	22.64			
	s		15.72	3.66			
	$s_{\bar{x}}$		11.11	2.59			
Harpacticoid copepods	1	-	1.53	12.61	9.24	53.58	5.41
	2	-	2.44	-	7.70	11.34	14.66
	$\bar{x}$		1.99		8.47	32.46	10.04
	s		0.64		1.09	29.87	6.54
	$s_{\bar{x}}$		0.46		0.77	21.12	4.63
Eurytemora sp.	1	-	-	8.41	1.54	13.39	18.94
	2	2.93	3.66	15.04	5.13	9.07	14.66
	$\bar{x}$			11.73	3.34	11.23	16.80
	s			4.69	2.54	3.05	3.03
	$s_{\bar{x}}$			3.32	1.79	2.16	2.14
Cyclopoid copepods	1	-	-	-	-	2.68	-
	2	-	-	-	-	-	-
	$\bar{x}$						
	s						
	$s_{\bar{x}}$						
Bosmina sp.	1	-	1.53	-	-	-	2.71
	2	-	1.22	-	1.28	-	-
	$\bar{x}$		1.38				
	s		0.22				
	$s_{\bar{x}}$		0.15				

TABLE (CONT.) 11

James River Zooplankton; November 3, 1975

Organism		Station					
		DWS	INTAKE	HPE 1	HPE 2	HPS	HPN
Gastropod larvae	1	-	-	-	-	-	-
	2	1.50	-	-	2.21	-	-
Acartia sp.	1	-	-	-	1.68	-	-
	2	-	-	-	-	-	-
Pelecypod larvae	1	-	-	-	-	-	-
	2	-	-	-	-	-	-

Organism		Station					
		HPW 2	HPW 1	DISCHARGE	CBE	CBC	J.I.
Gastropod larvae	1	-	-	-	-	-	-
	2	-	-	5.01	-	-	-
Acartia sp.	1	-	-	-	-	-	2.71
	2	-	1.22	-	-	-	-
Pelecypod larvae	1	-	-	-	-	2.68	-
	2	-	1.22	-	-	-	2.93

TABLE 12

James River Zooplankton; November 18, 1975

Organism		Station					
		DWS	INTAKE	HPE 1	HPE 2	HPS	HPN
Copepod nauplii	1	38.26	47.89	31.94	43.55	27.18	68.31
	2	22.97	45.36	43.86	42.85	50.50	83.09
	$\bar{x}$	30.62	46.63	37.90	43.20	38.84	75.70
	s	10.81	1.79	8.43	0.49	16.49	10.45
	$s_{\bar{x}}$	7.64	1.27	5.96	0.35	11.66	7.39
Rotifers	1	51.01	32.44	77.33	59.39	34.43	478.15
	2	47.08	32.02	56.14	131.08	53.75	353.62
	$\bar{x}$	49.05	32.23	66.74	95.24	44.09	415.89
	s	2.78	0.30	14.98	50.69	13.66	88.06
	$s_{\bar{x}}$	1.97	0.21	10.59	35.85	9.66	62.27
Polychaete larvae	1	31.88	63.34	77.33	71.27	21.74	7.59
	2	29.86	102.73	59.65	103.34	47.24	11.59
	$\bar{x}$	30.87	83.04	68.49	87.31	34.49	9.59
	s	1.43	27.85	12.50	22.68	18.03	2.83
	$s_{\bar{x}}$	1.01	19.70	8.84	16.03	12.75	2.00
Eurytemora sp.	1	9.50	13.90	3.36	5.94	-	-
	2	8.04	2.67	1.75	2.52	-	-
	$\bar{x}$	8.77	8.29	2.56	4.23		
	s	1.03	7.94	1.14	2.42		
	$s_{\bar{x}}$	0.73	5.62	0.81	1.71		
Acartia sp.	1	-	3.09	1.68	5.94	1.63	-
	2	2.30	4.00	-	-	-	-
	$\bar{x}$		3.55				
	s		0.64				
	$s_{\bar{x}}$		0.46				
Bosmina sp.	1	-	-	-	-	-	-
	2	-	-	-	-	-	-
	$\bar{x}$						
	s						
	$s_{\bar{x}}$						
Harpacticoid copepods	1	-	3.09	-	-	-	-
	2	-	-	-	-	-	-
Cyclopoid copepods	1	-	-	-	-	-	-
	2	-	1.33	-	-	-	-

TABLE 12 (Cont.)

James River Zooplankton; November 18, 1975

Organism		Station					
		HPW 2	HPW 1	DISCHARGE	CBE	CBC	J.I.
Copepod nauplii	1	38.20	46.76	27.20	25.44	93.21	94.39
	2	70.14	51.55	44.28	61.96	148.22	75.63
	$\bar{x}$	54.17	49.16	35.74	43.70	120.72	85.01
	s	22.58	3.39	12.08	25.82	38.90	13.27
	$s_{\bar{x}}$	15.97	2.40	8.54	18.26	27.51	9.38
Rotifers	1	383.59	315.66	13.60	65.72	360.95	363.74
	2	491.00	299.01	59.91	153.43	509.30	249.57
	$\bar{x}$	437.30	307.34	36.76	109.58	435.13	306.66
	s	75.95	11.77	32.75	62.02	104.90	80.73
	$s_{\bar{x}}$	53.71	8.32	23.16	43.86	74.18	57.09
Polychaete larvae	1	6.37	8.35	36.92	-	1.98	-
	2	2.42	5.88	54.70	5.90	-	1.89
	$\bar{x}$	4.40	7.12	45.81			
	s	2.79	1.75	12.57			
	$s_{\bar{x}}$	1.97	1.24	8.89			
Eurytemora sp.	1	-	-	-	-	-	-
	2	-	-	7.81	-	2.39	-
	$\bar{x}$						
	s						
	$s_{\bar{x}}$						
Acartia sp.	1	-	1.67	7.77	-	5.95	-
	2	-	-	7.81	-	2.39	-
	$\bar{x}$			7.79		4.17	
	s			0.03		2.52	
	$s_{\bar{x}}$			0.02		1.78	
Bosmina sp.	1	-	-	-	-	-	9.21
	2	-	-	-	-	-	3.78
	$\bar{x}$						6.50
	s						3.84
	$s_{\bar{x}}$						2.72
Harpacticoid copepods	1	-	-	1.94	-	-	-
	2	-	-	-	-	-	-
Cyclopoid copepods	1	-	-	-	-	-	-
	2	-	-	-	-	-	-

TABLE 12(Cont.)

James River Zooplankton; November 18, 1975

Organism		Station					
		DWS	INTAKE	HPE 1	HPE 2	HPS	HPN
Gastropod larvae	1	-	-	-	-	-	-
	2	-	-	1.75	2.52	-	-
Decapods	1	-	-	-	-	-	1.90
	2	-	-	-	-	-	-
Barnacle nauplii	1	-	-	-	-	-	-
	2	-	-	-	-	-	-

Organism		Station					
		HPW 2	HPW 1	DISCHARGE	CBE	CBC	J.I.
Gastropod larvae	1	-	-	-	-	-	-
	2	-	-	-	-	-	-
Decapods	1	-	-	-	-	-	-
	2	-	-	-	-	-	-
Barnacle nauplii	1	-	-	1.94	-	-	-
	2	-	-	-	-	-	-

TABLE 13

James River Zooplankton; December 29, 1975

Organism		Station					
		DWS	INTAKE	HPE 1	HPE 2	HPS	HPN
Copepod nauplii	1	27.87	24.72	23.86	13.46	15.55	19.76
	2	17.32	17.83	14.45	7.51	16.62	20.82
	$\bar{x}$	22.60	21.28	19.16	10.49	16.09	20.29
	s	7.46	4.87	6.65	4.21	0.76	0.75
	$s_{\bar{x}}$	5.28	3.45	4.71	2.97	0.54	0.53
Rotifers	1	953.47	226.39	117.00	74.63	132.86	186.49
	2	968.73	196.15	169.02	317.07	299.22	379.71
	$\bar{x}$	961.10	211.27	143.01	195.85	216.04	283.10
	s	10.79	21.38	36.78	171.43	117.63	136.63
	$s_{\bar{x}}$	7.63	15.12	26.01	121.22	83.18	96.61
Eurytemora sp.	1	2.93	9.11	1.41	1.22	7.07	2.47
	2	6.66	4.86	2.89	1.50	7.67	7.35
	$\bar{x}$	4.80	6.99	2.15	1.36	7.37	4.91
	s	2.64	3.01	1.05	0.20	0.42	3.45
	$s_{\bar{x}}$	1.86	2.13	0.74	0.14	0.30	2.44
Polychaete larvae	1	149.62	287.54	171.98	256.93	190.81	90.16
	2	185.22	260.99	260.04	643.16	204.60	53.89
	$\bar{x}$	167.42	274.27	216.01	450.05	197.71	72.03
	s	25.17	18.77	62.27	273.11	9.75	25.65
	$s_{\bar{x}}$	17.80	13.28	44.03	193.11	6.90	18.14
Harpacticoid copepods	1	2.93	-	-	-	2.83	1.24
	2	-	3.24	1.44	-	3.84	-
	$\bar{x}$					3.34	
	s					0.71	
	$s_{\bar{x}}$					0.51	
Acartia sp.	1	-	-	-	-	-	-
	2	-	-	-	-	-	-
	$\bar{x}$						
	s						
	$s_{\bar{x}}$						
Cyclopoid copepods	1	-	-	-	1.22	-	-
	2	1.33	1.62	-	-	-	-
	$\bar{x}$						
	s						
	$s_{\bar{x}}$						

TABLE 13 (Cont.)

James River Zooplankton; December 29, 1975

Organism		Station					
		HPW 2	HPW 1	DISCHARGE	CBE	CBC	J.I.
Copepod nauplii	1	28.99	17.17	17.54	13.67	40.81	6.82
	2	3.04	10.36	24.68	13.70	59.60	18.19
	$\bar{x}$	16.02	13.77	21.11	13.69	50.21	12.51
	s	18.35	4.82	5.05	0.02	13.29	8.04
	$s_{\bar{x}}$	12.97	3.81	3.57	0.01	9.39	5.69
Rotifers	1	101.47	201.11	72.22	316.07	51.01	20.47
	2	42.50	133.33	151.02	252.81	22.70	38.98
	$\bar{x}$	71.99	167.22	111.62	284.44	36.86	29.73
	s	41.70	47.93	55.72	44.73	20.02	13.09
	$s_{\bar{x}}$	29.49	33.89	39.40	31.63	14.15	9.25
Eurytemora sp.	1	10.87	7.36	3.10	6.83	10.20	23.88
	2	6.07	1.29	0.99	1.24	2.84	12.99
	$\bar{x}$	8.47	4.33	2.05	4.04	6.52	18.44
	s	3.39	4.29	1.49	3.95	5.20	7.70
	$s_{\bar{x}}$	2.40	3.04	1.05	2.80	3.68	5.45
Polychaete larvae	1	61.61	77.26	169.21	73.46	10.20	3.41
	2	85.01	169.58	174.71	44.83	-	7.80
	$\bar{x}$	73.31	123.42	171.96	59.15		5.61
	s	16.55	65.28	3.89	20.24		3.10
	$s_{\bar{x}}$	11.70	46.16	2.75	14.31		2.19
Harpacticoid copepods	1	28.99	2.45	2.06	5.12	3.40	6.82
	2	24.29	6.47	0.99	2.49	2.84	2.60
	$\bar{x}$	26.64	4.46	1.53	3.81	3.12	4.71
	s	3.32	2.84	0.76	1.86	0.40	2.98
	$s_{\bar{x}}$	2.35	2.01	0.54	1.32	0.28	2.11
Acartia sp.	1	-	-	-	-	6.80	3.41
	2	-	-	-	-	14.19	-
	$\bar{x}$					10.50	
	s					5.23	
	$s_{\bar{x}}$					3.70	
Cyclopoid copepods	1	-	-	-	-	-	3.41
	2	-	-	-	-	-	5.20
	$\bar{x}$						4.31
	s						1.27
	$s_{\bar{x}}$						0.89

TABLE (Cont.) 13

James River Zooplankton; December 29, 1975

Organism		Station					
		DWS	INTAKE	HPE 1	HPE 2	HPS	HPN
Bosmina sp.	1	-	-	-	-	-	2.47
	2	-	-	-	-	-	1.22
	$\bar{x}$						1.85
	s						0.88
	$s_{\bar{x}}$						0.63
Barnacle nauplii	1	-	-	-	-	1.41	-
	2	-	-	4.33	-	-	-
Gastropod larvae	1	-	-	-	-	-	-
	2	-	-	-	-	1.28	-
Pelecypod larvae	1	-	-	-	-	-	-
	2	-	-	-	-	-	-
Amphipods	1	-	-	-	-	-	-
	2	-	-	-	-	-	-

Organism		Station					
		HPW 2	HPW 1	DISCHARGE	CBE	CBC	J.L.
Bosmina sp.	1	-	1.23	-	-	-	-
	2	-	-	-	-	-	-
	$\bar{x}$						
	s						
	$s_{\bar{x}}$						
Barnacle nauplii	1	-	-	1.03	-	-	-
	2	-	-	-	-	-	-
Gastropod larvae	1	-	-	-	-	-	-
	2	-	-	-	-	-	-
Pelecypod larvae	1	-	-	-	-	-	6.82
	2	6.07	-	-	1.24	-	-
Amphipods	1	-	-	1.03	-	-	-
	2	-	-	-	-	-	-

TABLE 14

James River Benthos; July 9, 1975

Species, Number of Individuals and Total Wet Weight
(Without Clam Shell) in Grams per $0.1m^2$ at Each Station

Species	Station 1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	1
Mollusks																
Rangia cuneata	4	17	2	33	1	4	3	8	5	8	34		4	7	6	1
Congeria leucopaeta		1						2			1		1			
Macoma mitchelli														2		
Macoma balthica																
Corbicula manilensis	1		1	1		1			1			1				
Hydrobia sp.	44	21	19	234			24	1	6	4	2	2	15	30	2	1
Mya arenaria																
Brachidontes recurvus																
Annelids																
Polychaetes																
Scolecolepides viridis		2		1		1	1	1	1	1	3		4	2	1	
Nereis succinea	1		1										1		1	
Lysipiddes grayi																
Polydora ligni																
Laeonereis culveri																
Heteromastus filiformis																
Oligochaetes	3	15	4	4	1	2			4	3	3		1	3	1	

TABLE (Cont.) 14

James River Benthos; July 9, 1975

Species, Number of Individuals and Total Wet Weight (Without Clam Shell) in Grams per 0.1 m^2 at Each Station

Species	Station 1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
Amphipods																
Gammarus sp.																
Corophium lacustre								4	1							
Lepidactylus dytiscus			6				3		7			4				
Leptocheirus plumulosus		4		10		6		2		2		2	1	4	11	10
Monoculodes edwardsi																
Caprella sp.													1			1
Isopods																
Cyathura polita																
Edotea triloba																
Chiridotea almyra					1							1				
Dipteran larvae	2	2	2	1	1	2	1		3	5	2	1	1			
Nemerteans								1		2	1		1	2		
Hydroids				x	x	x	x	x		x	x		x	x	x	x
Nematodes						2										
Biomass (Grams)	2.4	3.7	2.2	5.8	0.2	1.3	2.0	0.5	0.9	0.2	5.9	0.2	2.7	1.0	0.2	0.7

TABLE 15

James River Benthos; August 7, 1975

Species, Number of Individuals and Total Wet Weight
(Without Clam Shell) in Grams per $0.1m^2$ at Each Station

Species	Station 1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
Mollusks																
Rangia cuneata	6	12	1	36	9	12	3	18	3		26	8	4	5	2	21
Congeria leucophaeta				4				30			3					1
Macoma mitchelli														2		
Macoma balthica																
Corbicula manilensis	1		1			2					2	8			1	1
Hydrobia sp.	10	3	12				1		5	1		3	9	29	1	14
Mya arenaria																
Brachidontes recurvus								2								
Annelids																
Polychaetes																
Scolecolepides viridis	1	1			5			6			1			7		1
Nereis succinea			1						2				12		1	1
Lysipiddes grayi																
Polydora ligni																
Laeonereis culveri																
Heteromastus filiformis																
Oligochaetes	2		3	3		6	1					5	3	3		1

TABLE (cont.) 15

James River Benthos; August 7, 1975

Species, Number of Individuals and Total Wet Weight (Without Clam Shell) in Grams per $0.1m^2$ at Each Station

Species	Station 1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
Amphipods																
Gammarus sp.											2					
Corophium lacustre	2							5								
Lepidactylus dytiscus							2		10			4				
Leptocheirus plumulosus		1				2							4		1	1
Monoculodes edwardsi																
Caprella sp.																1
Isopods																
Cyathura polita																
Edotea triloba																
Chiridotea almyra																
Dipteran larvae	1		3		1	3		3	1			7			1	
Nemerteans				1				1	1		1					
Hydroids					x	x			x	x	x		x	x	x	x
Balanus sp.																
Nematodes																
Biomass (Grams)	2.0	2.2	0.5	2.9	0.6	2.4	1.9	2.2	0.4	0.1	4.8	3.0	1.0	1.1	0.1	1.0

TABLE 16

James River Benthos; September 30, 1975

Species, Number of Individuals and Total Wet Weight (Without Clam Shell) in Grams per $0.1m^2$ at Each Station

Species	Station 1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
Mollusks																
Rangia cuneata	3	12	2	16	11	15	5	9	3		26		3	6	3	16
Congeria leucophaeta								1			16	1				
Macoma mitchelli																
Macoma balthica																
Corbicula manilensis	1		1						1			12				
Hydrobia sp.												1				
Mya arenaria																
Brachidontes recurvus											1					
Annelids																
Polychaetes																
Scolecolepides viridis		2			12			1							1	2
Nereis succinea			1									1	7		1	
Lysipiddes grayi								1								
Polydora ligni																
Laeonereis culveri																
Heteromastus filiformis																
Oligochaetes	1	1	7	6	4	5	2		1	3	2	8		3	2	

TABLE (Cont.) 16

James River Benthos; September 30, 1975

Species, Number of Individuals and Total Wet Weight
(Without Clam Shell) in Grams per $0.1m^2$ at Each Station

Species	Station 1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
Amphipods																
Gammarus sp.																
Corophium lacustre								1			3					
Lepidactylus dytiscus									1			4	1			
Leptocheirus plumulosus		5		6		5				1					1	
Monoculodes edwardsi																
Caprella sp.	1										1					
Isopods																
Cyathura polita																
Edotea triloba																
Chiridotea almyra																
Dipteran larvae									1	2		1		1	1	
Nemerteans									1							
Hydroids					x	x		x	x	x	x	x	x	x	x	
Balanus sp.											2					
Nematodes																
Biomass (Grams)	0.9	2.5	0.7	2.1	1.8	4.2	1.7	1.2	0.4	0.1	3.2	0.1	1.3	0.6	0.7	2.5

TABLE 17

Fouling Organisms
1975

Station DWS

Horizontal Plate	No. organisms/dm^2 Jul. - Aug.	Sep. - Oct.	Nov. - Dec.
Barnacles - *Balanus* sp.	109	423	
Bivalves - *Brachidontes recurvus*			
Congeria leucophaeta	21	177	
Amphipods - *Corophium lacustre*	642	491	1
Gammarus sp.	3		
Polychaetes - *Nereis succinea*	4	2	
Scolecolepides viridis			
Flatworms - *Stylochus elliptus*			
Crabs - *Rhithopanopeus horrisii*			
Ectoprocts - *Bowerbankia* sp.			
Bryozoans - *Membranipora tenuis*			
Hydroids	x		x
Dipteran Larvae			
Total No. of Genera (not including Hydroids and Dipteran Larvae)	5	4	1
Total No. of Organisms (not including Bryozoans or Hydroids)	779	1093	1

Table 17 (cont.)
Fouling Organisms 1975
Station DWS

Vertical Plate	No. organisms/dm^2 Jul. - Aug.	Sep. - Oct.	Nov. - Dec.
Barnacles - *Balanus* sp.	244	352	
Bivalves - *Brachidontes recurvus*			
Congeria leucophaeta	7	15	4
Amphipods - *Corophium lacustre*	601	148	5
Gammarus sp.		4	
Polychaetes - *Nereis succinea*	6		
Scolecolepides viridis			
Flatworms - *Stylochus ellipticus*			
Crabs - *Rhithopanopeus horrisii*			
Ectoprocts - *Bowerbankia* sp.			
Bryozoans - *Membranipora tenuis*			
Hydroids	x	x	x
Dipteran Larvae			
Total No. of Genera (not including Hydroids and Dipteran Larvae)	4	4	2
Total No. of Organisms (not including Bryozoans or Hydroids)	858	519	9

TABLE 18

Fouling Organisms
1975

Station CBN

Horizontal Plate	No. organisms/dm^2 Jul. - Aug.	Sep. - Oct.	Nov. - Dec.
Barnacles - *Balanus* sp.	510	711	
Bivalves - *Brachidontes recurvus*			
Congeria leucophaeta	8	6	2
Amphipods - *Corophium lacustre*	385	99	
Gammarus sp.	106	2	
Polychaetes - *Nereis succinea*			
Scolecolepides viridis			
Flatworms - *Stylochus ellipticus*			
Crabs - *Rhithopanopeus horrisii*			
Ectoprocts - *Bowerbankia* sp.			
Bryozoans - *Membranipora tenuis*			
Hydroids	x	x	
Dipteran Larvae	11		
Total No. of Genera (not including Hydroids and Dipteran Larvae)	4	4	1
Total No. of Organisms (not including Bryozoans or Hydroids)	1020	818	2

Table 18 (cont.)
Fouling Organisms 1975
Station CBN

Vertical Plate	No. organisms/dm^2 Jul. - Aug.	Sep. - Oct.	Nov. - Dec.
Barnacles - *Balanus* sp.	283	1173	
Bivalves - *Brachidontes recurvus*			
Congeria leucophaeta	33	20	1
Amphipods - *Corophium lacustre*	291	493	
Gammarus sp.	73		2
Polychaetes - *Nereis succinea*			
Scolecolepides viridis			
Flatworms - *Stylochus ellipticus*			
Crabs - *Rhithopanopeus horrisii*	2		
Ectoprocts - *Bowerbankia* sp.			
Bryozoans - *Membranipora tenuis*			
Hydroids	x	x	x
Dipteran Larvae	8	1	
Total No. of Genera (not including Hydroids and Dipteran Larvae)	5	3	2
Total No. of Organisms (not including Bryozoans or Hydroids)	690	1687	3

TABLE 19

Fouling Organisms
1975

Station CBS

Horizontal Plate	No. organisms/dm^2 Jul. - Aug.	Sep. - Oct.	Nov. - Dec.
Barnacles - *Balanus* sp.	12	1424	
Bivalves - *Brachidontes recurvus*			
Congeria leucophaeta	78	77	1
Amphipods - *Corophium lacustre*	569	602	6
Gammarus sp.	19		
Polychaetes - *Nereis succinea*			
Scolecolepides viridis			
Flatworms - *Stylochus ellipticus*			
Crabs - *Rhithopanopeus horrisii*			
Ectoprocts - *Bowerbankia* sp.			
Bryozoans - *Membranipora tenuis*			
Hydroids	x	x	x
Dipteran Larvae	1		2
Total No. of Genera (not including hydroids and dipteran larvae)	4	3	2
Total No. of Organisms (not including Bryozoans and Hydroids)	679	2103	9

Table 19 (cont.)
Fouling Organisms 1975
Station CBS

Vertical Plate	No. organisms/dm^2 Jul. - Aug.	Sep. - Oct.	Nov. - Dec.
Barnacles - *Balanus* sp.	37	955	
Bivalves - *Brachidontes recurvus* *Congeria leucophaeta*	48	50	
Amphipods - *Corophium lacustre* *Gammarus* sp.	416	875	7
Polychaetes - *Nereis succinea* *Scolecolepides viridis*			
Flatworms - *Stylochus ellipticus*			
Crabs - *Rhithopanopeus horrisii*		1	
Ectoprocts - *Bowerbankia* sp.			
Bryozoans - *Membranipora tenuis*			
Hydroids	x	x	x
Dipteran Larvae			
Total No. of Genera (not including Hydroids and Dipteran Larvae)	3	4	1
Total No. of Organisms (not including Bryozoans or Hydroids)	501	1881	7

TABLE 20

Phytoplankton Entrainment Data; April 7-8, 1975

Date (1975)	Tide	Time (EDT)	Station	Depth (m)	Temp. (°C)	Sal. (‰)	D.O. (mg/l)	Chl a (µg/l)		Total Cells per ml	
4-7	HWS	1135	Intake	0	8.70	4.06	9.89	3.0	2.4	400	250
				4	8.70	4.51	10.15	2.6	2.5	500	400
				8	8.55	4.65	10.09	2.8	2.8	450	450
4-7		1235	Discharge	0	16.80	4.32	9.89	3.1	3.3	500	500
				1	16.70	4.32	9.43	3.5	3.0	250	600
				2	16.70	4.32	9.83	3.2	3.1	450	450
4-7	LWS	1759	Intake	0	10.20	3.45	10.41	2.5	2.2	600	400
				3.75	9.90	3.62	10.09	3.0	2.9	450	550
				7.5	9.80	3.82	10.31	2.6	2.7	500	400
4-7		1900	Discharge	0	18.40	3.75	9.93	2.5	2.5	450	550
				1	18.20	3.72	9.97	2.2	2.1	300	450
				2	18.00	3.71	10.03	2.1	2.3	250	400
4-7	HWS	2308	Intake	0	9.20	4.35	10.25	2.0	2.5	400	550
				4	9.30	4.53	10.41	2.7	2.9	550	450
				8	9.20	4.58	10.45	3.5	2.8	650	700
4-8		0009	Discharge	0	17.40	4.48	10.03	2.5	2.8	500	300
				1	17.10	4.47	10.09	2.6	2.4	400	600
				2	17.10	4.45	10.13	2.8	2.8	250	450
4-8	LWS	0620	Intake	0	8.60	4.53	10.43	3.9	3.2	800	
				4	8.95	5.06	10.03	3.3	3.7	550	
				8	8.80	5.09	10.33	3.6	3.2	500	600
4-8		0721	Discharge	0	17.20	4.52	9.81	2.2	2.4		
				1	17.10	4.51	10.11	3.5	2.5		
				2	17.10	4.48	9.89	2.5	2.7		

TABLE 21

Phytoplankton Entrainment Data; May 8-9, 1975

Date (1975)	Tide	Time (EDT)	Station	Depth (m)	Temp. (°C)	Sal. (o/oo)	D.O. (mg/l)	Chl a (µg/l)		Total Cells per ml
5-8	HWS	1124	Intake	0	19.00	.910	8.15	3.8	3.5	
				4.25	19.60	.924	8.03	3.5	3.5	(1600 1350)
				8.5	18.40	1.07	8.27	3.5	3.5	
5-8		1222	Discharge	0	23.60	.818	8.33	3.5	3.8	
				1.5	23.60	.812	8.17	3.3	3.5	(1700 1550)
				3	23.60	.812	7.97	4.0	4.1	
5-8	LWS	1830	Intake	0	21.65	1.10	8.48	4.9	4.8	
				4.25	21.45	1.09	8.60	5.7	4.9	(1900 2200)
				8.5	20.80	.981	8.78	4.3	4.8	
5-8		1931	Discharge	0	25.20	.684	8.21	4.7	5.9	
				1.5	25.20	.684	8.35	5.0	4.0	(2350 2050)
				3	25.20	.662	8.17	5.4	5.2	
5-9	HWS	0010	Intake	0	19.45	1.28	8.21	5.0	4.4	
				4.25	19.40	1.20	8.56	4.7	3.6	(1950 1900)
				8.5	19.20	1.31	8.46	3.8	4.8	
5-9		0110	Discharge	0	24.20	1.04	8.29	3.8	4.4	
				1.5	24.00	1.02	8.13	3.4	4.2	(2000 1900)
				3	23.80	1.01	8.01	4.4	4.7	
5-9	LWS	0705	Intake	0	18.15	.737	8.07	4.5	3.5	
				4.25	18.20	.745	-	4.2	3.8	(2000 1900)
				8.5	18.25	.762	7.65	4.0	4.6	
5-9		0807	Discharge	0	23.40	.734	8.01	3.2	4.5	
				1.25	23.30	.751	7.71	4.6	4.5	(1750 1900)
				2.5	23.20	.745	7.91	4.2	5.1	

TABLE 22

Phytoplankton Entrainment Data; June 2-3, 1975

Date (1975)	Tide	Time (EDT)	Station	Depth (m)	Temp (C)	Sal. ‰	D.O. (mg/l	Chl a (µg/l)		Total Cells per ml	
6-2	LWS	1456	Intake	0	28.70	.792	10.18	4.8	6.1		
				4	27.40	.621	8.33	7.6	7.0	(4000	3700)
				8.25	27.30	.591	7.88	3.8	4.3		
6-2		1556	Discharge	0	32.50	.693	8.41	4.8	7.2		
				1.25	32.40	.704	8.43	4.2	6.4	(2400	2550)
				2.5	32.40	.709	8.39	3.8	4.6		
6-2	HWS	1949	Intake	0	26.40	.599	8.43	4.3	4.7		
				4.25	26.25	.629	7.82	4.6	4.1	(1450	1100)
				8.5	26.20	.629	7.96	4.6	4.8		
6-2		2047	Discharge	0	32.50	.624	8.27	5.0	3.8		
				1.25	32.40	.621	7.84	4.9	4.6	(1100	900)
				2.5	32.15	.621	7.86	5.4	4.7		
6-3	LWS	0310	Intake	0	24.80	.657	7.88	4.8	4.8		
				4	24.55	.643	7.66	4.0	4.3	(800	1200)
				8	24.00	.748	8.43	5.2	5.3		
6-3		0412	Discharge	0	30.90	.679	7.74	4.4	4.1		
				1.25	30.80	.657	8.11	4.4	3.8	(650	600)
				2.5	30.40	.657	7.80	4.4	4.4		
6-3	HWS	2013	Intake	0	24.85	.874	7.86	4.3	3.5		
				4.25	24.90	.941	8.04	3.5	2.7	(1800	1600)
				8.5	24.90	.961	7.44	3.4	4.0		
6-3		2114	Discharge	0	30.70	.876	7.74	2.5	2.5		
				1.25	30.65	.876	7.50	3.0	3.8	(1150	900)
				2.5	30.65	.882	7.34	4.4	3.1		

TABLE 23

Phytoplankton Entrainment Data; July 15-16, 1975

Date (1975)	Tide	Time (EDT)	Station	Depth (m)	Temp (C)	Sal. ‰	D.O. (mg/l)	Chl a (µg/l)		Total Cells per ml	
7-15	LWS	1322	Intake	0	28.15	2.56	7.22	8.3	6.2		
				4.5	28.00	2.52	7.18	8.0	7.6	(2150	1800)
				8.75	27.90	2.52	7.34	7.1	8.1		
7-15		1423	Discharge	0	35.40	2.58	6.87	4.8	4.7		
				1.1	35.20	2.59	7.02	4.4	5.1	(500	500)
				2.25	35.35	2.59	7.22	5.6	5.1		
7-15	HWS	1900	Intake	0	26.80	1.96	7.28	3.0	3.0		
				4.5	26.70	1.96	6.97	4.8	3.3	(1500	1550)
				9.0	26.75	2.17	7.18	4.5	5.5		
7-15		2000	Discharge	0	34.40	2.12	7.18	2.4	2.8		
				1.5	34.20	2.13	6.89	4.0	4.4	(550	600)
				3.0	34.15	2.15	6.67	5.7	4.0		
7-16	LWS	0155	Intake	0	27.20	1.58	6.44	2.9	3.8		
				4.25	27.05	1.74	6.89	4.0	3.8	(850	1250)
				8.5	26.80	1.97	6.49	2.3	5.0		
7-16		0255	Discharge	0	34.40	1.95	6.81	2.5	3.8		
				1.25	34.30	1.96	6.59	1.9	2.5	(450	500)
				2.5	34.05	2.00	6.61	3.2	3.0		
7-16	HWS	0703	Intake	0	26.95	1.69	6.81	2.8	2.8		
				4.25	26.85	1.74	6.30	2.8	3.0	(1200	1350)
				8.5	26.80	1.76	6.65	4.0	2.7		
7-16		0803	Discharge	0	34.30	1.66	6.30	2.1	2.7		
				1.25	34.20	1.65	7.14	2.7	2.3	(500	500)
				2.5	34.10	1.65	6.40	3.8	2.7		

TABLE 24

Phytoplankton Entrainment Data; August 18-19, 1975

Date (1975)	Tide	Time (EDT)	Station	Depth (m)	Temp (C)	Sal. (‰)	D.O. (mg/l)	Chl a (µg/l)		Total Cells per ml	
8-18	HWS	1109	Intake	0	29.55	5.69	8.30	11.6	5.4		
				4.1	29.40	5.81	7.42	10.1	9.8	(5600	5850)
				8.25	29.40	5.84	7.34	13.4	9.2		
8-18		1209	Discharge	0	37.70	5.70	6.69	5.1	5.7		
				1.25	37.70	5.70	6.59	5.6	7.4	(2200	2100)
				2.5	37.70	5.69	7.02	6.2	8.9		
8-18	LWS	1753	Intake	0	30.75	5.16	8.54	8.7	12.6		
				4.6	30.80	5.15	8.30	9.7	8.5	(5000	5400)
				9.1	30.80	5.15	8.10	12.0	23.1		
8-18		1853	Discharge	0	39.10	4.94	7.24	6.0	6.5		
				1.25	38.80	4.94	7.86	7.6	5.1	(1600	1550)
				2.5	38.60	4.93	7.20	12.7	14.8		
8-19	HWS	0011	Intake	0	29.95	5.35	7.54	10.8	10.6		
				4.6	29.85	5.45	7.54	12.9	9.9	(4550	4600)
				9.1	29.70	5.62	7.30	8.3	8.0		
8-19		0112	Discharge	0	37.65	5.51	6.93	5.1	4.4		
				1.25	37.65	5.51	7.10	3.7	3.7	(1450	950)
				2.5	37.40	5.50	6.75	5.2	5.2		
8-19	LWS	0649	Intake	0	29.35	5.15	6.49	11.2	11.1		
				4.6	29.15	5.16	6.95	11.3	8.3	(6950	7300)
				9.1	28.30	5.64	6.15	6.5	9.4		
8-19		0749	Discharge	0	37.20	5.04	6.63	4.6	4.6		
				1.25	37.20	5.04	6.63	4.9	6.5	(2800	2950)
				2.5	37.00	5.03	6.41	4.0	4.0		

TABLE 25

Phytoplankton Entrainment Data; September 17-18, 1975

Date (1975)	Tide	Time (EDT)	Station	Depth (m)	Temp. (C)	Sal. (‰)	D.O. (mg/l)	Chl a (µg/l)		Total Cells per ml
9-17	HWS	1135	Intake	0	22.15	4.32	-	4.4	3.8	
				4.75	22.00	4.46	7.53	4.3	3.5	
				9.75	21.90	4.47	8.14	4.6	5.3	
9-17		1236	Discharge	0	29.50	4.30	7.74	3.7	3.1	
				1.25	29.50	4.30	7.78	3.2	4.2	
				2.5	29.50	4.28	7.37	4.7	4.8	
9-17	LWS	1833	Intake	0	23.30	3.85	8.18	3.7	4.2	
				4.75	22.90	3.82	8.12	4.7	4.4	
				9.5	22.90	3.90	8.54	4.8	4.6	
9-17		1933	Discharge	0	31.60	3.64	7.76	2.0	2.2	
				1.25	31.25	3.62	7.68	2.1	3.2	
				2.5	31.10	3.61	9.09	2.8	2.4	
9-18	HWS	0018	Intake	0	22.3	4.36	7.58	2.9	2.4	
				4.75	22.3	4.44	7.98	2.7	2.9	
				9.5	22.2	4.42	7.70	3.5	3.4	
9-18		0118	Discharge	0	30.5	4.38	7.19	1.6	2.4	
				1.25	30.5	4.37	8.58	2.7	2.2	
				2.5	30.1	4.37	7.51	2.7	3.0	
9-18	LWS	0656	Intake	0	22.0	4.39	7.98	3.7	3.4	
				4.75	22.0	4.39	7.70	3.5	3.3	
				9.5	22.0	4.38	7.98	3.6	2.8	
9-18		0756	Discharge	0	29.9	4.16	7.25	2.3	2.2	
				1.5	29.9	4.17	7.62	2.3	2.3	
				3.0	29.6	4.15	7.41	2.4	2.7	

TABLE 26

Phytoplankton Entrainment Data; October 16-17, 1975

Date (1975)	Tide	Time (EDT)	Station	Depth (m)	Temp. (C)	Sal. (‰)	D.O. (mg/l)	Chl a (µg/l)		Total cells per ml
10-16	HWS	1106	Intake	0	20.55	2.49	8.18	5.4	4.4	
				4.5	20.55	2.54	7.38	4.9	3.7	
				8.75	20.55	2.54	7.54	4.9	4.3	
10-16		1210	Discharge	0	26.20	2.30	7.86	3.9	3.3	
				1.25	26.20	2.30	7.44	3.7	3.8	
				2.5	26.35	2.30	7.94	4.3	3.9	
10-16	LWS	1728	Intake	0	21.20	1.96	7.84	3.1	3.2	
				4.25	21.40	1.86	7.44	2.7	3.7	
				8.5	21.15	1.83	8.10	2.6	3.8	
10-16		1821	Discharge	0	27.70	2.00	7.74	3.1	2.1	
				1.25	27.60	2.01	7.38	3.2	2.8	
				2.5	27.60	2.02	7.34	2.7	2.8	
10-16	HWS	2313	Intake	0	20.55	1.97	8.52	3.1	2.8	
				4.5	20.55	2.06	7.92	2.7	2.2	
				9.0	20.50	2.09	7.94	2.2	2.5	
10-17		0013	Discharge	0	26.70	2.29	8.09	2.6	2.2	
				1.25	26.40	2.29	7.98	2.9	2.8	
				2.5	26.20	2.32	7.34	3.1	2.7	
10-17	LWS	0620	Intake	0	20.00	1.90	7.58	2.4	1.9	
				4.5	19.85	2.10	8.18	2.6	3.0	
				9.0	19.75	2.13	7.56	3.0	3.9	
10-17		0720	Discharge	0	26.10	1.99	7.46	2.6	2.2	
				1.25	25.80	1.98	7.10	2.4	2.8	
				2.5	25.65	1.98	6.85	2.9	2.7	

TABLE 27

Phytoplankton Entrainment Data; November 19-20, 1975

Date (1975)	Tide	Time (EST)	Station	Depth (m)	Temp. (C)	Sal. (‰)	D.O. (mg/l)	Chl a (µg/l)		Total Cells per ml
11-19	HWS	1300	Intake	0	14.20	2.98	9.01	1.6	2.0	
				4.75	13.90	3.33	9.36	2.0	1.8	
				9.5	14.00	3.36	9.82	2.4	2.0	
11-19		1400	Discharge	0	19.45	3.10	8.85	1.5	1.3	
				1.25	19.45	3.10	8.71	1.6	1.6	
				2.5	19.40	3.08	8.79	1.8	1.9	
11-19	LWS	1949	Intake	0	13.60	3.10	9.27	1.3	1.4	
				4.5	13.60	3.12	8.71	1.3	1.2	
				9.0	13.60	3.13	9.13	1.2	1.3	
11-19		2048	Discharge	0	19.80	2.91	8.99	1.0	1.1	
				1.25	19.60	2.91	9.03	1.1	1.2	
				2.5	19.35	2.90	8.91	1.1	1.3	
11-20	HWS	0007	Intake	0	13.60	3.26	8.77	-	1.1	
				4.75	13.45	3.25	9.05	1.1	1.4	
				9.5	13.40	3.27	9.03	1.5	1.4	
11-20		0104	Discharge	0	19.40	3.11	8.79	1.1	1.4	
				1.25	19.00	3.12	9.05	1.0	1.1	
				2.5	18.60	3.16	9.25	1.4	1.3	
11-20	LWS	0739	Intake	0	12.85	2.98	9.01	1.9	1.6	
				4.5	12.85	3.00	8.93	1.8	2.0	
				9.0	12.80	3.00	8.59	1.9	1.9	
11-20		0840	Discharge	0	18.95	2.84	8.97	1.4	1.3	
				1.0	18.80	2.84	8.43	1.5	1.0	
				2.0	18.70	2.84	8.63	1.3	1.4	

TABLE 28

Phytoplankton Entrainment Data; December 17-18, 1975

Date (1975)	Tide	Time (EST)	Station	Depth (m)	Temp. (C)	Sal. (‰)	D.O. (mg/l)	Chl a (µg/l)		Total Cells per ml
12-17	HWS	1156	Intake	0	10.00	4.81	10.56	1.9	2.0	
				4.5	10.05	4.77	10.20	2.0	2.1	
				9.0	10.10	4.97	10.02	2.0	2.5	
12-17		1258	Discharge	0	16.90	4.55	10.04	1.4	2.1	
				1.0	16.80	4.53	10.00	1.8	2.1	
				2.0	16.60	4.53	10.18	1.8	1.6	
12-17	LWS	1846	Intake	0	9.70	4.20	10.04	1.2	1.5	
				4.5	9.70	4.22	10.10	1.1	1.4	
				9.0	9.65	4.20	10.08	1.2	1.4	
12-17		1946	Discharge	0	17.65	4.09	10.12	1.3	1.4	
				1.0	17.35	4.10	9.90	1.2	0.9	
				2.0	17.05	4.10	10.10	1.4	1.0	
12-17	HWS	2308	Intake	0	9.60	4.72	10.93	1.2	1.3	
				4.5	9.55	4.79	10.42	1.5	1.1	
				9.0	9.60	4.98	11.57	1.6	1.6	
12-18		0007	Discharge	0	17.80	4.70	10.28	1.4	1.3	
				1.0	17.60	4.68	10.28	1.3	1.3	
				2.0	17.10	4.68	10.14	1.4	1.1	
12-18	LWS	0647	Intake	0	9.30	4.39	10.36	3.2	1.9	
				4.5	9.25	4.40	11.01	2.5	1.8	
				9.0	9.10	4.35	10.50	2.3	1.9	
12-18		0747	Discharge	0	17.40	4.12	10.44	1.4	1.7	
				1.0	17.15	4.13	10.85	1.3	1.6	
				2.0	17.10	4.11	10.83	1.3	1.3	

TABLE 29

Phytoplankton Entrainment Data; January 15-16, 1976

Date 1975	Tide	Time EDT	Station	Depth (m)	Temp. (°C)	Sal. 0/00	D.O. (mg/l)	Chl a (µg/l)		Total Cells per ml
1-15	HWS	1135	Intake	0	5.20	1.74	11.58	2.7	2.7	
				4.5	5.15	1.79	11.29	2.1	2.7	
				8.75	5.25	1.82	11.27	2.2	2.1	
1-15		1235	Discharge	0	13.00	1.81	11.15	2.7	2.7	
				1	12.80	1.81	11.23	2.7	2.6	
				2	12.80	1.80	10.99	2.4	2.7	
1-15	LWS	1819	Intake	0	6.40	.91	11.42	4.0	3.9	
				4	6.25	.94	11.48	3.6	2.7	
				8.25	6.20	.98	11.13	4.4	5.3	
1-15		1919	Discharge	0	15.25	.90	11.03	2.6	3.3	
				1	15.10	.88	11.11	2.7	3.4	
				2	14.90	.89	11.38	3.0	2.6	
1-15	HWS	2305	Intake	0	5.40	1.10	11.50	3.3	3.1	
				4.5	5.00	1.37	11.78	3.6	3.8	
				8.75	5.25	1.46	11.70	4.4	4.0	
1-16		0000	Discharge	0	13.50	1.33	11.23	4.1	4.2	
				1	13.40	1.32	11.17	4.2	3.8	
				2	13.20	1.31	11.38	3.8	4.2	
1-16	LWS	0621	Intake	0	4.00	1.31	12.39	5.9	5.0	
				4.25	4.95	1.55	11.36	6.5	5.2	
				8.5	5.00	1.55	11.42	5.9	5.7	
1-16		0728	Discharge	0	13.15	1.46	11.01	5.9	4.6	
				1	13.00	1.45	11.78	4.7	6.0	
				2	12.90	1.45	11.78	6.5	6.4	

TABLE 30

Vertical Phytoplankton Distribution Data; April 17, 1975

Station	Time (EDT)	Depth (m)	Temp (°C)	Sal. (o/oo)	D.O. (mg/l)	Secchi Depth (cm)	Chl a (µg/l)		Total Cells per ml	
DWS	1046	0	11.10	2.85	9.7	50	1.5	1.6	300	300
		1	11.20	2.89	9.8		1.9	1.9	300	400
		2	11.40	2.98	10.0		1.6	1.7	400	250
Intake	1123	0	11.95	2.23	9.8	30	2.4	2.3	300	400
		4	12.00	2.32	9.7		2.6	2.7	300	450
		8	12.10	2.46	9.9		2.8	2.6	550	350
HPE 1	1154	0	12.15	1.06	9.9	25	2.2	2.4	150	200
		2.5	12.15	1.07	9.9		2.2	2.3	150	200
		5	12.35	1.09	10.0		2.4	2.7	100	250
HPE 2	1253	0	11.85	.86	10.0	25	2.0	2.0	250	150
		2	11.70	.90	9.9		1.9	2.1	200	250
		4	11.90	.92	9.8		2.1	2.0	150	150
HPS	1321	0	13.35	1.11	9.8	28	2.0	1.6	150	350
		2.5	13.00	1.10	10.0		3.2	2.8	150	250
		5	13.05	1.10	9.9		3.0	2.3	100	150
HPN	1349	0	11.95	.61	9.9	26	1.6	1.8	200	250
		1	11.85	.61	10.0		1.6	2.6	250	250
		2	11.50	.65	9.9		1.9	1.9	150	350
HPW 2	1418	0	12.60	.49	10.0	25	2.2	2.1	150	200
		1.75	12.40	.50	9.8		1.8	2.4	200	150
		3.5	12.20	.50	9.7		2.7	3.0	300	150
HPW 1	1445	0	15.40	1.40	10.1	33	1.8	2.0	250	300
		.5	15.25	1.40	9.7		1.7	2.3	150	200
		1	15.30	1.41	9.7		2.0	2.2	150	250
Discharge	1525	0	21.40	2.72	9.8	32	2.3	2.2	250	300
		1.25	21.40	2.72	9.8		2.3	2.4	400	250
		2.5	21.40	2.71	9.7		2.2	2.3	450	300

TABLE (cont.) 30

Vertical Phytoplankton Distribution Data; April 17, 1975

Station	Time (EDT)	Depth (m)	Temp. (°C)	Sal. (o/oo)	D.O. (mg/l)	Secchi Depth (cm)	Chl a (µg/l)		Total Cells per ml	
CBE	1550	0	13.90	.59	9.5	29	1.6	1.4	200	250
		.5	13.40	.55	9.9		1.5	2.0	500	150
		1	13.25	.53	9.7		1.6	1.4	200	200
CBC	1618	0	12.60	.48	9.8	29	2.2	2.3	200	250
		2	12.45	.47	9.8		3.0	2.7	200	100
		4	12.40	.46	10.0		5.6	4.4	150	300
JI	1649	0	11.85	.19	9.8	23	1.1	2.4	200	150
		4	11.70	.19	9.8		3.7	3.7	250	200
		8	11.70	.19	9.9		5.8	6.2	450	150

TABLE 31

Vertical Phytoplankton Distribution Data; July 17, 1975

Station	Time (EDT)	Depth (m)	Temp. (°C)	Sal. (o/oo)	D.O. (mg/l)	Secchi Depth (cm)	Chl a (µg/l)		Total Cells per ml	
DWS	0835	0	26.35	.56	7.07	51	2.8	5.0	2200	1600
		1	26.30	.57	6.95		3.5	5.1	1250	2100
		2	26.25	.80	6.97		2.4	2.5	600	450
Intake	0958	0	27.35	1.02	7.56	34	5.1	4.9	850	1000
		3.5	27.25	1.01	6.73		4.2	5.4	850	950
		7	27.15	.97	7.38		5.2	4.3	1000	1100
HPE 1	1123	0	27.35	.53	6.32	40	4.4	4.9	700	900
		2.5	27.45	.54	6.44		5.4	2.4	450	500
		5	27.60	.57	6.42		7.7	1.7	600	350
HPE 2	1237	0	26.95	.27	5.94	33	4.0	3.4	700	700
		1.75	27.00	.26	5.65		7.0	5.2	700	450
		3.5	27.15	.27	5.55		7.8	8.2	600	700
HPN	1318	0	28.00	.47	6.52	62	7.8	8.2	2450	3200
		.6	27.15	.46	6.12		8.3	9.2	2300	1950
		1.25	27.25	.44	6.22		4.9	6.5	3100	1800
HPS	1358	0	30.15	.63	7.11	37	4.2	2.4	1150	1000
		2	30.00	.61	6.85		2.8	4.8	1250	1350
		4	30.00	.60	6.65		3.6	4.2	1400	1550
HPW 2	1422	0	26.60	.10	5.82	38	7.3	7.8	1100	850
		1.5	26.75	.10	4.72		6.1	7.7	1150	700
		3	27.20	.10	5.00		11.2	14.9	850	800
HPW 1	1508	0	31.00	.72	6.32	48	3.3	3.8	1050	1100
		.5	31.05	.73	6.71		5.6	3.7	1100	1400
		1	30.95	.72	6.81		3.2	3.2	950	1150

TABLE (cont.) 31

Vertical Phytoplankton Distribution Data; July 17, 1975

Station	Time (EDT)	Depth (m)	Temp. (°C)	Sal. (o/oo)	D.O. (mg/l)	Secchi Depth (cm)	Chl a (µg/l)		Total Cells per ml	
Discharge	1552	0	36.40	1.03	6.39	35	3.4	3.9	650	1000
		1	36.20	1.06	6.41		4.0	3.8	650	550
		2	36.45	1.05	7.01		4.1	4.3	650	500
CBE	1624	0	30.15	.56	6.86	48	10.4	10.4	17150	13650
		.5	29.85	.56	8.46		8.1	7.7	12100	8600
		1	29.60	.54	8.34		7.6	4.2	11450	7100
CBC	1703	0	26.60	.10	5.48	50	3.8	7.6	850	800
		1.5	26.55	.10	5.50		4.0	5.6	850	650
		3	26.45	.10	4.60		5.4	5.0	550	550
JI	1735	0	26.50	.09	5.21	54	4.6	2.6	650	750
		4	26.40	.08	5.47		4.4	4.6	1000	1000
		8	26.20	.08	4.96		8.1	9.6	900	500

TABLE 32

Vertical Phytoplankton Distribution Data; November 3, 1975

Station	Time (EST)	Depth (m)	Temp. (°C)	Sal. o/oo	D.O. mg/l	Secchi Depth (cm)	Chl a (μg/l)		Total Cells per ml	
DWS	0820	0	15.60	1.18	7.87	37	0.6	1.6	1100	750
		1.25	15.80	1.69	7.87		1.1	1.0	650	550
		2.5	15.90	2.04	7.97		1.0	1.3	350	450
Intake	0921	0	16.10	1.90	8.34	31	2.6	2.7	900	650
		4.5	15.95	2.07	8.07		3.0	2.8	1000	900
		9.0	15.75	2.22	8.42		2.5	3.0	650	700
HPE 1	1011	0	16.15	1.88	8.01	31	2.1	4.4	700	500
		2	16.15	1.90	7.93		4.9	5.4	300	900
		4	16.25	1.92	8.07		4.9	7.1	600	450
HPE 2	1101	0	16.25	2.61	8.21	39	2.7	2.0	400	550
		2.5	16.15	2.61	8.13		6.4	4.7	700	300
		5	16.30	2.61	8.27		6.6	7.5	600	550
HPS	1153	0	16.80	1.93	8.36	36	1.4	1.6	1250	1200
		2.5	16.50	1.93	8.19		2.1	2.3	1300	700
		5	16.65	1.90	8.13		1.9	1.4	1000	800
HPN	1230	0	16.35	.56	8.36	58	2.5	2.8		
		.75	16.15	.55	8.34		2.7	2.9		
		1.5	16.00	.56	8.56		3.9	4.0		
HPW 2	1400	0	16.45	1.17	8.19	37	2.9	1.9		
		1.5	16.40	1.18	8.27		2.4	2.6		
		3	16.55	1.19	8.60		2.4	2.6		
HPW 1	1437	0	19.80	1.42	8.56	53	1.1	1.2		
		.5	18.45	1.21	8.48		1.0	1.3		
		1	18.50	1.25	8.76		2.7	1.1		
Discharge	1540	0	22.45	2.58	7.97	37	3.0	2.3		
		1	22.45	2.61	8.27		2.1	2.7		
		2	22.50	2.64	8.54		3.0	2.2		
CBE	1617	0	15.60	.28	8.78	57	1.4	1.9		
		1	15.60	.31	8.56		1.2	1.8		
		2	15.80	.32	8.97		2.3	1.4		
CBC	1657	0	16.20	.36	8.40	36	2.6	2.5		
		1.5	16.20	.36	8.17		2.7	3.8		
		3	16.25	.36	8.27		4.3	4.3		
JI	1743	0	15.70	.16	8.36	36	2.4	3.0		
		3.75	15.70	.16	8.36		2.9	4.7		
		7.5	15.65	.17	8.46		6.3	10.8		

TABLE 33

Diel Phytoplankton Data, HPW 2; May 5-6, 1975

Date 1975	Tide	Time EDT	Depth m	Temp. °C	Sal. 0/00	D.O. mg/l	Secchi Depth cm	Chl a µg/l	Total Cells per ml
5-5	ebb	1249	0	17.55	.474	8.45	32	2.4	4.3
			1.5	17.60	.474	8.33		5.1	2.5
			3	17.60	.480	8.43		4.8	3.7
5-5	ebb	1549	0	17.20	.101	8.17	38	3.3	2.0
			1.5	17.25	.101	8.03		1.9	1.8
			3	17.35	.104	8.03		3.0	3.0
5-5	flood	1830	0	18.85	.690	8.45	32	2.7	3.8
			1.75	18.75	.665	8.33		2.3	3.1
			3.5	18.80	.629	8.23		5.6	6.8
5-5	flood	2145	0	17.40	.632	8.43	-	2.1	2.4
			1.75	17.35	.627	8.53		2.5	2.5
			3.5	17.30	.635	8.45		1.9	2.3
5-6	ebb	0032	0	17.25	.464	8.35	-	3.0	3.2
			1.75	17.20	.469	8.41		3.1	4.0
			3.5	17.10	.477	8.37		2.3	3.5
5-6	ebb	0353	0	17.00	.118	8.03	-	3.9	3.6
			1.75	16.90	.116	7.84		3.8	5.6
			3.5	16.80	.116	8.01		5.7	3.8
5-6	LWS	0635	0	17.00	.108	7.94	37	1.9	3.7
			1.75	16.90	.106	8.07		2.9	2.2
			3.5	16.75	.106	7.88		2.6	1.8
5-6	flood	0933	0	18.35	.657	8.25	34	2.8	1.9
			1.75	17.95	.640	8.43		3.6	2.5
			3.5	17.95	.649	8.23		4.0	2.4

TABLE 34

Diel Phytoplankton Data, CBC; July 22-23, 1975

Date 1975	Tide	Time EDT	Depth m	Temp. °C	Sal. 0/00	D.O. mg/l	Secchi Depth cm	Chl a µg/l		Total Cells per ml
7-22	flood	1245	0	30.35	.152	6.40	38	10.0	6.7	
			1.25	28.60	.157	5.96		4.2	3.0	
			2.5	28.80	.197	5.96		5.1	5.1	
7-22	ebb	1545	0	29.75	.152	7.29	41	9.0	15.5	
			1.25	28.95	.140	6.30		2.3	4.0	
			2.5	28.75	.130	6.30		3.2	3.9	
7-22	ebb	1849	0	28.80	.097	6.32	44	8.4	7.9	
			1.25	28.40	.089	5.84		4.5	4.3	
			2.5	28.25	.087	5.61		4.0	4.0	
7-22	flood	2150	0	30.80	.160	6.42	-	5.3	4.2	
			1.25	29.75	.128	6.24		6.2	4.6	
			2.5	28.60	.099	6.12		3.6	3.4	
7-23	flood	0047	0	28.40	.157	5.88	-	3.8	4.7	
			1.25	28.35	.150	5.92		3.3	4.6	
			2.5	28.25	.150	5.80		6.1	4.3	
7-23	HWS	0345	0	29.90	.175	6.00	-	3.7	4.4	
			1.25	28.60	.157	5.88		4.5	3.4	
			2.5	28.20	.155	5.82		3.9	2.5	
7-23	ebb	0645	0	28.55	.123	6.22	32	5.2	7.1	
			1.25	28.50	.108	6.10		4.7	3.8	
			2.5	28.40	.113	6.26		5.7	5.5	
7-23	flood	0943	0	28.40	.089	6.52	48	4.1	5.9	
			1.25	28.00	.099	5.77		5.2	5.4	
			2.5	28.15	.089	5.84		4.7	6.4	

TABLE 35

Diel Phytoplankton Data,CBC; October 22-23, 1975

Date 1975	Tide	Time EDT	Depth m	Temp. °C	Sal. 0/00	D.O mg/l	Secchi depth cm	Chl a µg/l		Total Cells per ml
10-22	flood	1220	0	18.40	.066	7.90	33	3.5	3.3	
			1.5	18.30	.068	7.72		3.2	3.2	
			3	18.45	.085	7.72		5.7	4.2	
10-22	flood	1519	0	19.30	.160	8.08	34	4.0	3.8	
			1.5	18.80	.140	8.10		2.8	2.6	
			3	19.15	.142	7.86		2.6	2.1	
10-22	ebb	1818	0	19.35	.140	7.82	41	3.7	2.4	
			1.5	19.00	.140	7.92		2.7	2.4	
			3	18.90	.135	8.22		3.3	4.8	
10-22	ebb	2135	0	18.80	.068	7.22	-	3.1	3.5	
			1.5	18.75	.068	7.50		2.9	3.1	
			3	18.75	.089	7.54		3.9	3.2	
10-23	flood	0029	0	20.40	.318	7.52	-	1.9	1.9	
			1.5	19.00	.106	7.72		3.8	3.0	
			3	18.75	.075	7.26		2.0	1.9	
10-23	flood	0314	0	19.10	.227	7.80	-	1.9	2.4	
			1.5	19.00	.227	7.88		1.9	1.9	
			3	19.00	.227	8.12		1.5	1.6	
10-23	ebb	0616	0	18.45	.080	7.26	-	1.9	1.6	
			1.5	18.40	.082	7.60		2.1	1.9	
			3	18.55	.101	7.12		4.1	2.9	
10-23	ebb	0920	0	18.50	.073	7.16	44	2.4	2.2	
			1.5	18.50	.073	6.72		2.7	2.7	
			3	18.60	.073	7.00		2.8	2.2	

4.0 RADIOLOGICAL ENVIRONMENTAL MONITORING PROGRAM

The Surry Station of the Virginia Electric and Power Company is located on a peninsula in the James River, 25 miles upstream of the junction of the river with the Chesapeake Bay. The site is on the west bank of the river in Surry County, Virginia. Two (2) pressurized water reactors are located at the site with a design output of 824.3 MWe (gross) per unit. Cooling water for the condensers is taken in downstream of the site and discharged 5.7 miles upstream of the intake. The flow of the river at the site is complex, influenced by the amount of fresh water run-off, the back-and-forth flow of the tide, upstream flow of more saline water near the bottom, and downstream flow of less saline water near the top.

During plant operation, low levels of radioactivity are released with the cooling water to the James River and with ventilation air to the atmosphere. These releases are limited to the "lowest practicable level" and are measured to assure compliance with NRC Regulations and the Surry Power Station Technical Specifications. The environmental monitoring program provides confirmatory surveillance.

The low levels of radionuclides released to the air and water from Surry Station contribute to the radiation background through both external and internal exposure. The primary modes of external exposure include immersion in a cloud of radioactive gaseous effluent, submersion in water containing radioactive effluent, and exposure from contaminated land surface. The primary modes of internal deposition include inhalation of air and ingestion of milk, fish, and shellfish. Dose via the

ingestion pathway is limited by the following site related considerations. The vicinity represents a very limited milk shed. During the year, milk was analyzed by gamma spectrometry with a conservative detection limit of 10 pCi/ℓ. In order to completely document this potential path, the 1975 program includes radiochemical analyses of milk samples for I-131 content with a sensitivity of 0.25 pCi/ℓ. The saline river is unusable for drinking purposes. Fish and shellfish consumption could become an important pathway in the future when sewage pollution (from cities upstream) is reduced.

The following shows the manner in which the elements of the Surry Surveillance Program fit together to monitor any radiological impact as a result of operations:

TABLE I
Relationship of Sampling and Measurements to Elements of the Radiation Dose Paths

Radiation Dose Path	Sample and Measurements (Supportive Data)
Air Immersion	Thermoluminescent Dosimetry (Air Sampling)
Inhalation	Air Sampling (Precipitation, Crop, Soil, and Milk Sampling)
Land Surface	Thermoluminescent Dosimetry, Crop and Soil Sampling (Air and Milk Sampling)
Ingestion	
Fish and Shellfish	Fish, Oysters, Clam and Crab Sampling (Water and Silt Sampling)
Water	Well, Surface Water, and Precipitation Sampling (River Water and Silt Sampling)
Milk	Milk Sampling (Air, Water, Soil and Crop Sampling)
Water Submersion	Water Sampling (Silt Sampling)

This report contains data resulting form a radioassy of various samples obtained from the environs of the station. Figure 1 indicates the land based sampling stations while Figure 2 indicates James River stations.

Data obtained by Eberline Instrument Corporation (EIC), a consulting service, is presented for the first and second quarters of this year.

The 1975 program when compared to that presented in the Technical Specifications is redundant in order to maintain the sampling and analytical requirements.

TABLE II

Monitoring or Sampling Locations and Frequencies

	Air Particulate	Ambient Radiation	Precipitation	Milk	Well Water	Surface Water	Soil
Surry Station	BW	Q	M		SA		A
Hog Island Res.	BW	Q			SA		
Bacon's Castle	BW	Q			SA		A
Chippokes Creek						SA	
Alliance	BW	Q					A
Colonial Parkway	BW	Q		M			A
Williamsburg						SA	
Jamestown		Q			SA		
Dow	BW	Q					A
Fort Eustis	BW	Q					A
Newport News	BW	Q	M			SA	
Scotland		Q					
Leehall		Q		M			
Routes 10-676		Q					
Smithfield		Q		M		SA	

TABLE III
ENVIRONMENTAL MEASUREMENT
AND
SAMPLE ANALYSIS PROGRAM

Type Sample	Frequency	Analysis
Air Particulate	Bi-weekly (VEPCo) Monthly (VEPCo) Bi-weekly (EIC) Quarterly (EIC)	Gross Beta (1) Gross Alpha Gross Beta Gamma Isotopic (2)
James River Water (Salt Water)	Bi-monthly (VEPCo) Bi-monthly (EIC) Semi-annual (EIC)	Tritium Gamma Isotopic (3) Tritium (4)
Well Water	Semi-annual (VEPCo) Semi-annual (EIC)	Gross Alpha, Gross Beta and Tritium Gross Alpha, Gross Beta and Tritium
Surface Water (Fresh Water)	Semi-annual (VEPCo) Semi-annual (EIC)	Gross Alpha, Gross Beta and Tritium Gross Alpha, Gross Beta and Tritium
Precipitation	Monthly (VEPCo) Quarterly (EIC)	Gross Beta and Tritium Gross Beta(5) and Tritium*
TLD	Quarterly (EIC)	mRem
Crops	Annually (EIC)	Gamma Isotopic and Sr-90
Fowl	Semi-annual (EIC)	Gamma Isotopic (6)
Fish (Catfish & White Perch or Eel)	Semi-annual (EIC)	Gamma Isotopic
Oyster & Clam	Bi-monthly (EIC)	Gamma Isotopic (6)
Crab	Summer months (EIC)	Gamma Isotopic
Silt	Semi-annual (EIC)	Gamma Isotopic
Soil	Annually (EIC)	Gamma Isotopic
Milk	Monthly (EIC)	Sr-89,90, Calcium, Gamma Isotopic (7), I-131 (8)

*Enriched Tritium

	Crops	Fowl (Coot)	James River Water	Silt	Oyster	Clams	Fish	Crab
Bacon's Castle	A(3)							
Hog Island Res.		SA						
Jamestown						BM		
Newport News			BM	SA	BM			
Chickahominy			BM	SA		BM		
Station Discharge			BM	SA		BM		
Hog Island Pt.			BM	SA		BM		
Station Intake			BM	SA			SA	SM
Lawnes Creek						BM		
Deep Water Shoals					BM			
Point of Shoals				SA	BM			

BW-Bi-weekly M-Monthly

BM-Bi-monthly Q-Quarterly

SA-Semi-annually A-Annually

A(3)-Annually corn, peanuts, and soybeans

SM-Summer Months (two samplings: July - September)

NOTES TO TABLE III

1. Gamma isotopic analysis if gross beta exceeds 10 pCi/M^3.

2. Quarterly composites of bi-weekly air particulate samples will be analyzed for gamma emitters in three groups as follows:

   Stations 1 & 2 analyzed as one sample
   Stations 3,5,6,9, & 10 analyzed as one sample
   Station 11 analyzed as one sample

   Strontium-90 determined radiochemically if significant amounts of fission products attributable to the Station are detected by the gamma isotopic analysis.

3. Gamma isotopic analysis performed on bi-monthly samples from Stations 1 & 10.

4. Tritium analysis to be performed using the electrolytic enrichment technique on semi-annual composites of bi-monthly samples from Station 1 & 10.

5. Perform gamma isotopic analysis if gross beta exceeds 15 nCi/M^2.

6. Entire sample analyzed for gamma emitters. Sr-90 to be determined if a significant amount of fission products attributable to the Station are noted in the gamma analysis.

7. Milk analyzed by gamma spectrometry with lithium drifted germanium detector. Quantitative values for Cs-137 are reported if concentrations exceeds 10 pCi/l.

8. Radiochemical analysis for iodine-131 in milk with a sensitivity of 0.25 pCi/l (± 10% counting error or ± 25% overall error at 0.5 pCi/l) at time of collection.

SUMMARY

Air Particulate Samples

Gross beta concentrations in air particulate samples continued to decrease from the expected spring maximum which was 1.6 E-01 picocuries per cubic meter during April, 1975. During the second half of 1975, chronological averages of the individual stations ranged from 1.6 E-02 to 5.3 E-02 picocuries per cubic meter. Early in the fourth quarter a rash of mechanical problems became apparent and by November extensive maintenance included replacement of air sampling pumps at suspect locations as well as changing various components to reduce apparent leaks in the sampling trains. The latter appears to have been the greatest single problem since levels were artificially low and many below analytical sensitivity. Visible inspection of the filters showed notably reduced dust loading and, in some cases, no dust zone was discernible.

Gross beta concentrations that were measurable showed relatively low levels in comparison to previous surveillance. Average concentrations at each location during the second half of 1975 indicated 2.9 E-02 picocuries per cubic meter with a range of from 1.3 E-02 to 4.9 E-02 picocuries per cubic meter.

Gamma spectrometry of composited filters yielded low level, but measurable, concentrations of fission and activation products. They are summaried by quarter below:

Third Quarter, 1975

Bacon's Castle, Alliance, Colonial Pkwy., Dow, & Fort Eustis	Mn-54	1.2 ± 0.5 fCi/M^3
	Ce-144	7.9 ± 5.3
Newport News	Ru-103	3.5 ± 2.8

Fourth Quarter, 1975		
Surry Station & Hog Island Reserve	Mn-54	2.3 ± 1.8 fCi/M^3
	Co-58	8.2 ∓ 2.7
	Co-60	5.2 ∓ 2.3
	Cs-137	2.0 ± 1.8
Bacon's Castle, Alliance Colonial Pkwy., Dow, & Fort Eustis	Co-58	1.5 ± 0.7
Newport News	Cs-137	4.6 ± 2.8

The fourth quarter cesium-137 concentrations at Newport News and at Surry-Hog Island are not distinct from levels attributable to world wide fallout. Cerium-144 in the five station composite from the third quarter is likely to be from more recent fallout since measurable levels were experienced during the first half of 1975. The ruthenium-103 in the third quarter composite from Newport News is not attributed to Surry Station since it is a single indication at the sampler most remote to the power plant.

The activation products that could be attributed to Surry effluent include the manganese-54, and cobalt's-58 and 60. Selecting the highest concentration of each of the three and comparison to Column 1 of Table II of Appendix B of 10 CFR 20 (Non-restricted areas)

Isotope	Concentration	Fraction of Table II of Appendix B
Mn-54	2.3 ± 1.8 fCi/M^3	2.3 E-06
Co-58	8.2 ∓ 2.7	4.1 E-06
Co-60	5.2 ∓ 2.3	1.7 E-05

Ambient Thermoluminescent Dosimetry

Presentation of the significance of environmental dosimetry measurements was altered beginning in 1975. Improvement of the dosimetry service through a new annealing procedure that reduced post-annealing delay and, also through more rigorous pre-

selection, improved the quality of the data. Even through care is taken in control dosimeter storage at Surry Station, a slightly elevated ambient dose rate has usually resulted in measurably lower dose rates at several field locations. This was not true during the Fourth Quarter of 1975. For these reasons, the recent method of comparison has included use of the lowest field locations as the "control" dosimeter with all other stations compared to this level. For all of 1975, the "control" locations and the associated dose rates have been

First Quarter	Second Quarter
1.2 mrem/wk at Bacons Castle Rts 10-676 (Control was 2.2 mrem/wk)	0.7 mrem/wk at Colonial Pkwy. Rts 10-676, Dow (Control was 1.1 mrem/wk)
Third Quarter	**Fourth Quarter**
0.5 mrem/wk at Bacon's Castle Alliance (Control was 0.7 mrem/wk)	0.6 mrem/wk at Alliance (Control was 0.4 mrem/wk)

An overall comparison, on that basis, is given in Table IV.

* The highest dose rate was apparently at Surry Station during the fourth quarter with 5.7 mrem/wk indicated. The dosimeter station is on site and does not constitute exposure to off-site populace. Due to the proximity to the plants, the dose could be due to direct gamma shine. The closest in off site location is on Hog Island Reserve. In comparison to the lowest ambient measurements, this station indicated approximately 15.6 mrem/yr with an average two sigma error term of 53 percent. Compared to its own lowest net dose as a control, Hog Island Reserve indicates an elevation of 5.8 mrem/yr.

7
17
16
14
6
9
15
1
10
5
4
3
15
11
COSHAM BAY
HAMPTON ROADS
YORK RIVER
JAMES RIVER
NEWPORT

FIGURE 1

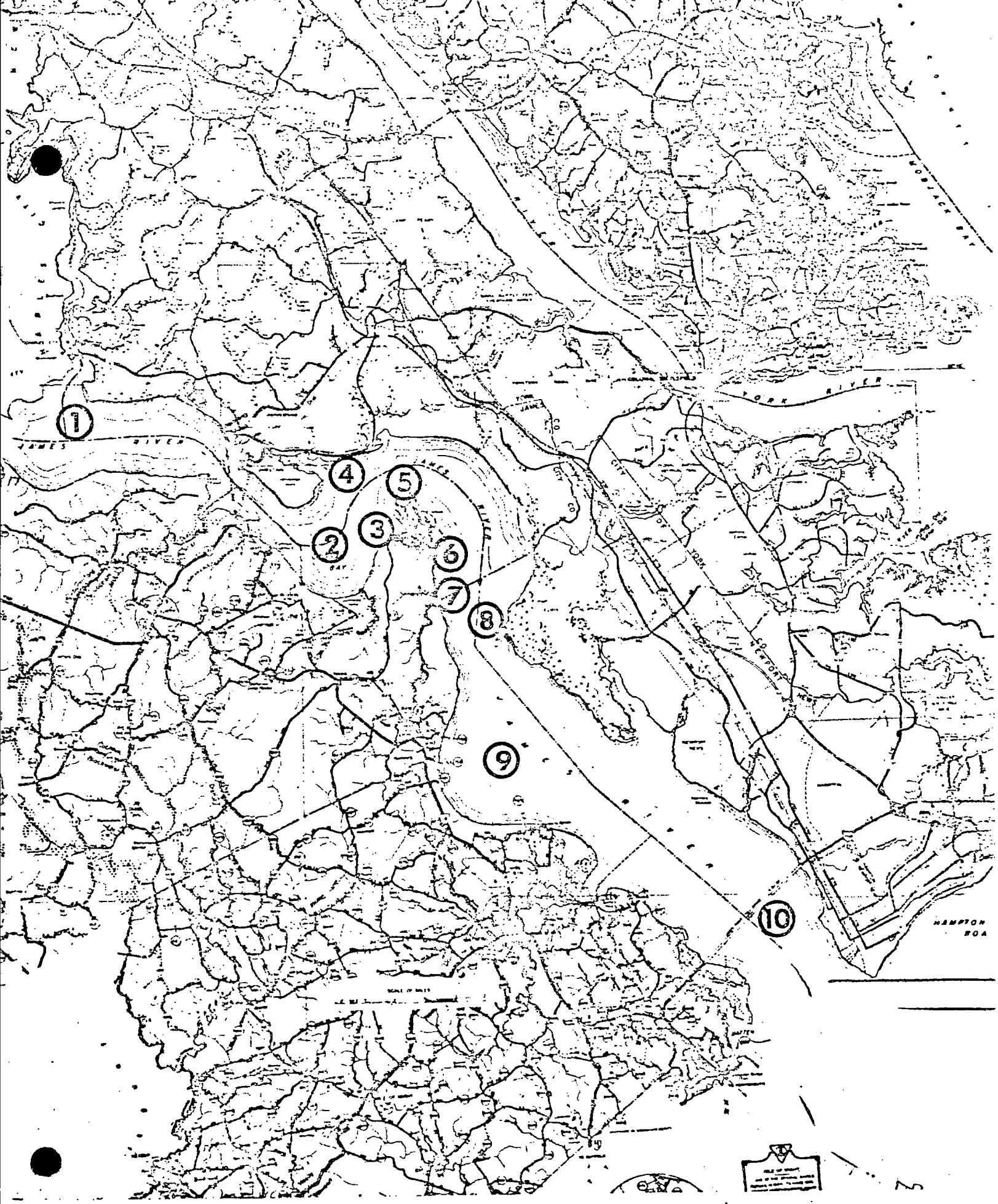

FIGURE 2

TABLE IV
NET AMBIENT DOSE RATES USING
LOWEST FIELD STATION FOR CONTROL
FOR THE FOUR QUARTERS OF 1975
(mrem/wk)

Station	First Quarter	Second Quarter	Third Quarter	Fourth Quarter
Control	1.0 (± 27%)	0.4 (± 35%)	0.2 (± 20%)	Less than 0.2 (± 73%)
Surry Station	1.6 (± 19%)	0.3 (± 47%)	0.4 (± 22%)	5.1 (± 63%)
Hog Island Reserve	0.3 (± 64%)	0.2 (± 27%)	-	0.4 (± 67%)
Bacon's Castle	0.0 (± 150%)	.1	0	0.3 (± 63%)
Alliance	.1	0.1 (± 120%)	0	0
Colonial Pkwy.	.1	0.0 (± 120%)	0.5 (± 22%)	0.2 (± 79%)
Dow	.1	0.0 (± 80%)	0.1 (± 33%)	0.1 (± 85%)
Ft. Eustis	0.1 (± 49%)	0.2 (± 90%)	0.2 (± 20%)	0.3 (± 75%)
Newport News	0.3 (± 80%)	0.3 (± 60%)	0.2 (± 11%)	0.1 (± 86%)
Smithfield	0.4 (± 50%)	0.3 (± 17%)	0.3 (± 21%)	0.4 (± 95%)
Scotland Warf	0.4 (± 98%)	0.1 (± 30%)	0.2 (± 20%)	0.2 (± 103%)
Jamestown	0.2 (± 100%)	0.1 (± 20%)	0.1 (± 20%)	0.1 (± 95%)
Lee Hall	0.5 (± 37%)	0.4 (± 20%)	0.4 (± 17%)	0.5 (± 95%)
Routes 10-676	0	0	0.1 (± 11%)	0.1 (± 77%)

NOTE: Error terms represent 95 percent confidence and include propogation of both the noted standard deviation within a specific packet (5 chips) and that associated with the lowest field station used as the control.

The dosimeters located at Alliance and at the intersection of routes 10 and 676 indicated consistently low ambient dose rates. Highest noted ambient dose rates at off site locations, compared to the lowest ambient stations, were at Lee Hall and Smithfield. Due to the locations of the dosimetry stations, the relative higher and lower dose rates are related to the natural radiation background rather than any contribution, or lack of same, from Surry Station.

Precipitation Samples

Precipitation composite samples for the third quarter yielded the following:

	Newport News	Surry Station
Gross Beta	3.1 ± 0.1 nCi/M^2	2.8 ± 0.1 nCi/M^2
Tritium	53 ± 35	75 ± 50

Gross beta levels during the first half of 1975 averaged 5.7 nCi/M^2 at Newport News and 7.6 nCi/M^2 at Surry Station. Previous tritium data showed a single high value of 114 nCi/M^2 at Surry for the second quarter of 1974. Other values for tritium have ranged from less than detectable to 70 nCi/M^2. The 1974 averages were 43 nCi/M^2 and 70 nCi/M^2 at Newport News and Surry Station respectively.

Due to an error in sample identity, by Eberline, the fourth quarter precipitation composite was first identified as a James River water sample and gamma spectrometry was performed. The built in system of cross checks resulted in identification of the error however the entire sample had been evaporated to dryness by that time. The remainder of that sample at Surry had also been taken to dryness therefore the

tritium analysis could not be performed. Results of gamma spectrometry of the Surry Station sample showed the predominant activity was due to naturally occurring beryllium-7. For purposes of comparison to previous gross beta measurements, the following were observed in the Surry Station precipitation sample:

Co-58	0.65 ± 0.33 nCi/M^2
Co-60	0.31 ± 0.25
Cs-137	0.45 ± 0.37
Ce-144	2.1 ± 1.6
Approximate Total	3.5 nCi/M^2

This is roughly comparable to the previous beta measurements although it is important to note that counting efficiency and beta self absorption for gross beta determinations presumes cesium-137 beta energies. Further, naturally occurring potassium-40 is expected to contribute some beta activity however less than 5.1 nCi/M^2 was present relative to three standard deviations above the compton continuum (and background) for that sample. The sample from Newport News showed only cobalt-58 to be measurable with 0.22 ± 0.18 nCi/M^2.

Milk Samples

During the second half of 1975, 29 milk samples were collected from five locations with one double collection at Epps (10-1-75) and at Lee Hall (10-2-75) for quality control purposes. All samples were analyzed radiochemically for low levels of iodine-131 with no positive indications. Analytical sensitivity for this group was approximately 0.1 pCi/l at three

standard deviations with the worst radiochemical recovery yielding less than 0.28 pCi/1.

Radiochemical analyses for strontium showed several samples with strontium-89 activity:

Location	Date	Sr-89 (pCi/1)
Lee Hall	7-15-75	2.9 ± 2.0
Colonial Pkwy.	7-15-75	16 ± 2
Judkins	10-21-75	6.8 ± 2.3
Epps	11-18-75	4.9 ± 2.5
Judkins	11-18-75	5.4 ± 2.6

These indications of Sr-89 activity in 5 of 29 samples are somewhat unusual. During the first half of 1975 only one sample may have contained strontium-89; the 1-27-75 collection from Colonial Parkway indicated 2.3 ± 2.3 pCi/1. Due to the analytical method, it is possible for some strontium-90 activity to be calculated to be strontium-89 activity, especially with low levels such as in the Lee Hall collection on 7-15-75. The significances, in terms of dose committment, can be understood by examining the highest concentration in a single saple location.

If one presumes the Colonial Parkway level is as analyzed and that the activity is attributable to the Surry Station, an adult bone dose committment of 0.074 mrem is calculated. Presumptions include a 13 day effective half life demonstrated by the July 15th and August 12th data, consumption of 1 liter per day for the 28 days, and also the dose model given by the AEC in Draft Regulatory Guides for Implementation - ALAP LWR Effluent[1].

(1) Numerical Guides for Design Objectives and Limiting Conditions for Operation to Meet the Criteria "As Low as Practicable- - -" Docket No. RM-50-2 U.S. Atomic Energy Commission, February 20, 1974.

Strontium-90 concentrations averaged 5.6 pCi/l in milk samples collected during the second half of 1975. The range of concentrations was from 1.7 ± 1.7 to 12 ± 4 pCi/l. Of the three samples showing 10 pCi/l or more, non indicated strontium-89 activity. The latter strontium isotope would be expected to be more abundant in plant effluent. For historical comparison strontium-90 concentrations ranged from 1.6 to 20 pCi/l during the second half of 1974 and then from 1.6 to 15 pCi/l during the first half of 1975. Levels are typical and expected due to old weapons test fallout.

Gamma spectrometry of milk samples showed expected levels of naturally occurring potassium-40. Cesium-137 was measurable in seven of the 29 samples. The seven averaged 14 pCi/l with a range of from 10 ± 9 to 22 ± 15 pCi/l. The data are similar to those for previous periods and the cesium-137 is not believed to be plant related. The sample collected at Judkins on 12-9-75 may have contained ruthenium-103 with an indicated 14 ± 12 pCi/l. No other fission or activation products were observed through gamma spectrometry.

Well Water Samples

The semi-annual well water samples were collected on October 21 and 22, 1975. Gross alpha measurements showed no detectable activity (less than 1.8 pCi/l at three standard deviations) and gross beta activity was measurable in two of the four samples:

Jamestown	11 ± 6 pCi/l
Bacon's Castle	15 ± 6 pCi/l

The beta activity is believed to be natural to both sites since previous measurements have indicated beta activity would be present.

Gross beta (pCi/l)

	Jamestown	Bacon's Castle
1973 1st half	19 ± 6	5.9 ± 4.4
2nd half	-	8.6 ± 4.5
1974 1st half	-	11 ± 5
2nd half	-	17 ± 5
1975 1st half	5.6 ± 5.1	16 ± 5

Tritium levels remained within those expected due to natural production of the isotope. Concentrations for this period averaged 200 pCi/l with a range of from 170 ± 80 to 230 ± 90 pCi/l.

Surface Water Samples

Surface water samples showed no measurable alpha activity (less than 2.4 pCi/l) and two of the four had measurable gross beta concentrations. Chippokes Creek showed 21 ± 7 pCi/l and the Smithfield Reservoir had 7.0 ± 5.8 pCi/l of gross beta activity. Measurable gross beta activity is not unusual at Smithfield through previous sample analyses. The gross beta concentrations are typical in comparison to EPA determinations (1970) from samples from the Kerr Dam in Virginia which ranged from 2 to 31 pCi/l. Tritium levels were typical of naturally occurring levels in surface water.

James River Water

Relatively low levels of cesium-137 were observed in five of the samples collected during this period. Those five samples averaged 5.1 pCi/l and ranged from 3.9 ± 3.4 to 6.8 ± 4.0 pCi/l. Levels are presumed to be due to world wide distribution of old fall-out since other potentially significant isotopes were not observed.

A single sample from Newport News (9-30-75) may have contained cobalt-57 with an indicated 6.2 ± 4.8 pCi/l.

Enriched tritium analysis of composited samples from Chickahominy and Newport News showed expected naturally occurring levels of 210 ± 130 and 290 ± 120 pCi/l respectively.

Silt Samples

Gamma spectrometry of silt samples collected during September, 1975 showed primarily cobalt-60 and cesium-137.

	Co-60 (pCi/kg)	Cs-137 (pCi/kg)
Station Discharge	4.7 ± 1.4 E+02	1.1 ± 0.2 E+03
Hog Island Point	3.0 ± 1.2 E+02	5.3 ± 1.4 E+02
Point of Shoals	1.2 ± 0.8 E+02	7.2 ± 1.7 E+02
Newport News	1.6 ± 1.0 E+02	8.4 ± 2.0 E+02
Chickahominy	-	1.0 ± 0.2 E+03

The cesium-137 and cobalt-60 concentrations are notably lower than those of the first half of 1975 and correspond to averages noted during 1973 and 1974. Cobalt-58 was reportable in a Station Discharge sample (2.3 ± 1.3 E+02 pCi/kg) and also at Hog Island Point (1.6 ± 1.2 E+02 pCi/kg). The Station Dishcarge sample, collected on September 9, also showed the following radionuclides:

Cr-51	1.7 ± 1.4 E+03 pCi/kg
Mn-54	1.6 ± 1.2 E+02
Cs-134	3.6 ± 1.1 E+02

The Hog Island Point sample also showed antimony-125 with 3.6 ± 3.4 E+02 pCi/kg.

Oyster Samples

A summary of fission and activation products measured at the three sampling locations is given below:

Point of Shoals

7-28-75	Mn-54	1.3 ± 0.9 E+01 pCi/kg
9-17-75	Cs-137	3.8 ± 2.3 E+01
11-18-75	Co-58	2.8 ± 1.6 E+01
	Ag-110m	3.0 ± 2.6 E+01

Deep Water Shoals

7-28-75	Co-58	2.4 ± 1.5 E+01 pCi/kg
	Cs-137	1.7 ± 1.7 E+01

Newport News

9-29-75	Mn-54	1.8 ± 1.5 E+01 pCi/kg
	Cs-137	3.9 ± 2.0 E+01
11-17-75	Cr-51	2.3 ± 1.4 E+02
	Ru-103	1.8 ± 1.6 E+01

The concentrations of cobalt-58 and cesium-137 are comparable to previous sample data. Manganese-54 had previously been observed in a single sample collected from Point of Shoals on 5-18-75 with 1.7 ± 1.2 E+01 pCi/kg. The concentration in the Newport News sample during the current period is the first noted at that location. The cesium-137 concentrations above represent a continuation of those observed during the previous year. Since cesium-137 is not increasing, it is logical to presume that the observed levels are due to the world wide distribution of that isotope; not from Surry Station. Consumption of 9 kg/yr of oysters containing 18 pCi/kg of manganese-54, 28 pCi/kg of cobalt-58, 30 pCi/kg of silver-110m 230 pCi/kg of chrominium-51, and 18 pCi/kg of ruthenium-103, would result in an annual total dose committment of .03 mrem to the GI-LLI of an adult.

Clam Samples

Gamma spectrometry of clam samples showed a number of both fission and activation products. A summary of isotopes shows:

	Manganese-54	
Chickahominy	9-17-75	37 ± 16 pCi/kg
	Cobalt-58	
Jamestown Island	7-17-75	22 ± 18 pCi/kg
Hog Island Point	7-17-75	78 ± 20
Station Discharge	9-15-75	62 ± 20
Jamestown Island	9-15-75	41 ± 25
Hog Island Point	9-17-75	79 ± 30
Lawnes Creek	9-17-75	33 ± 23
Jamestown Island	11-17-75	36 ± 15
Hog Island Point	11-17-75	100 ± 20
Station Discharge	11-17-75	170 ± 40
Chickahominy	11-17-75	74 ± 30
	Cobalt-60	
Station Discharge	7-17-75	48 ± 16 pCi/kg
Jamestown Island	7-17-75	23 ± 14
Hog Island Point	7-17-75	85 ± 21
Station Discharge	9-15-75	42 ± 18
Jamestown Island	9-15-75	49 ± 24
Hog Island Point	9-17-75	72 ± 34
Chickahominy	9-17-75	32 ± 26
Station Discharge	11-17-75	100 ± 30
Hog Island Point	11-17-75	43 ± 21
	Ruthenium-103	
Lawnes Creek	11-18-75	12 ± 11 pCi/kg
	Iodine-131	
Jamestown Island	7-17-75	28 ± 17 pCi/kg
Station Discharge	9-15-75	340 ± 60
Jamestown Island	9-15-75	220 ± 80
Chickahominy	9-17-75	330 ± 80
	Cesium-134	
Station Discharge	9-15-75	34 ± 20 pCi/kg
Chickahominy	9-17-75	30 ± 24
Jamestown Island	11-17-75	21 ± 14
Station Discharge	11-17-75	30 ± 27

Cesium-137

Station Dishcarge	7-17-75	44 ± 16 pCi/kg
Jamestown Island	7-17-75	37 ± 19
Hog Island Point	7-17-75	31 ± 19
Lawnes Creek	7-28-75	28 ± 21
Station Discharge	9-15-75	65 ± 22
Jamestown Island	9-15-75	35 ± 34
Station Discharge	11-17-75	99 ± 29
Jamestown Island	11-17-75	19 ± 9
Lawnes Creek	11-18-75	19 ± 14
Chickahominy	11-17-75	37 ± 21

Barium-140

Station Discharge	9-15-75	15 ± 6 pCi/kg

Lanthanum-140

Station Dishcarge	9-15-75	95 ± 6 pCi/kg
Chickahominy	9-17-75	68 ± 49

Cerium-144

Station Discharge	7-17-75	160 ± 160 pCi/kg
	9-15-75	220 ± 160

In order to assess the significance of the above concentrations one can construct a "conservative clam" by utilizing the average (or single value) of isotopes found at the various collection locations in order to calculate the corresponding dose. Such a clam possess the following concentrations:

Conservative Clam

Mn-54	37 pCi/kg
Co-58	69
Co-60	55
I-131	230
Cs-134	29
Cs-137	41
Ba-140	220
La-140	120
Ce-144	190

One can tabulate a dose committment presuming the concentration above remained constant for one year and that an adult would consume 9 kg of oysters:

Isotope	Dose Committment (mrem) Body	GI-LLI	Thyroid	Bone
Mn-54	2.9 E-04	4.6 E-03	-	-
Co-58	1.0 E-03	9.4 E-03	-	-
Co-60	2.3 E-03	1.9 E-02	-	-
I-131*	1.7 E-03	7.9 E-04	9.6 E-01	2.0 E-03
Cs-134	2.6 E-02	6.7 E-04	-	1.4 E-02
Cs-137	2.1 E-02	7.6 E-04	-	2.3 E-02
Ba-140	2.6 E-03	7.9 E-02	-	4.0 E-02
La-140	3.6 E-07	1.0 E-01	-	2.7 E-06
Ce-144	3.4 E-05	2.9 E-01	-	5.6 E-04
Totals	5.5 E-02	5.0 E-01	9.6 E-01	7.9 E-02

*I-131 dose estimate based upon consumption of 2.25 kg since only detected in July and September samples.

Crab Samples

Two crab samples were collected during the second half of 1975 with only naturally occurring potassium-40 and expected concentrations of cesium-137. The latter appear typical to world wide distribution of that isotope.

Fish Sample

A fish sample was collected from near the Station Intake on 8-20-75. Natural potassium-40 was documented and the cesium-137 concentration showed no notable plant contribution.

Soil Samples

Six soil samples were collected on August 12th. Strontium-90 was detectable in two of those samples:

Location	Sr-90
Fort Eustis	3.4 ± 2.5 E+02 pCi/kg
Bacon's Castle	2.6 ± 2.4 E+02

Both results are not unusual for strontium-90 concentrations in soil due to old weapons tests. The closest in location,

at Surry Station, indicated less than 3.5 E+02 pCi/kg at 99.7% confidence.

Gamma spectrometry showed measurable levels of a number of naturally occurring and man-made radionuclides. The sample from Surry Station, as can be expected, showed the greatest variety:

Surry Station

Isotope	Concentrations (pCi/kg)
Mn-54	2.1 ± 1.6 E+02
Co-60	6.8 ± 2.6 E+02
Cs-134	1.4 ± 0.3 E+03
Cs-137	3.5 ± 0.4 E+03

For purposes of comparison, the 1974 soil samples showed no detectable manganese-54, cobalt-60, or cesium-134. Cesium-137 indicated less than 110 pCi/kg. There would appear to be a build-up at Surry Station however some variability can be expected due to the variation in specific sampling location.

Cesium-137 was detectable in all of the other five smaples. The average was 9.4 E+02 pCi/kg and the range was from 2.1 ± 1.7 E+02 to 1.6 ± 0.3 E+03 pCi/kg. While an apparent increase, these levels have been observed at other locations in the south-eastern United States and the apparent variation could be due to the variability in sampling locations. In addition, a single sample, from Colonial Parkway, indicated cobalt-58 with 120 ± 80 pCi/kg. Two locations, Fort Eustis and Dow, indicated cerium-144 at 1.7 ± 1.6 E+03 pCi/kg and 4.5 ± 2.0 E+03 pCi/kg respectively.

Crop Samples

Gamma spectrometry of crop samples collected during the second half of 1975 indicated no activity that could be attributed to Surry Plant operations. Cesium-137 was quantitated in a single peanut sample collected at Bacon's Castle on 10-22-75 with 84 ± 82 pCi/kg.

Strontium-90 was measurable in that peanut sample with 69 ± 31 pCi/kg and the soybean sample collected on 11-6-75 at Bacon's Castle yielded 130 ± 30 pCi/kg.

Fowl Sample

The coot normally collected on Hog Island Reserve was not available and a crane was collected as an alternate. Gamma spectrometry of the flesh showed no measurable radionuclide concentrations.

Conclusion

The environmental surveillance program, conducted by VEPCo at its Surry Power Station, continued to document both natural and plant related radionuclides during the second half of 1975.

Gross beta concentrations in air particulate samples remained relatively low with an average of 2.9 E-02 pCi/M^3 for the entire network. Gamma spectrometry of quarterly composites permitted documentation of extremely low concentrations of several fission and activation products. The single composite showing the greatest variety of these radionuclides was that from the fourth quarter for filters from both Surry Station and Hog Island Reserve with:

Mn-54	2.3 ± 1.8 fCi/M^3	Co-60	5.2 ± 2.3 fCi/M^3
Co-58	8.2 ± 2.7	Cs-137	2.0 ± 1.8

Environmental Dosimetry yielded measurements typical to previous data with the exception of the fourth quarter dosimeter at Surry Station. While not an off-site dose, the measurement yielded 5.1 mrem/wk and is believed to be due to direct gamma shine rather than noble gas immersion.

Precipitation samples were typical of previous data. Through temporary mistaken sample identity, tritium measurements could not be made during the fourth quarter. Concomitant to the mistaken identity, additional information was afforded through gamma spectrometry of the composites. Beta emitters identified in the Surry Station samples showed low levels of cobalts-58 and 60, cesium-137, and cerium-144.

Radiochemical analysis of milk samples showed no detectable iodine-131. Strontium-89 was measured in 5 of the 29 samples; an analysis of the highest concentration showed a bone dose committment of approximately 0.07 mrem. Strontium-90 concentrations were essentially the same as those of previous years with no indication of any plant contribution. Cesium-137 was measurable in seven of the 29 samples with those averaging 14 pCi/l. The cesium data are similar to those of previous years and are typical of the world wide distribution due to old fallout.

Well water, surface water, and James River water samples showed no activity that could be expected from a nuclear power plant. Five of the James River Water samples had measurable cesium-137 with those giving an average of 5.1 pCi/l.

Silt samples continued to exhibit levels of fission and activation products with primarily cesium-137 and cobalt-60. The average concentrations of the two were lower than those measured during the first half of 1975 and similar to measurements made during 1973 and 1974. The single sample from the Station Discharge area had low, but measurable additional quantities of chromium-51, manganese-54, cobalt-58, and cesium-134.

Oysters and clams contained the expected variety of fission and activation products. A conservative dose committment estimate was made in both cases. Specific radioisotopes in the oysters constituted a dose primarily to the GI-LLI with the resultant committment calculated to be 0.03 mrem based upon continuous consumption for one year. A similar analysis of clam sample concentrations yielded a GI-LLI committment of 0.5 mrem and a thyroid committment of 0.96 mrem. Bone and whole body dose committments were also calculated and were less than those above.

Soil samples showed some measurable plant contribution with Surry Station sample showing the greatest array of fission and activation products including manganese-54, cobalt-60, cesium-134, and cesium-137. The air particulate filters composited from Surry Station and Hog Island Reserve, during the fourth quarter, did not show cesium-134, but did show cobalt-58. The other three radionuclides were measured in air and soil.

The crops and fowl samples collected during this period did not indicate activity attributable to plant effluent.

ANALYTICAL PROCEDURES

Air Particulate

Gross alpha and gross beta radioactivity measurements are made utilizing a Beckman Widebeta II low background (anti-coincidence proportional) counter. The minimum detectable levels (99.7% confidence) are approximately 0.24 pCi per sample for alpha particles and 0.80 pCi per sample for beta particles.

Air particulate samples are mounted in two inch planchets and counted directly.

Gamma spectrum analysis utilizes a lithium-drifted germanium detector with a sensitive volume of 55 cm^3 and a thin aluminium window. The detector is housed in a graded lead shield with an internal volume of eight ft^3; six inches of lead are at the bottom with four inches of lead on all sides and on top. The analyzer system is a Nuclear Data 4420 and ND812 computer housing a 20K memory for acquisition, storage, and manipulation of spectra and computer programs. The overall system has a resolution of 2.2 kev for the 1170 kev peak of cobalt-60 with a peak to compton ratio of 32:1.

Air particulate composites are fitted into a Petri dish and analyzed directly.

Ambient Radiation

Thermoluminescent dosimeters of lithium flouride (TLD-100) are used to indicate ambient background radiation as well as noble gases such as xenon. The chips are pre-

selected by laboratory irradiation and measurement with criterion of ± 4%. At low dose levels subsequent response can vary with ± 6% typical and with a range of less than ± 10%. A standard annealing cycle is used with one hour at 400° C. Calibration of the overall system includes use of ionization chambers as directly received from calibration by the National Bureau of Standards. Each annealing batch includes a packet for quality control comparison. The dose reported is that received between annealing and reading unless otherwise directed.

Well Water and Surface Water

These water samples are treated identically as the precipitation samples. The major factor influencing the data is the fraction of the total sample analyzed.

Fowl

The single coot sample analyzed semi-annually is analyzed by high resolution gamma spectrometry on the Ge-Li system. Following separation of the flesh from feathers, bone and other organs, the sample is ground and dried. The minimum detectable activities are essentially equal to those of other dried organic materials.

Silt and Soil Samples

Soil and silt samples are analyzed in an identical manner. Samples are dried and seived through a number 11 U.S.A. Standard Testing Seive to remove pebbles and other foreign matter. The samples are tumbled to provide uniform mixing and aliquots of approximately 100g are analyzed by high resolution gamma spectrometry. Representative sensitivities for various isotopes are

Zr-95	0.1 pCi/g
Nb-95	0.1 pCi/g
Cs-137	0.1 pCi/g
Pb-214	1.0 pCi/g
Bi-214	1.0 pCi/g
Ra-226	9.0 pCi/g

James River Water

Water samples are analyzed by high resolution gamma spectrometry and also by an enrichment procedure for tritium. The gamma spectrometry is performed by slowly drying a one liter aliquot and counting the residue. The tritium aliquot is electrolytically enriched before liquid scintillation counting and has a sensitivity of 90 pCi/l. This sensitivity is more than adequate to document equilibrium concentration due to world-wide environmental inventories.

Aquatic and Marine Organisms

Oysters and clams are analyzed by high resolution gamma spectrometry following grinding and drying. Only the edible portion of the mollusks are analyzed. Fish entrails are removed and the remainder submitted to pressurized steam to allow segregration of bone and flesh. The resultant sample weights are on the order of 10-20 grams. Typical resultant sensitivities are:

Zr-95	0.8 pCi/g
Nb-95	0.8 pCi/g
Sb-125	1.1 pCi/g
Cs-137	0.4 pCi/g
Ce-144	5.0 pCi/g
Ra-226	10.0 pCi/g

Precipitation

An aliquot of the composite is counted directly for tritium activity via liquid scintillation. The minimum detectable activity is 1.0 pCi/ml. Gross beta analysis is performed by drying an aliquot, in a planchet. The dried planchet is counted directly in the Widebeta II with a minimum detectable activity of 0.58 pCi per planchet.

The fractions of the samples analyzed are then related to the total precipitation collected and the area of the sample collector with units reported as nCi/M^2.

Milk Samples

Milk samples are analyzed for gamma emitters by high resolution gamma spectrometry. Minimum detectable activities are identical to those for water samples. Samples are also analyzed for Sr-90 and calcium.

The strontium procedure includes separation by ion exchange with subsequent dried eluant counted on the Widebeta II system. An initial count with an additional count several days later, identifies the Y-90 in-growth. The sensitivity for Sr-90 is approximately 2 pCi/l. Stable calcium is measured by a standard titration with a sensitivity of 1 mg/L for dosimetric techniques.

Milk samples are analyzed for low concentrations of I-131 through radiochemical analysis; sensitivity is approximately 0.25 pCi/L. Iodide carrier is added to the raw milk and ion exchange is used for the first step of purification. Sodium hypochlorite leached solution is treated with nitric acid and hydroxylamine. An organic extraction is effected and AgI is precipitated. The precipitate is washed, dried, and the tared filter is counted on a low background proportional beta particle counter. Recovery is based upon iodide carrier recovery.

KEY INFORMATION FOR TABLES

1. Where data can range over several orders of magnitude, concentrations are expressed as powers of ten using E notation. For example E-03 is 10^{-3}.
2. Error terms are expressed as two standard deviations (95% confidence) for EIC data; zero values have three standard deviation error terms (99.7% confidence).
3. Where shown, averages are based upon measurable data, that is where two standard deviations are smaller than the calculated value. These averages should be used only as presented; averages among different sampling locations only present a basis for relative variability. The sequence in time is also an important factor.
4. The exact minimum detectable concentrations are variable dependent upon many factors such as complexity of a spectrum, quantity of the sample, etc. In order to maximize the value of the analysis, certain concentrations are reported as less than a given value. These data are reported through two methods.
    a. Frequently the analyses present information, such as a gamma spectrum peak, where the calculated error term at 95% confidence is larger than the calculated value. One can discern a very finite probability for the presence of that isotope. In these cases, the error term is increased to permit 99.7% confidence

and the result is divided by sample size to yield concentration.

b. One can expect certain isotopes to be present in a sample due to the nature of that sample. This is especially true when a member of a class of samples has definite data, but other members of the class do not exhibit the same information. Likewise, one can observe a small concentration of one member of a parent-daughter pair without observing the other member which is obviously present. In these cases (always represented by the lowest "less than" concentrations) the value reported is based upon three standard deviations (99.7% confidence) of the instrument background with a blank sample in the counting geometry.

EQUIPMENT

Gross alpha, gross beta, Sr-89 and Sr-90 measurements are made using a low background Beckman Widebeta II equipped with shielding and anti-coincidence electronic to obtain very low background counting rates. Automatic absorber measurements are also availabe.

Tritium enrichment analysis has a minimum detectable concentration of tritium in water on the order of 0.10 pCi/ml. Tritium is determined using a Beckman Model LS-200 liquid scintillation counter with 5 ml of water in Insta-Gel scintillator. The MDA for this system without enrichment is 0.6 pCi/ml based on a 100-minutes counting time, but the practical reporting level is 1 pCi/ml. When values below 1 pCi/ml are required, the sample is electrolytically enriched (HASL procedure) prior to liquid scintillation counting.

The gamma spectrometry system utilizes a high resolution detection with efficiency and resolution suitable for counting environmental samples. The analyzer system is a Nuclear Data 4420 with ND 812 Computer with 20 K memory for acquisition, storage, manipulation of spectra and programs. The Ge-Li detector is a right circular cylinder with a 40 mm diameter, drifted coaxially with an open end. The "P" core diameter is 6 mm and "N" layer thickness of 0.5 mm. An active area of 12.3 cm^2 faces the thin aluminum window which permits analysis of photon energies as low as 35 kev. The resolution is 2.2 kev for the 1170 kev peak of Co-60 and the peak-to-compton ratio is 32:1 for Co-60 gamma. The minimum detectable activities

(MDA), based upon typical samples for the type indicated are listed in Table IV. The reporting level is a function of spectrum complexity, detector resolution, and peak-to-compton ratio. One reason this particular system was selected for environmental samples was the excellent resolution and peak-to compton ratio. The detector resides in a graded shield with eight ft^3 interior and with four inches of lead on top and sides and six inches on the bottom.

TABLE IV

TYPICAL MINIMUM DETECTABLE CONCENTRATIONS
GE-LI GAMMA SPECTROMETRY

Air Samples	
Cs-134	1.6×10^{-2} pCi/M^3
Cs-137	1.6×10^{-2} pCi/M^3
Ba-140	5.2×10^{-2} pCi/M^3
La-140	3.2×10^{-2} pCi/M^3
Other Expected Gamma Emitters	1.2×10^{-2} to 1.2×10^{-1} pCi/M^3
Water Samples	
Cr-51	80 pCi/l
Co-58	8 pCi/l
Co-60	8 pCi/l
Mn-54	8 pCi/l
Cs-134	9 pCi/l
Cs-137	9 pCi/l
Ba-140	30 pCi/l
La-140	20 pCi/l
Other Expected Gamma Emitters	8 to 80 pCi/l
Soil and Bottom Sediments	
Cs-134	35 pCi/kg (dry)
Cs-137	35 pCi/kg (dry)
Cr-51	280 pCi/kg (dry)
Co-58	30 pCi/kg (dry)
Co-60	30 pCi/kg (dry)
Mn-54	30 pCi/kg (dry)
Other Expected Gamma Emitters	30 to 300 pCi/kg (dry)
Fish, Benthus, and Aquatic Vegetation	
I-131	13 pCi/kg (wet)
Cs-134	14 pCi/kg (wet)
Cs-137	13 pCi/kg (wet)
Cr-51	110 pCi/kg (wet)
Co-58	12 pCi/kg (wet)
Co-60	13 pCi/kg (wet)
Mn-54	12 pCi/kg (wet)
Other Expected Gamma Emitters	1 to 120 pCi/kg (wet)

SUMMARY OF SAMPLE DATA

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AIR PARTICULATE SAMPLES
GROSS BETA ANALYSIS
(picocuries per cubic meter)

Date Collected	Volume/ Cu.M.	7-15-75
Surry Station	297	5.6 ± 0.5 E-02
Hog Island Reserve	278	5.6 ± 3.4 E-03
Bacon's Castle	262	6.5 ± 0.6 E-02
Alliance	272	9.4 ± 0.6 E-02
Colonial Pkwy.	202	0.0 ± 3.0 E-03
Dow	202	6.2 ± 0.7 E-02
Fort Eustis	302	2.0 ± 0.4 E-02
Newport News	202	4.2 ± 0.6 E-02
Average		4.9 E-02
Maximum		9.4 ± 0.6 E-02
Minimum		5.6 ± 3.4 E-03

AIR PARTICULATE SAMPLES
GROSS BETA ANALYSIS
(picocuries per cubic meter)

		7-29-75
Surry Station	297 Cu.M.	3.4 ± 0.5 E-02
Hog Island Reserve	282	0.0 ± 4.1 E-03
Bacon's Castle	325	2.5 ± 0.4 E-02
Alliance	262	5.8 ± 0.7 E-02
Colonial Parkway	302	0.0 ± 3.8 E-03
Dow	222	3.6 ± 0.7 E-02
Fort Eustis	302	1.1 ± 0.4 E-02
Newport News	182	2.9 ± 0.7 E-02
Average		3.2 E-02
Maximum		5.8 ± 0.7 E-02
Minimum		1.1 ± 0.4 E-02

AIR PARTICULATE SAMPLES
GROSS BETA CONCENTRATIONS
(picocuries per cubic meter)

		Aug. 12, 1975
Surry Station	297 Cu.M.	4.0 ± 0.5 E-02
Hog Island Reserve	278	2.8 ± 0.5 E-02
Bacon's Castle	302	4.0 ± 0.5 E-02
Alliance	282	7.2 ± 4.0 E-03
Colonial Pkwy.	302	3.2 ± 0.5 E-02
Dow	202	5.2 ± 0.8 E-02
Fort Eustis	302	1.1 ± 0.4 E-02
Newport News	282	2.9 ± 0.5 E-02
	Average	3.0 E-02
	Maximum	5.2 ± 0.8 E-02
	Minimum	7.2 ± 4.0 E-03

AIR PARTICULATE SAMPLES
GROSS BETA CONCENTRATIONS
(picocuries per cubic meter)

		August 26, 1975
Surry Station	302 Cu.M.	4.0 ± 0.4 E-02
Hog Island Reserve	292	3.3 ± 0.4 E-02
Bacon's Castle	282	4.7 ± 0.5 E-02
Alliance	282	9.1 ± 3.5 E-03
Colonial Parkway	282	3.8 ± 0.5 E-02
Dow	238	6.3 ± 3.9 E-03
Fort Eustis	282	1.7 ± 0.4 E-02
Newport News	282	1.0 ± 0.4 E-02
	Average	2.5 E-02
	Maximum	4.7 ± 0.5 E-02
	Minimum	6.3 ± 3.9 E-03

AIR PARTICULATE SAMPLES
GROSS ALPHA/BETA CONCENTRATIONS
(picocuries per cubic meter)

		September 9, 1975
Surry Station	297 Cu.M.	1.4 ± 0.4 E-02
Hog Island Reserve	282	2.5 ± 0.4 E-02
Bacon's Castle	302	3.2 ± 0.4 E-02
Alliance	262	2.0 ± 0.4 E-02
Colonial Pkwy	302	9.8 ± 3.4 E-03
Dow	222	5.1 ± 4.2 E-03
Fort Eustis	282	1.5 ± 0.4 E-02
Newport News	242	1.4 ± 0.4 E-02
	Average	1.7 E-02
	Maximum	3.2 ± 0.4 E-02
	Minimum	5.1 ± 4.2 E-03

AIR PARTICULATE SAMPLES
GROSS BETA CONCENTRATIONS
(picocuries per cubic meter)

		September 23, 1975
Surry Station	302 Cu.M.	2.2 ± 0.4 E-02
Hog Island Reserve	252	7.6 ± 3.9 E-03
Bacon's Castle	282	2.0 ± 0.4 E-02
Alliance	282	9.7 ± 3.6 E-03
Colonial Parkway	282	2.5 ± 0.4 E-02
Dow	238	0.0 ± 3.9 E-03
Fort Eustis	282	1.1 ± 0.4 E-02
Newport News	161	0.0 ± 5.8 E-03
	Average	1.6 E-02
	Maximum	2.5 ± 0.4 E-02
	Minimum	7.6 ± 3.9 E-03

AIR PARTICULATE SAMPLES
GROSS BETA ANALYSIS
(picocuries per cubic meter)

THIRD QUARTER AVERAGES

Surry Station	3.4 E-02
Hog Island Reserve	2.0 E-02
Bacon's Castle	3.8 E-02
Alliance	3.3 E-02
Colonial Pkwy.	2.6 E-02
Dow	3.2 E-02
Fort Eustis	1.4 E-02
Newport News	2.5 E-02
Average	2.6 E-02
Average Maximum	5.1 E-02
Average Minimum	7.1 E-03

AIR PARTICULATE SAMPLES
GROSS BETA CONCENTRATIONS
(picocuries per cubic meter)

		October 7, 1975
Surry Station	282	3.1 ± 0.5 E-02
Hog Island Reserve	282	1.4 ± 0.4 E-02
Bacon's Castle	302	0.0 ± 3.1 E-03
Alliance	282	2.2 ± 0.4 E-02
Colonial Parkway	282	1.6 ± 0.4 E-02
Dow	202	0.0 ± 4.7 E-03
Fort Eustis	252	5.6 ± 3.8 E-03
Newport News	202	0.0 ± 4.7 E-03
	Average	1.8 E-02
	Maximum	3.1 ± 0.5 E-02
	Minimum	5.6 ± 3.8 E-03

AIR PARTICULATE SAMPLES
GROSS BETA CONCENTRATIONS
(picocuries per cubic meter)

		October 21, 1975
Surry Station	302 Cu.M.	7.7 ± 0.6 E-02
Hog Island Reserve	292	9.1 ± 3.4 E-03
Bacon's Castle	312	2.4 ± 0.4 E-02
Alliance	302	6.8 ± 3.1 E-03
Colonial Parkway	282	7.1 ± 3.4 E-03
Dow	282	7.1 ± 0.7 E-02
Fort Eustis	282	1.7 ± 0.4 E-02
Newport News	202	4.9 ± 0.7 E-02
	Average	3.3 E-02
	Maximum	7.7 ± 0.6 E-02
	Minimum	6.8 ± 3.1 E-03

AIR PARTICULATE SAMPLES
GROSS BETA CONCENTRATIONS
(picocuries per cubic meter)

	Volume	November 4, 1975
Surry Station	297	5.2 ± 0.5 E-02
Bacon's Castle	312	0.0 ± 3.0 E-03
Hog Island Reserve	292	1.4 ± 0.4 E-02
Newport News	182	3.1 ± 0.7 E-02
Fort Eustis	262	1.5 ± 0.4 E-02
Dow	242	0.0 ± 3.4 E-03
Colonial Parkway	282	0.0 ± 3.4 E-03
Alliance	282	1.6 ± 0.4 E-02
	Average	2.6 E-02
	Maximum	5.2 ± 0.5 E-02
	Minimum	1.4 ± 0.4 E-02

AIR PARTICULATE SAMPLES
GROSS BETA CONCENTRATIONS
(picocuries per cubic meter)

		Nov. 18, 1975
Newport News	297	0.0 ± 4.4 E-03
Fort Eustis	282	0.0 ± 4.7 E-03
Dow	283	0.0 ± 4.6 E-03
Colonial Pkwy.	252	0.0 ± 5.2 E-03
Alliance	252	3.8 ± 0.7 E-02
Bacon's Castle	242	6.6 ± 0.8 E-02
Hog Island Reserve	222	1.4 ± 0.6 E-02
Surry Station	302	9.1 ± 0.8 E-02
	Average	5.2 E-02
	Maximum	9.1 ± 0.8 E-02
	Minimum	1.4 ± 0.6 E-02

AIR PARTICULATE SAMPLES
GROSS BETA CONCENTRATIONS
(picocuries per cubic meter)

		December 4, 1975
Surry Station	297	1.1 ± 0.1 E-01
Hog Island Reserve	282	1.2 ± 0.4 E-02
Bacon's Castle	282	0.0 ± 4.0 E-03
Alliance	252	8.5 ± 0.8 E-02
Colonial Parkway	252	0.0 ± 4.5 E-03
Dow	242	0.0 ± 4.7 E-03
Fort Eustis	222	0.0 ± 5.1 E-03
Newport News	302	4.9 ± 3.8 E-03
	Average	5.3 E-02
	Maximum	1.1 ± 0.1 E-01
	Minimum	4.9 ± 3.8 E-03

AIR PARTICULATE SAMPLES
GROSS BETA CONCENTRATIONS
(picocuries per cubic meter)

		December 16, 1975
Surry Station	302	0.0 ± 3.4 E-03
Hog Island Reserve	282	3.1 ± 0.5 E-02
Bacon's Castle	272	9.3 ± 4.1 E-03
Alliance	272	0.0 ± 3.8 E-03
Colonial Pkwy.	242	0.0 ± 4.3 E-03
Dow	202	6.5 ± 0.8 E-02
Newport News	182	0.0 ± 5.7 E-03
Fort Eustis	282	0.0 ± 3.7 E-03
	Average	3.5 E-02
	Maximum	6.5 ± 0.8 E-02
	Minimum	9.3 ± 4.1 E-03

AIR PARTICULATE SAMPLES
GROSS BETA ANALYSIS
(picocuries per cubic meter)

		December 31, 1975
Newport News	324	9.0 ± 2.8 E-03
Fort Eustis	508	1.6 ± 0.2 E-02
Dow	259	1.9 ± 0.4 E-02
Colonial Pkwy.	238	2.0 ± 0.4 E-02
Alliance	302	1.5 ± 0.3 E-02
Bacon's Castle	324	5.9 ± 2.6 E-03
		January 2, 1976
Hog Island Reserve	343	3.0 ± 0.4 E-02
Surry Station	392	2.4 ± 0.3 E-02
	Average	1.7 E-02
	Maximum	3.0 ± 0.4 E-02
	Minimum	5.9 ± 2.6 E-03

AIR PARTICULATE SAMPLES
GROSS BETA ANALYSIS
(picocuries per cubic meter)

FOURTH QUARTER AVERAGES

Surry Station	6.4 E-02
Hog Island Reserve	1.8 E-02
Bacon's Castle	2.6 E-02
Alliance	3.0 E-02
Colonial Parkway	1.4 E-02
Dow	5.2 E-02
Fort Eustis	1.3 E-02
Newport News	2.3 E-02
Average	3.0 E-02
Maximum	6.4 E-02
Minimum	1.3 E-02

AIR PARTICULATE SAMPLES
(picocuries per cubic meter)

THIRD QUARTER, 1975 COMPOSITES

	Hog Island Reserve Surry Station	Bacon's Castle, Alliance Colonial Parkway, Dow Fort Eustis
Volume	3456 Cu.M.	8240 Cu.M.
Gamma Spectrometry		
Be-7	2.5 ± 1.3 E-02	3.3 ± 0.9 E-02
K-40	Less than 3.2 E-02	Less than 1.3 E-02
Mn-54	Less than 1.8 E-03	1.2 ± 0.5 E-03
Nb-95	Less than 3.1 E-03	Less than 1.3 E-03
Zr-95	Less than 2.6 E-03	Less than 1.1 E-03
Ru-103	Less than 1.6 E-03	Less than 6.9 E-04
Sb-125	Less than 7.9 E-03	Less than 3.3 E-03
Cs-137	Less than 2.5 E-03	Less than 1.3 E-03
Ce-144	Less than 1.9 E-02	7.9 ± 5.3 E-03
Pb-212	Less than 6.7 E-03	Less than 2.8 E-03
Pb-214	Less than 8.0 E-03	Less than 3.3 E-03
Bi-214	Less than 7.6 E-03	Less than 3.2 E-03
Ac-228	Less than 7.0 E-02	Less than 8.3 E-03

AIR PARTICULATE SAMPLES
(picocuries per cubic meter)

THIRD QUARTER, 1975 COMPOSITES

Newport News

Volume	1351 Cu.M.

Gamma Spectrometry

Be-7	Less than 4.9 E-02
K-40	6.7 ± 5.6 E-02
Mn-54	Less than 4.6 E-03
Nb-95	Less than 7.9 E-03
Zr-95	Less than 6.7 E-03
Ru-103	3.5 ± 2.8 E-03
Sb-125	Less than 2.2 E-02
Cs-137	Less than 6.3 E-03
Ce-144	Less than 4.8 E-02
Pb-212	Less than 1.7 E-02
Pb-214	Less than 2.0 E-02
Bi-214	Less than 1.9 E-02
Ac-228	Less than 5.1 E-02

AIR PARTICULATE SAMPLES
(picocuries per cubic meter)

FOURTH QUARTER, 1975 COMPOSITES

	Surry Station and Hog Island Reserve	Bacon's Castle, Alliance Colonial Pkwy, Dow, Fort Eustis
Volume	3645 Cu.M.	8311 Cu.M.
Gamma Spectrometry		
Be-7	4.3 ± 1.5 E-02	2.4 ± 0.7 E-02
K-40	Less than 3.9 E-02	Less than 1.1 E-02
Mn-54	2.3 ± 1.8 E-03	Less than 1.2 E-03
Co-58	8.2 ± 2.7 E-03	1.5 ± 0.7 E-03
Co-60	5.2 ± 2.3 E-03	Less than 1.1 E-03
Cs-137	2.0 ± 1.8 E-03	Less than 1.2 E-03
Bi-212	Less than 1.8 E-02	Less than 7.9 E-03
Pb-212	Less than 6.1 E-03	Less than 2.7 E-03
Pb-214	Less than 7.5 E-03	Less than 3.3 E-03
Bi-214	Less than 7.1 E-03	Less than 3.1 E-03
Ra-226	Less than 7.0 E-02	Less than 3.1 E-02

AIR PARTICULATE SAMPLES
(picocuries per cubic meter)

FOURTH QUARTER, 1975 COMPOSITES

Newport News

Volume	1394 Cu.M.
<u>Gamma Spectrometry</u>	
Be-7	4.4 ± 2.4 E-02
K-40	Less than 9.7 E-02
Mn-54	Less than 7.0 E-03
Co-58	Less than 6.3 E-03
Co-60	Less than 6.5 E-03
Cs-137	4.6 ± 2.8 E-03
Bi-212	Less than 4.7 E-02
Pb-212	Less than 1.6 E-02
Pb-214	Less than 1.9 E-02
Bi -214	Less than 1.7 E-02
Ra-226	Less than 1.7 E-01

AMBIENT THERMOLUMINESCENT DOSIMETRY

THIRD QUARTER, 1975

Date Annealed: 6-25-75
Date Issued: 7-3-75

Date Returned: 10-23-75
Date Read: 10-23-75

	Net mrem							
	1st	2nd	3rd	4th	5th	Average*	± 2 Sigma	mrem/wk
Control	13	12	13	12	13	13.1	1.1	0.7
Surry Station	15	15	17	16	16	16.4	1.8	0.9
Hog Island Reserve	Missing in Field							
Bacon's Castle	10	10	9	9	9	9.8	1.1	0.5
Alliance	10	9	9	9	9	9.6	0.9	0.5
Colonial Pkwy	18	17	17	19	17	18.3	1.9	1.0
Dow	9	11	11	11	9	10.6	2.3	0.6
Ft. Eustis	11	11	12	12	12	12.1	1.1	0.7
Newport News	12	12	12	12	12	12.5	0.0	0.7
Smithfield	15	14	14	14	13	14.6	1.5	0.8
Scotland Warf	12	11	12	11	11	11.9	1.1	0.7
Jamestown	10	10	10	10	9	10.2	0.9	0.6
Lee Hall	15	16	15	15	15	15.8	0.9	0.9
Routes 10-676	10	10	10	10	10	10.4	0.0	0.6
						Average		0.7

*Batch B Calibration Factor of 1.04 applied.

AMBIENT THERMOLUMINESCENT DOSIMETRY

FOURTH QUARTER, 1975

Date Annealed: 9-29-75
Date Issued: 9-30-75

Date Returned: 1-7-76
Date Read: 1-8-76

	Net mrem							
	1st	2nd	3r	4th	5th	Average*	± 2 Sigma	mrem/wk
Control	5	5	5	4	5	5.2	1.0	0.4
Surry Station	70	75	75	79	73	84.0	7.2	5.7
Hog Island Reserve	14	14	12	13	14	14.5	1.9	1.0
Bacon's Castle	13	13	12	13	12	13.6	1.2	0.9
Alliance	11	9	7	6	D	8.9	4.8	0.6
Colonial Pkwy.	11	10	9	9	12	11.1	2.8	0.8
Dow	7	10	10	11	10	10.4	3.2	0.7
Ft. Eustis	13	12	14	11	11	13.2	2.8	0.9
Newport News	7	10	9	9	11	10.0	3.2	0.7
Smithfield	15	13	16	15	9	14.7	6.1	1.0
Scotland Warf	6	12	12	12	11	11.5	5.6	0.8
Jamestown	8	10	10	9	9	10.0	1.8	0.7
Lee Hall	10	15	15	17	18	16.3	6.7	1.1
Routes 10-676	11	10	10	8	10	10.6	2.4	0.7
				Average of Locations				1.2

*Calibration factor of 1.085 applied.

PRECIPITATION SAMPLES
(nanocuires per square meter)

THIRD QUARTER, 1975 COMPOSITE

	Newport News	Surry Station
Gross Beta	3.1 ± 0.1 E+00	2.8 ± 0.1 E+00
Tritium	5.3 ± 3.5 E+01	7.5 ± 5.0 E+01

Newport News - 757 mls representing 15140 mls Total for Third Quarter - Collector area = 8.56 E-02 Sq. M.

Surry Station - 913 mls representing 18260 mls Total for Third Quarter. Collector area = 7.29 E-02 Sq. M.

PRECIPITATION SAMPLES
(nanocuries per meter squared)

FOURTH QUARTER, 1975 COMPOSITE

	Surry Station	Newport News
Gamma Spectrometry		
Be-7	4.8 ± 2.2 E+00	
K-40	Less than 5.1 E+00	Less than 3.1 E+00
Co-58	6.5 ± 3.3 E-01	2.2 ± 1.8 E-01
Co-60	3.1 ± 2.5 E-01	
Cs-137	4.5 ± 3.7 E-01	Less than 2.4 E-01
Ce-144	2.1 ± 1.6 E+00	
Tl-208	Less than 4.2 E-01	
Pb-212	Less than 9.6 E-01	Less than 8.2 E-01
Pb-214	Less than 1.2 E+00	
Ra-226	Less than 1.1 E+01	Less than 8.7 E+00

MILK SAMPLES
(picocuries per liter)

	Lee Hall	Colonial Parkway
Date Collected	7-15-75	7-15-75
Radiochemistry		
I-131	0.0 ± 1.1 E-01	0.0 ± 1.1 E-01
Ca (g/l)	No sample left	No sample left
Sr-89	2.9 ± 2.0 E+00	1.6 ± 0.2 E+01
Sr-90	3.2 ± 1.1 E+00	5.3 ± 1.2 E+00
Gamma Spectrometry		
K-40	1.6 ± 0.4 E+03	1.3 ± 0.4 E+03
Cs-137	Less than 1.8 E+01	2.2 ± 1.2 E+01
Ce-141	Less than 7.5 E+01	Less than 7.5 E+01
Pb-212	Less than 8.5 E+01	Less than 8.3 E+01
Bi-214	Less than 8.4 E+01	Less than 8.4 E+01
Pb-214	Less than 8.4 E+01	Less than 8.4 E+01
Ra-226	Less than 9.3 E+02	Less than 9.3 E+02

MILK SAMPLES
(picocuries per liter)

	Epps	Judkins
Date Collected	8-4-75	8-4-75
Radiochemistry		
I-131	0.0 ± 8.8 E-02	0.0 ± 8.1 E-02
Ca (g/l)	1.4	1.2
Sr-89	0.0 ± 4.2 E+00	0.0 ± 3.8 E+00
Sr-90	6.1 ± 2.2 E+00	4.9 ± 2.0 E+00
Gamma Spectrometry		
K-40	1.2 ± 0.4 E+03	1.4 ± 0.4 E+03
Mn-54	Less than 1.1 E+01	Less than 1.1 E+01
Co-60	Less than 1.9 E+01	Less than 1.9 E+01
Sb-125	Less than 8.2 E+01	Less than 8.2 E+01
Cs-137	Less than 2.0 E+01	1.5 ± 1.5 E+01
Ce-141	Less than 7.6 E+01	Less than 7.6 E+01
Hg-203	Less than 3.1 E+01	Less than 3.1 E+01
Pb-212	Less than 8.4 E+01	Less than 8.0 E+01
Pb-214	Less than 8.7 E+01	Less than 8.7 E+01
Bi-214	Less than 1.9 E+02	8.5 ± 7.6 E+01
Ra-226	Less than 9.3 E+02	Less than 9.3 E+02
Ac-228	Less than 1.8 E+02	Less than 1.8 E+02

MILK SAMPLES
(picocuries per liter)

	Epps	Lee Hall
Date Collected	8-5-75	8-5-75
Radiochemistry		
Sr-89	0.0 ± 1.8 E+00	0.0 ± 1.7 E+00
Sr-90	2.2 ± 1.2 E+00	2.0 ± 1.2 E+00
I-131	0.0 ± 7.8 E-02	0.0 ± 5.6 E-02
Ca (g/l)	1.5	1.3
Gamma Spectrometry		
K-40	1.4 ± 0.4 E+03	1.2 ± 0.4 E+03
Mn-54	Less than 1.1 E+01	Less than 1.1 E+01
Co-60	Less than 1.9 E+01	Less than 1.9 E+01
Sb-125	Less than 8.2 E+01	Less than 8.2 E+01
Cs-137	Less than 2.1 E+01	Less than 1.2 E+01
Ce-141	Less than 7.6 E+01	Less than 7.6 E+01
Hg-203	Less than 3.1 E+01	Less than 3.1 E+01
Pb-212	Less than 8.0 E+01	Less than 8.0 E+01
Pb-214	Less than 8.7 E+01	Less than 8.7 E+01
Bi-214	Less than 1.9 E+02	Less than 1.9 E+02
Ra-226	Less than 9.3 E+02	Less than 9.3 E+02
Ac-228	Less than 1.8 E+02	Less than 7.8 E+02

MILK SAMPLES
(picocuries per liter)

	Lee Hall	Colonial Parkway
Date Collected	8-12-75	8-12-75
Radiochemistry		
I-131	0.0 ± 7.9 E-02	0.0 ± 9.1 E-02
Ca (g/l)	1.3	1.3
Sr-89	0.0 ± 2.5 E+00	0.0 ± 3.1 E+00
Sr-90	2.8 ± 1.6 E+00	8.9 ± 2.0 E+00
Gamma Spectrometry		
K-40	1.4 ± 0.4 E+03	1.3 ± 0.4 E+03
Mn-54	1.2 ± 1.1 E+01	Less than 1.1 E+01
Co-60	Less than 1.9 E+01	Less than 1.9 E+01
Sb-125	Less than 8.2 E+01	Less than 8.2 E+01
Cs-137	Less than 2.1 E+01	Less than 2.3 E+01
Ce-141	Less than 7.6 E+01	Less than 7.6 E+01
Hg-203	Less than 3.1 E+01	Less than 3.1 E+01
Pb-212	Less than 8.3 E+01	Less than 8.0 E+01
Pb-214	Less than 8.7 E+01	Less than 8.7 E+01
Bi-214	Less than 1.9 E+02	Less than 1.9 E+02
Ra-226	Less than 9.3 E+02	Less than 9.3 E+02
Ac-228	Less than 1.8 E+02	Less than 1.8 E+02

MILK SAMPLES
(picocuries per liter)

	Judkins	Epps
Date Collected	8-26-75	8-26-75
Radiochemistry		
I-131	0.0 ± 5.8 E-02	0.0 ± 1.1 E-01
Ca (g/l)	1.4	1.4
Sr-89	0.0 ± 3.5 E+00	0.0 ± 2.6 E+00
Sr-90	7.3 ∓ 2.0 E+00	5.0 ∓ 1.6 E+00
Gamma Spectrometry		
K-40	1.6 ± 0.4 E+03	1.4 ± 0.4 E+03
Mn-54	Less than 1.1 E+01	Less than 1.1 E+01
Co-60	Less than 1.9 E+01	Less than 1.9 E+01
Sb-125	Less than 8.2 E+01	Less than 8.2 E+01
Cs-137	Less than 2.0 E+01	Less than 1.8 E+01
Ce-141	Less than 7.6 E+01	Less than 7.7 E+01
Hg-203	Less than 3.1 E+01	Less than 3.1 E+01
Pb-212	Less than 8.0 E+01	Less than 8.0 E+01
Pb-214	Less than 8.7 E+01	Less than 8.7 E+01
Bi-214	Less than 1.9 E+02	Less than 1.9 E+02
Ra-226	Less than 9.3 E+02	Less than 9.3 E+02
Ac-228	Less than 1.8 E+02	Less than 1.8 E+02

MILK SAMPLES
(picocuries per liter)

	Colonial Parkway	Lee Hall
Date Collected	9-9-75	9-9-75
Radiochemistry		
I-131	0.0 ± 1.4 E-01	0.0 ± 1.8 E-01
Ca (g/l)	1.3	1.3
Sr-89	0.0 ± 3.0 E+00	0.0 ± 3.5 E+00
Sr-90	3.0 ± 2.2 E+00	6.0 ± 2.6 E+00
Gamma Spectrometry		
K-40	1.7 ± 0.4 E+03	1.6 ± 0.4 E+03
Cs-137	Less than 2.1 E+01	Less than 2.1 E+01
Tl-208	Less than 2.6 E+01	Less than 2.6 E+01
Pb-212	Less than 8.2 E+01	Less than 8.2 E+01
Pb-214	Less than 8.4 E+01	Less than 8.4 E+01
Bi-214	Less than 8.2 E+01	Less than 8.2 E+01

MILK SAMPLES
(picocuries per liter)

	Judkins	Epps
Date Collected	9-23-75	9-23-75
Radiochemistry		
I-131	0.0 ± 2.5 E-01	0.0 ± 2.0 E-01
Ca (g/l)	1.3	1.3
Sr-89	0.0 ± 4.5 E+00	0.0 ± 4.6 E+00
Sr-90	1.0 ± 0.2 E+01	1.0 ± 0.3 E+01
Gamma Spectrometry		
K-40	1.1 ± 0.4 E+03	9.9 ± 3.7 E+02
Cs-137	Less than 3.1 E+01	Less than 2.6 E+01
Tl-208	Less than 2.6 E+01	Less than 2.6 E+01
Pb-212	Less than 8.2 E+01	Less than 8.2 E+01
Pb-214	Less than 8.4 E+01	Less than 8.4 E+01
Bi-214	Less than 8.2 E+01	Less than 8.2 E+01

MILK SAMPLES
(picocuries per liter)

	Epps	Lee Hall
Date Collected	10-1-75	10-2-75
Radiochemistry		
I-131	0.0 ± 2.5 E-01	0.0 ± 2.6 E-01
Ca (g/l)	1.2	1.4
Sr-89	0.0 ± 5.8 E+00	0.0 ± 4.8 E+00
Sr-90	6.3 ± 2.2 E+00	5.0 ± 1.7 E+00
Gamma Spectrometry		
K-40	1.2 ± 0.4 E+03	1.5 ± 0.4 E+03
Cs-137	Less than 2.1 E+01	Less than 1.8 E+01
Tl-208	Less than 2.4 E+01	Less than 2.4 E+01
Pb-212	Less than 8.1 E+01	Less than 8.0 E+01
Ra-226	Less than 9.2 E+02	Less than 9.0 E+02
Ac-228	Less than 1.5 E+02	Less than 1.9 E+02

MILK SAMPLES
(picocuries per liter)

	Lee Hall	Epps
Date Collected	10-2-75	10-1-75
Radiochemistry		
I-131	0.0 ± 2.8 E-01	0.0 ± 1.9 E-01
Ca (g/l)	1.4	1.2
Sr-89	0.0 ± 3.1 E+00	0.0 ± 3.1 E+00
Sr-90	1.7 ± 1.7 E+00	2.9 ± 1.5 E+00
Gamma Spectrometry		
K-40	1.5 ± 0.4 E+03	1.3 ± 0.4 E+03
Sb-125	Less than 8.5 E+01	Less than 8.0 E+01
Cs-137	Less than 1.6 E+01	Less than 1.8 E+01
Tl-208	Less than 2.4 E+01	Less than 2.6 E+01
Pb-212	Less than 8.0 E+01	Less than 8.1 E+01
Pb-214	Less than 8.6 E+01	Less than 7.5 E+01
Bi-214	Less than 6.7 E+01	Less than 6.4 E+01
Ra-226	Less than 9.0 E+02	Less than 9.0 E+02

MILK SAMPLES
(picocuries per liter)

	Lee Hall	Colonial Parkway
Date Collected	10-7-75	10-7-75
Radiochemistry		
I-131	0.0 ± 5.6 E-02	0.0 ± 7.1 E-02
Ca (g/l)	1.4	1.4
Sr-89	0.0 ± 2.5 E+00	0.0 ± 3.1 E+00
Sr-90	5.4 ± 1.6 E+00	5.5 ± 1.7 E+00
Gamma Spectrometry		
K-40	1.7 ± 0.4 E+03	1.3 ± 0.4 E+03
Cs-137	1.0 ± 0.9 E+01	1.0 ± 0.9 E+01
Pb-212	Less than 8.6 E+01	Less than 8.1 E+01
Pb-214	Less than 7.5 E+01	Less than 7.6 E+01
Ac-228	Less than 1.9 E+02	Less than 1.5 E+02

MILK SAMPLES
(picocuries per liter)

	Epps	Judkins
Date Collected	10-21-75	10-21-75
Radiochemistry		
Sr-89	0.0 ± 3.7 E+00	6.8 ± 2.3 E+00
Sr-90	1.2 ± 0.4 E+01	4.2 ± 3.1 E+00
I-131	0.0 ± 1.2 E-01	0.0 ± 1.1 E-01
Ca (g/l)	1.3	1.3
Gamma Spectrometry		
K-40	1.1 ± 0.4 E+03	1.3 ± 0.4 E+03
Nb-95	Less than 2.1 E+01	Less than 2.0 E+01
Zr-95	Less than 1.2 E+01	Less than 1.0 E+01
Cs-137	Less than 1.6 E+01	Less than 2.4 E+01
Bi-212	Less than 8.0 E+01	2.4 ± 1.4 E+02
Pb-212	Less than 8.1 E+01	Less than 8.4 E+01
Pb-214	Less than 7.5 E+01	Less than 8.6 E+01
Bi-214	1.0 ± 0.8 E+02	6.0 ± 3.6 E+01

MILK SAMPLES
(picocuries per liter)

	Colonial Parkway
Date Collected	11-5-75
Radiochemistry	
Sr-89	0.0 ± 4.1 E+00
Sr-90	4.8 ± 1.8 E+00
I-131	0.0 ± 1.9 E-01
Ca (g/l)	1.3
Gamma Spectrometry	
K-40	1.4 ± 0.6 E+03
Cs-137	Less than 3.2 E+01
Bi-214	Less than 1.0 E+02
Ra-226	Less than 1.5 E+03

MILK SAMPLES
(picocuries per liter)

	Epps	Judkins
Date Collected	11-18-75	11-18-75
Radiochemistry		
Sr-89	4.9 ± 2.5 E+00	5.4 ± 2.6 E+00
Sr-90	3.9 ± 2.2 E+00	5.5 ± 2.4 E+00
I-131	0.0 ± 8.4 E-02	0.0 ± 8.8 E-02
Ca (g/l)	1.4	1.3
Gamma Spectrometry		
K-40	1.8 ± 0.4 E+03	1.7 ± 0.4 E+03
Sb-125	Less than 8.0 E+01	Less than 8.1 E+01
Cs-137	Less than 2.0 E+01	1.3 ± 1.0 E+01
Tl-208	Less than 2.5 E+01	Less than 2.4 E+01
Pb-212	Less than 8.5 E+01	Less than 8.3 E+01
Pb-214	Less than 8.0 E+01	Less than 9.0 E+01
Bi-214	Less than 1.4 E+02	Less than 7.8 E+01
Ra-226	Less than 9.4 E+02	Less than 9.0 E+02

MILK SAMPLES
(picocuries per liter)

	Colonial Pkwy. Dairy	Lee Hall Dairy
Date Collected	12-4-75	12-4-75
Radiochemistry		
I-131	0.0 ± 6.2 E-02	0.0 ± 8.0 E-02
Ca (g/l)	1.3	1.3
Sr-89	0.0 ± 3.9 E+00	0.0 ± 3.3 E+00
Sr-90	7.0 ± 2.8 E+00	5.6 ± 2.4 E+00
Gamma Spectrometry		
K-40	1.4 ± 0.4 E+03	1.7 ± 0.4 E+03
Cs-137	Less than 2.1 E+01	1.6 ± 1.3 E+01
Pb-212	Less than 8.2 E+01	Less than 8.0 E+01
Pb-214	Less than 7.5 E+01	Less than 9.7 E+01
Ra-226	Less than 9.0 E+02	Less than 9.2 E+02

MILK SAMPLES
(picocuries per liter)

	Judkins Dairy	Gwaltney Dairy
Date Collected	12-9-75	12-9-75
Radiochemistry		
I-131	0.0 ± 7.2 E-02	0.0 ± 1.0 E-01
Ca (g/l)	0.6	0.8
Sr-89	0.0 ± 3.8 E+00	0.0 ± 3.3 E+00
Sr-90	8.9 ± 2.4 E+00	7.0 ± 2.2 E+00
Gamma Spectrometry		
K-40	1.2 ± 0.4 E+03	1.0 ± 0.4 E+03
Ru-103	1.4 ± 1.2 E+01	Less than 1.0 E+01
Sb-125	Less than 8.4 E+01	Less than 8.0 E+01
Cs-137	Less than 2.2 E+01	Less than 2.0 E+01
Pb-212	Less than 8.0 E+01	Less than 8.6 E+01
Ra-226	Less than 9.0 E+02	Less than 9.0 E+02

WELL WATER SAMPLES
(picocuries per liter)

	Hog Island Reserve	Surry Station
Date Collected	10-21-75	10-22-75
Radiochemistry		
Gross Alpha	0.0 ± 1.8 E+00	0.0 ± 1.8 E+00
Gross Beta	0.0 ± 5.0 E+00	0.0 ± 5.0 E+00
Tritium	2.3 ± 0.9 E+02	1.8 ± 1.0 E+02

	Jamestown	Bacon's Castle
Date Collected	10-21-75	10-21-75
Radiochemistry		
Gross Alpha	0.0 ± 1.8 E+00	0.0 ± 1.8 E+00
Gross Beta	1.1 ± 0.6 E+01	1.5 ± 0.6 E+01
Tritium	1.7 ± 0.8 E+02	2.3 ± 0.9 E+02

SURFACE WATER SAMPLES
(picocuries per liter)

10-21/22-75	Gross Alpha	Gross Beta	Tritium
Williamsburg Reservoir	0.0 ± 2.4 E+00	0.0 ± 5.7 E+00	5.3 ± 3.8 E+02
Newport News Reservoir	0.0 ± 2.3 E+00	0.0 ± 5.5 E+00	6.5 ± 3.8 E+02
Chippokes Creek	0.0 ± 2.3 E+00	2.1 ± 0.7 E+01	Less than 3.9 E+02
Smithfield Reservoir	0.0 ± 2.3 E+00	7.0 ± 5.8 E+00	Less than 3.9 E+02

JAMES RIVER WATER SAMPLES
(picocuries per liter)

	Chickahominy	Station Intake
Date Collected	7-31-75	7-31-75
Gamma Spectrometry		
K-40	Less than 1.0 E+02	Less than 1.0 E+02
Sb-125	Less than 2.8 E+01	Less than 2.8 E+01
I-131	Less than 1.0 E+01	Less than 1.0 E+01*
Cs-137	6.8 ± 4.0 E+00	Less than 5.8 E+00
Ce-141	Less than 4.6 E+01	Less than 4.6 E+01
Tl-208	Less than 9.2 E+00	Less than 9.2 E+00
Pb-212	Less than 2.3 E+01	Less than 2.2 E+01
Pb-214	Less than 2.5 E+01	Less than 2.6 E+01
Bi-214	Less than 2.6 E+01	Less than 2.6 E+01
Ac-228	Less than 7.4 E+01	Less than 7.4 E+01

*Aug. 7, 1975 (1130)

JAMES RIVER WATER SAMPLES
(picocuries per liter)

	Station Discharge	Newport News
Date Collected	7-17-75	7-28-75
Gamma Spectrometry		
K-40	Less than 1.0 E+02	Less than 1.0 E+02
Sb-125	Less than 2.8 E+01	Less than 2.8 E+01
I-131	Less than 1.0 E+01	Less than 1.0 E+01
Cs-137	Less than 5.4 E+00	6.1 ± 5.2 E+00
Ce-141	Less than 4.6 E+01	Less than 4.6 E+01
Tl-208	Less than 9.2 E+00	Less than 9.2 E+00
Pb-212	Less than 2.3 E+01	Less than 4.7 E+01
Pb-214	Less than 2.5 E+01	Less than 2.5 E+01
Bi-214	Less than 2.6 E+01	Less than 4.1 E+01
Ac-228	Less than 7.4 E+01	8.2 ± 7.4 E+01

JAMES RIVER WATER
(picocuries per liter)

	Hog Island Point
Date Collected	7-17-75
Gamma Spectrometry	
K-40	Less than 1.0 E+02
Sb-125	Less than 2.8 E+01
I-131	Less than 1.0 E+01
Cs-137	4.1 ± 4.1 E+00
Ce-141	Less than 4.6 E+01
Tl-208	Less than 9.2 E+00
Pb-212	Less than 2.3 E+01
Pb-214	Less than 2.5 E+01
Bi-214	Less than 2.6 E+01
Ac-228	Less than 7.4 E+01

JAMES RIVER WATER
(picocuries per liter)

	Hog Island Point	Discharge
Date Collected	9-9-75	9-9-75
Gamma Spectrometry		
K-40	Less than 1.0 E+02	Less than 1.0 E+02
Cs-137	Less than 5.6 E+00	Less than 6.8 E+00
Pb-212	Less than 2.4 E+01	Less than 2.3 E+01
Bi-214	Less than 2.4 E+01	Less than 2.4 E+01

JAMES RIVER WATER SAMPLES
(picocuries per liter)

	Chickahominy
Date Collected	9-17-75
<u>Gamma Spectrometry</u>	
K-40	Less than 1.4 E+02
Cs-137	Less than 6.7 E+00
Pb-212	Less than 2.4 E+01
Pb-214	Less than 3.0 E+01
Bi-214	Less than 2.5 E+01
Ac-228	Less than 6.1 E+01

JAMES RIVER WATER SAMPLES
(picocuries per liter)

	Newport News
Date Collected	9-30-75
Radiochemistry	
Gross Alpha	0.0 ± 5.0 E+00
Gross Beta	7.5 ± 1.7 E+01
Tritium	4.0 ± 4.0 E+02
Gamma Spectrometry	
K-40	Less than 1.0 E+02
Co-57	6.2 ± 4.8 E+00
Sb-125	Less than 2.8 E+01
Cs-137	Less than 8.0 E+00
Pb-212	Less than 2.4 E+01
Pb-214	Less than 2.7 E+01

JAMES RIVER WATER
(picocuries per liter)

	Station Intake	Chickahominy
Date Collected	11-18-75	11-17-75
Gamma Spectrometry		
K-40	Less than 1.3 E+02	Less than 1.1 E+02
Co-60	Less than 5.0 E+00	Less than 6.6 E+00
Ru-103	Less than 5.5 E+00	4.5 ± 3.7 E+00
Sb-125	Less than 3.0 E+01	Less than 2.8 E+01
Cs-137	Less than 5.1 E+00	4.6 ± 4.1 E+100
Pb-212	Less than 2.3 E+01	Less than 2.4 E+01
Pb-214	Less than 2.7 E+01	Less than 2.5 E+01
Bi-214	Less than 2.5 E+01	Less than 2.9 E+01
Ra-226	Less than 2.4 E+02	Less than 2.4 E+02

JAMES RIVER WATER
(picocuries per liter)

	Newport News	Hog Island Point
Date Collected	11-18-75	11-17-75
Gamma Spectrometry		
K-40	Less than 1.3 E+02	Less than 1.5 E+02
Co-60	Less than 5.0 E+00	Less than 5.0 E+00
Ru-103	Less than 5.5 E+00	Less than 5.5 E+00
Sb-125	Less than 2.8 E+01	Less than 2.8 E+01
Cs-137	Less than 6.6 E+00	Less than 7.4 E+00
Pb-212	Less than 2.0 E+01	Less than 2.3 E+01
Pb-214	Less than 2.5 E+01	Less than 2.5 E+01
Bi-214	Less than 2.0 E+01	Less than 2.0 E+01
Ra-226	Less than 2.4 E+02	Less than 2.3 E+02

JAMES RIVER WATER
(picocuries per liter)

	Station Discharge
Date Collected	11-17-75
<u>Gamma Spectrometry</u>	
K-40	Less than 1.3 E+02
Co-60	Less than 5.0 E+00
Ru-103	Less than 5.5 E+00
Sb-125	Less than 2.8 E+01
Cs-137	3.9 ± 3.4 E+00
Pb-212	Less than 2.4 E+01
Pb-214	Less than 2.5 E+01
Bi-214	Less than 2.0 E+01
Ra-226	Less than 2.4 E+02

JAMES RIVER WATER SAMPLES
SEMI-ANNUAL COMPOSITE
(picocuries per liter)

	Enriched Tritium
Chickahominy	2.1 ± 1.3 E+02
Newport News	2.9 ± 1.2 E+02

SILT SAMPLES
(picocuries per kilogram dry)

	Discharge	Hog Island Point
Date Collected	9-9-75	9-9-75
Sample Weight Dry	0.1045 kg	0.110 kg
Gamma Spectrometry		
Be-7	Less than 1.7 E+03	1.1 ± 1.0 E+03
K-40	1.4 ± 0.3 E+04	1.2 ± 0.4 E+04
Cr-51	1.7 ± 1.4 E+03	Less than 1.9 E+03
Mn-54	1.6 ± 1.2 E+02	Less than 1.7 E+02
Co-58	2.3 ± 1.3 E+02	1.6 ± 1.2 E+02
Co-60	4.7 ± 1.4 E+02	3.0 ± 1.2 E+02
Nb-95	Less than 1.7 E+02	Less than 1.6 E+02
Zr-95	Less than 2.7 E+02	Less than 2.6 E+02
Sb-125	Less than 5.4 E+02	3.6 ± 3.4 E+02
Cs-134	3.6 ± 1.1 E+02	Less than 1.8 E+02
Cs-137	1.1 ± 0.2 E+03	5.3 ± 1.4 E+02
Hg-203	Less than 2.3 E+02	Less than 2.2 E+02
Tl-208	2.7 ± 2.1 E+02	3.5 ± 1.8 E+02
Bi-212	1.7 ± 1.5 E+03	Less than 2.1 E+03
Pb-212	1.3 ± 0.4 E+03	1.8 ± 0.4 E+03
Pb-214	9.9 ± 4.1 E+02	7.2 ± 4.1 E+02
Bi-214	5.3 ± 4.5 E+02	1.0 ± 0.4 E+03
Ra-226	6.5 ± 3.9 E+03	Less than 5.5 E+03
Ac-228	1.2 ± 0.9 E+03	1.6 ± 0.7 E+03

SILT SAMPLES
(picocuries per kilogram dry)

	Point of Shoals	Chickahominy
Date Collected	9-17-75	9-17-75
Sample Weight Dry	0.121 kg	0.097 kg
Gamma Spectrometry		
Be-7	Less than 1.5 E+03	Less than 1.8 E+03
K-40	1.3 ± 0.3 E+04	1.6 ± 0.3 E+04
Cr-51	Less than 1.8 E+03	Less than 2.3 E+03
Mn-54	Less than 1.5 E+02	Less than 1.9 E+02
Co-58	Less than 1.6 E+02	Less than 2.0 E+02
Co-60	1.2 ± 0.8 E+02	Less than 1.5 E+02
Nb-95	Less than 1.5 E+02	Less than 1.8 E+02
Zr-95	Less than 2.3 E+02	Less than 2.9 E+02
Sb-125	Less than 4.6 E+02	Less than 5.8 E+02
Cs-134	Less than 1.6 E+02	Less than 2.0 E+02
Cs-137	7.2 ± 1.7 E+02	1.0 ± 0.2 E+03
Hg-203	Less than 2.0 E+02	Less than 2.5 E+02
Tl-208	2.1 ± 1.6 E+02	3.0 ± 1.9 E+02
Bi-212	Less than 1.9 E+03	Less than 2.4 E+03
Pb-212	1.7 ± 0.4 E+03	1.8 ± 0.4 E+03
Pb-214	8.6 ± 3.3 E+02	1.3 ± 0.4 E+03
Bi-214	Less than 4.1 E+02	1.2 ± 0.4 E+03
Ra-226	Less than 5.1 E+03	7.1 ± 4.4 E+03
Ac-228	1.0 ± 0.7 E+03	1.4 ± 0.9 E+03

SILT SAMPLES
(picocuries per kilogram dry)

	Newport News
Date Collected	9-30-75
Sample Weight Dry	0.111 kg
Gamma Spectrometry	
Be-7	Less than 1.6 E+03
K-40	1.6 ± 0.3 E+04
Cr-51	Less than 9.0 E+03
Mn-54	Less than 1.7 E+02
Co-58	Less than 1.8 E+02
Co-60	1.6 ± 1.0 E+02
Nb-95	Less than 1.6 E+02
Zr-95	Less than 2.5 E+02
Sb-125	Less than 5.0 E+02
Cs-134	Less than 1.8 E+02
Cs-137	8.4 ± 2.0 E+02
Hg-203	Less than 2.2 E+02
Tl-208	3.2 ± 1.5 E+02
Bi-212	Less than 2.1 E+03
Pb-212	9.8 ± 4.1 E+02
Pb-214	1.1 ± 0.4 E+03
Bi-214	6.9 ± 3.3 E+02
Ra-226	Less than 5.6 E+03
Ac-228	9.7 ± 7.4 E+02

OYSTER SAMPLES
(picocuries per kilogram wet)

	Newport News*	Point of Shoals
Date Collected	7-28-75	7-28-75
Sample Weight Dry/Wet	0.044/0.412 kg	0.028/0.420 kg
Gamma Spectrometry		
K-40	Less than 7.2 E+02	Less than 6.2 E+02
Mn-54	Less than 1.4 E+01	1.3 ± 0.9 E+01
Co-58	Less than 2.3 E+01	Less than 2.3 E+01
Co-60	Less than 3.5 E+01	Less than 1.8 E+01
Sb-125	Less than 1.2 E+02	Less than 1.2 E+02
Cs-137	Less than 3.0 E+01	Less than 3.5 E+01
Tl-208	Less than 3.6 E+01	Less than 5.3 E+01
Pb-212	Less than 1.2 E+02	Less than 1.2 E+02
Pb-214	Less than 6.7 E+01	Less than 6.6 E+01
Bi-214	Less than 9.3 E+01	9.7 ± 9.7 E+01
Ra-226	Less than 1.3 E+03	Less than 1.3 E+03

*Sample part of VEPCo split program. VEPCo/State/AEC.

OYSTER SAMPLES
(picocuries per kilogram wet)

	Deep Water Shoals
Date Collected	7-28-75
Sample Weight Dry/Wet	0.0255/0.428 kg
<u>Gamma Spectrometry</u>	
K-40	5.1 ± 4.0 E+02
Mn-54	Less than 1.3 E+01
Co-58	2.4 ± 1.5 E+01
Co-60	Less than 1.8 E+01
Sb-125	Less than 1.2 E+02
Cs-137	1.7 ± 1.7 E+01
Tl-208	Less than 4.6 E+01
Pb-212	Less than 1.2 E+02
Pb-214	Less than 6.5 E+01
Bi-214	6.0 ± 6.0 E+01
Ra-226	Less than 1.3 E+03

OYSTER SAMPLES
(picocuries per kilogram wet)

	Deep Water Shoals	Point of Shoals
Date Collected	9-17-75	9-17-75
Sample Weight Dry/Wet	0.023/0.334	0.023/0.293
Gamma Spectrometry		
K-40	Less than 4.6 E+02	5.8 ± 3.8 E+02
Mn-54	Less than 1.7 E+01	Less than 8.7 E+02
Co-58	Less than 2.9 E+01	Less than 3.3 E+01
Co-60	Less than 2.3 E+01	Less than 2.6 E+01
Sb-125	Less than 9.6 E+01	Less than 1.7 E+02
Cs-137	Less than 2.3 E+01	3.8 ± 2.3 E+01
Tl-208	Less than 6.6 E+01	Less than 7.6 E+01
Pb-212	Less than 6.9 E+01	Less than 1.7 E+02
Pb-214	Less than 8.3 E+01	Less than 9.4 E+01
Bi-214	Less than 1.1 E+02	Less than 1.3 E+02
Ra-226	Less than 7.6 E+02	Less than 1.9 E+03

OYSTER SAMPLE
(picocuries per kilogram wet)

Newport News

Date Received	9-29-75
Sample Weight Dry/Wet	0.067/0.5567 kg

Gamma Spectrometry

K-40	1.0 ± 0.4 E+03
Mn-54	1.8 ± 1.5 E+01
Co-58	Less than 3.1 E+01
Co-60	Less than 2.5 E+01
Sb-125	Less than 5.8 E+01
Cs-137	3.9 ± 2.0 E+01
Tl-208	Less than 3.3 E+01
Pb-212	Less than 9.6 E+01
Pb-214	Less than 8.6 E+01
Bi-214	Less than 1.8 E+02
Ra-226	Less than 1.0 E+03

OYSTER SAMPLES
(picocuries per kilogram wet)

	Newport News	Point of Shoals
Date Collected	11-17-75	11-18-75
Sample Weight Dry/Wet	0.045/0.2885	0.030/0.3935
Gamma Spectrometry		
Be-7	1.8 ± 1.2 E+02	Less than 2.7 E+02
K-40	4.0 ± 3.6 E+02	9.9 ± 4.6 E+02
Cr-51	2.3 ± 1.4 E+02	Less than 3.1 E+02
Co-58	Less than 1.6 E+01	2.8 ± 1.6 E+01
Ru-103	1.8 ± 1.6 E+01	Less than 3.6 E+01
Ag-110m	Less than 2.6 E+01	3.0 ± 2.6 E+01
Sb-125	Less than 3.9 E+01	Less than 1.3 E+02
Cs-137	Less than 2.9 E+01	Less than 4.1 E+01
Pb-212	Less than 8.5 E+01	Less than 1.3 E+03
Pb-214	Less than 3.5 E+01	Less than 1.3 E+02
Bi-214	Less than 9.3 E+01	Less than 8.9 E+01
Ra-226	Less than 3.2 E+02	Less than 1.4 E+03

OYSTER SAMPLES
(picocuries per kilogram wet)

	Deep Water Shoals
Date Collected	11-18-75
Sample Weight Dry/Wet	0.019/0.3125

Gamma Spectrometry

Be-7	Less than 4.3 E+02
K-40	6.6 ± 3.4 E+02
Cr-51	Less than 5.0 E+02
Co-58	Less than 3.8 E+01
Ru-103	Less than 5.7 E+01
Ag-110m	Less than 6.1 E+01
Sb-125	Less than 9.2 E+01
Cs-137	Less than 2.9 E+01
Pb-212	Less than 2.0 E+02
Pb-214	Less than 8.2 E+01
Bi-214	Less than 2.2 E+02
Ra-226	Less than 7.6 E+02

CLAM SAMPLES
(picocuries per kilogram)

	Station Discharge	Jamestown
Date Collected	7-17-75	7-17-75
Sample Weight Dry/Wet	0.058/0.7985 kg	0.040/0.643 kg
Gamma Spectrometry		
Be-7	Less than 1.5 E+02	Less than 1.9 E+02
K-40	6.3 ± 2.8 E+02	6.9 ± 2.7 E+02
Mn-54	Less than 6.2 E+01	Less than 7.7 E+01
Co-58	Less than 2.2 E+01	2.2 ± 1.8 E+01
Co-60	4.8 ± 1.6 E+01	2.3 ± 1.4 E+01
Nb-95	Less than 1.7 E+01	Less than 2.1 E+01
Ru-103	Less than 1.3 E+01	Less than 1.6 E+01
I-131	Less than 6.4 E+01	2.8 ± 2.7 E+01
Cs-134	Less than 2.1 E+01	Less than 2.7 E+01
Cs-137	4.4 ± 1.6 E+01	3.7 ± 1.9 E+01
Ba-140	Less than 6.4 E+01	Less than 8.0 E+01
La-140	Less than 6.4 E+01	Less than 8.0 E+01
Ce-141	Less than 6.0 E+01	Less than 8.9 E+01
Ce-144	1.6 ± 1.6 E+02	Less than 3.0 E+02
Tl-208	Less than 2.3 E+01	Less than 3.1 E+01
Pb-212	Less than 7.6 E+01	Less than 9.6 E+01
Pb-214	Less than 6.0 E+01	7.2 ± 6.5 E+01
Bi-214	Less than 6.3 E+01	Less than 9.8 E+01
Ra-226	Less than 8.4 E+02	Less than 9.0 E+02

CLAM SAMPLES
(picocuries per kilogram)

	Hog Island Point
Date Collected	7-17-75
Sample Weight Dry/Wet	0.044/0.833 kg
Gamma Spectrometry	
Be-7	Less than 1.4 E+02
K-40	4.8 ± 2.5 E+02
Mn-54	Less than 6.0 E+01
Co-58	7.8 ± 2.0 E+01
Co-60	8.5 ± 2.1 E+01
Nb-95	Less than 1.6 E+01
Ru-103	Less than 1.2 E+01
I-131	Less than 6.2 E+01
Cs-134	Less than 2.1 E+01
Cs-137	3.1 ± 1.9 E+01
Ba-140	Less than 6.2 E+01
La-140	Less than 6.2 E+01
Ce-141	Less than 5.8 E+01
Ce-144	Less than 2.3 E+01
Tl-208	Less than 2.2 E+01
Pb-212	Less than 7.3 E+01
Pb-214	Less than 5.7 E+01
Bi-214	Less than 7.9 E+01
Ra-226	Less than 8.6 E+02

CLAM SAMPLES
(picocuries per kilogram wet)

	Lawnes Creek	Chickahominy
Date Collected	7-28-75	7-31-75
Sample Weight Dry/Wet	0.0345/0.318 kg	0.0530/0.500 kg
Gamma Spectrometry		
Be-7	Less than 3.8 E+02	Less than 2.4 E+02
K-40	6.5 ± 4.2 E+02	Less than 3.4 E+02
Mn-54	Less than 1.6 E+02	Less than 1.0 E+02
Co-58	Less than 5.4 E+01	Less than 3.5 E+01
Co-60	Less than 4.4 E+01	Less than 2.8 E+01
Nb-95	Less than 4.3 E+01	Less than 2.7 E+01
Ru-103	Less than 3.2 E+01	Less than 2.0 E+01
I-131	Less than 1.6 E+02	Less than 1.0 E+02
Cs-134	Less than 5.4 E+01	Less than 3.4 E+01
Cs-137	2.8 ± 2.1 E+01	Less than 2.8 E+01
Ba-140	Less than 1.6 E+02	Less than 1.0 E+02
La-140	Less than 1.6 E+02	Less than 1.0 E+02
Ce-141	Less than 1.5 E+02	Less than 9.6 E+01
Ce-144	Less than 6.0 E+01	Less than 3.8 E+01
Tl-208	Less than 5.8 E+01	Less than 3.0 E+01
Pb-212	Less than 1.5 E+02	Less than 9.2 E+01
Pb-214	Less than 1.5 E+02	Less than 9.5 E+01
Bi-214	1.6 ± 1.4 E+02	Less than 2.1 E+02
Ra-226	Less than 1.7 E+03	Less than 1.2 E+03

CLAM SAMPLES
(picocuries per kilogram wet)

	Hog Point Station	Chickahominy
Date Collected	9-17-75	9-17-75
Sample Weight Dry/Wet	0.0185/0.2235 kg	0.024/0.2435 kg
Gamma Spectrometry		
K-40	Less than 6.6 E+02	3.4 ± 3.0 E+02
Mn-54	Less than 3.1 E+01	3.7 ± 1.6 E+01
Co-58	7.9 ± 3.0 E+01	Less than 3.7 E+01
Co-60	7.2 ± 3.4 E+01	3.2 ± 2.6 E+01
Sb-125	Less than 1.7 E+02	Less than 1.3 E+02
I-131	Less than 1.5 E+02	3.3 ± 0.8 E+02
Cs-134	Less than 4.7 E+01	3.0 ± 2.4 E+01
Cs-137	Less than 4.8 E+01	Less than 3.8 E+01
Ba-140	Less than 1.4 E+02	Less than 1.1 E+02
La-140	Less than 9.5 E+01	9.9 ± 7.1 E+01*
Tl-208	Less than 2.6 E+01	Less than 2.0 E+01
Bi-212	3.3 ± 3.1 E+02	Less than 3.6 E+02
Pb-212	Less than 1.0 E+02	Less than 9.7 E+01
Pb-214	Less than 1.5 E+02	Less than 1.2 E+02
Bi-214	Less than 7.5 E+01	Less than 5.8 E+01
Ra-226	Less than 1.5 E+03	Less than 1.2 E+03

*Corrected to time of colletion using Ba-140 half life.

CLAM SAMPLES
(picocuries per kilogram wet)

	Lawnes Creek
Date Collected	9-17-75
Samle Weight Dry/Wet	0.022/0.2095 kg

Gamma Spectrometry

K-40	Less than 6.2 E+02
Mn-54	Less than 2.6 E+01
Co-58	3.3 ± 2.3 E+01
Co-60	Less than 4.2 E+01
Sb-125	Less than 1.4 E+02
I-131	Less than 1.3 E+02
Cs-134	Less than 3.9 E+01
Cs-137	Less than 3.7 E+01
Ba-140	Less than 1.2 E+02
La-140	Less than 8.0 E+01
Tl-208	Less than 2.2 E+01
Bi-212	Less than 3.9 E+02
Pb-212	Less than 1.2 E+02
Pb-214	Less than 1.3 E+02
Bi-214	Less than 6.3 E+01
Ra-226	Less than 1.3 E+03

CLAM SAMPLES
(picocuries per kilogram wet)

	Station Discharge	Jamestown Island
Date Collected	9-15-75	9-15-75
Sample Weight Dry/Wet	0.0355/0.5739 kg	0.022/0.3869 kg
Gamma Spectrometry		
Be-7	1.4 ± 1.4 E+02	Less than 3.1 E+02
K-40	5.4 ± 2.6 E+02	5.7 ± 3.5 E+02
Mn-54	Less than 8.7 E+01	Less than 1.3 E+02
Co-58	6.2 ± 2.0 E+01	4.1 ± 2.5 E+01
Co-60	4.2 ± 1.8 E+01	4.9 ± 2.4 E+01
Nb-95	Less than 2.4 E+01	Less than 3.5 E+01
Ru-103	Less than 1.8 E+01	Less than 2.6 E+01
I-131	3.4 ± 0.6 E+02	2.2 ± 0.8 E+02
Cs-134	3.4 ± 2.0 E+01	Less than 4.4 E+01
Cs-137	6.5 ± 2.2 E+01	3.5 ± 3.4 E+01
Ba-140	1.5 ± 0.6 E+01	Less than 1.3 E+02
La-140	9.5 ± 0.6 E+01	Less than 1.3 E+02
Ce-141	Less than 8.4 E+01	Less than 1.2 E+02
Ce-144	2.2 ± 1.6 E+02	Less than 4.9 E+01
Tl-208	Less than 3.2 E+01	Less than 4.2 E+01
Pb-212	Less than 9.0 E+01	Less than 1.2 E+02
Pb-214	Less than 8.3 E+01	Less than 1.2 E+02
Bi-214	Less than 1.8 E+02	Less than 2.7 E+02
Ra-226	Less than 1.0 E+03	Less than 1.5 E+03

*Decayed to time of collection using Ba-140 half life.

CLAM SAMPLES
(picocuries per kilogram wet)

	Jamestown	Station Discharge
Date Collected	11-17-75	11-17-75
Sample Weight Dry/Wet	0.023/0.3890 kg	0.0235/0.2944 kg
Gamma Spectrometry		
K-40	2.5 ± 2.0 E+02	Less than 3.6 E+02
Co-58	3.6 ± 1.5 E+01	1.7 ± 0.4 E+02
Co-60	Less than 2.2 E+01	1.0 ± 0.3 E+02
Ru-103	Less than 1.6 E+01	Less than 1.6 E+01
Sb-125	Less than 7.8 E+01	Less than 9.9 E+01
Cs-134	2.1 ± 1.4 E+01	3.0 ± 2.7 E+01
Cs-137	1.9 ± 0.9 E+01	9.9 ± 2.9 E+01
Tl-208	Less than 2.4 E+01	Less than 2.4 E+01
Bi-212	Less than 3.9 E+02	Less than 3.8 E+02
Pb-212	Less than 6.1 E+01	Less than 8.2 E+01
Pb-214	Less than 7.3 E+01	Less than 7.3 E+01
Ra-226	Less than 6.5 E+02	Less than 6.4 E+02

CLAM SAMPLES
(picocuries per kilogram wet)

	Lawnes Creek	Hog Island Point
Date Collected	11-18-75	11-17-75
Sample Weight Dry/Wet	0.0225/0.3620	0.022/0.3311
Gamma Spectrometry		
K-40	Less than 3.8 E+02	Less than 5.0 E+02
Co-58	Less than 2.3 E+01	1.0 ± 0.2 E+02
Co-60	Less than 2.2 E+01	4.3 ± 2.1 E+01
Ru-103	1.2 ± 1.1 E+01	Less than 1.7 E+01
Sb-125	Less than 7.7 E+01	Less than 7.9 E+01
Cs-134	Less than 2.1 E+01	Less than 2.2 E+01
Cs-137	1.9 ± 1.4 E+01	Less than 3.5 E+01
Tl-208	Less than 2.5 E+01	Less than 2.5 E+01
Bi-212	Less than 4.0 E+02	Less than 4.0 E+01
Pb-212	Less than 6.4 E+01	Less than 6.2 E+01
Pb-214	Less than 7.5 E+01	Less than 7.9 E+01
Ra-226	Less than 6.8 E+02	Less than 7.4 E+02

CLAM SAMPLES
(picocuries per kilogram wet)

	Chickahominy
Date Collected	11-17-75
Sample Weight Dry/Wet	0.0195/0.3085

Gamma Spectrometry

K-40	Less than 4.4 E+02
Co-58	7.4 ± 3.0 E+01
Co-60	Less than 3.0 E+01
Ru-103	Less than 1.9 E+01
Sb-125	Less than 8.9 E+01
Cs-134	Less than 2.5 E+01
Cs-137	3.7 ± 2.1 E+01
Tl-208	Less than 2.9 E+01
Bi-212	Less than 4.6 E+02
Pb-212	Less than 3.6 E+02
Pb-214	Less than 8.7 E+01
Ra-226	Less than 7.7 E+02

CRAB SAMPLE
(picocuries per kilogram wet)

	Crab at Station Intake
Date Collected	7-31-75
Sample Weight Dry/Wet	0.0625/0.383 kg
<u>Gamma Spectrometry</u>	
K-40	2.1 ± 0.6 E+03
Cs-137	4.7 ± 3.1 E+01
Pb-212	Less than 1.3 E+02
Ra-226	Less than 1.4 E+03

CRAB SAMPLE
(picocuries per kilogram wet)

	Crab at Station Intake
Date Collected	8-20-75
Sample Weight Dry/Wet	0.036/0.270 kg
Gamma Spectrometry	
K-40	2.9 ± 0.8 E+03
Ru-106	Less than 3.6 E+02
Sb-125	Less than 1.9 E+02
Cs-137	3.5 ± 2.8 E+01
Pb-212	Less than 1.8 E+02
Pb-214	Less than 1.7 E+02
Bi-214	Less than 2.1 E+02

FISH SAMPLES
(picocuries per kilogram wet)

	Station Intake VEP-SI-Fish
Date Collected	8-20-75
Sample Weight Dry/Wet	0.0195/0.048 kg
<u>Gamma Spectrometry</u>	
K-40	3.5 ± 2.6 E+03
Cs-137	2.0 ± 1.4 E+02
Tl-208	Less than 2.8 E+02
Pb-212	Less than 9.9 E+02
Pb-214	Less than 9.6 E+02