OFFICE COPY

ENVIRONMENT CANADA
MONITORING PROGRAM DATA
NOVA SCOTIA
FISCAL YEAR 1987/88

VOLUME - II

INDEX

(U)

(V)

(W) Wooden's River

(X)

(Y) Yava Mine

(Z)

B . P . L . MANAFACTURING LTD .

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**********************************************************************
* 88PH001 - PHIL HENNEBURY                    STATUS AS OF FEB 10, 1988 *

REGISTERED ON: JAN 27, 1988,  BY :PHIL H

LOCATOR: SPECNS01/SPECIAL SAMPLES, N.S.
                                                          PROV: NS

PROJECT CODE: 240/ENV. CONTROL SITE FISHERIES ACT

SAMPLING BEGAN: DATE: 27/ 1/88 (JAN 27, 1988), TIME: 1400, FREQ: 1
SAMPLING ENDED: DATE: 27/ 1/88 (JAN 27, 1988), TIME: 1400

DEPTH:    .00 METERS, TIDE:
NARRATIVE: RINSE TANK OVERFLOW
           B.P.L. MANUFACTUREING LTD  SPRINGHILL N.
                    ---- SAMPLE ANALYSIS ----
    .............PARAMETER ..... ..... VALUE ..... UNITS
 1: 001F/PH.......................... 7.8
 2: 005 /HARDNESS.................... 21.                  MG/L
 3: 022 /MAGNESIUM (TOTAL)........... 1.33                 MG/L
 4: 036 /CALCIUM (TOTAL).............. 1.28                 MG/L
 5: 044 /ARSENIC (TOTAL).............. L0.05                MG/L
 6: 046 /CADMIUM (TOTAL).............. 0.02                 MG/L
 7: 047 /CHROMIUM (TOTAL)............. 0.03                 MG/L
 8: 048 /COPPER (TOTAL)............... 0.12                 MG/L
 9: 049 /IRON (TOTAL)................. 13.5                 MG/L
10: 051 /LEAD (TOTAL)................. 0.78                 MG/L
11: 054 /ZINC (TOTAL)................. 95.7                 MG/L
12: 159 /NICKEL (TOTAL).............. 2.74                 MG/L
13: 160 /MANGANESE (TOTAL)........... 0.39                 MG/L
14: 162 /ALUMINUM (TOTAL)............ 1.84                 MG/L
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CRYSTAL SPRINGS LTD.

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**********************************************************************
* 870A027 - OUTSIDE AGENCIES                    STATUS AS OF MAR 11, 1987 *

REGISTERED ON: MAR  4, 1987,  BY :CHEMLAB

LOCATOR: SPECNS01/SPECIAL SAMPLES, N.S.
                                                          PROV: NS
PROJECT CODE: 265/LAB SUPPORT - PREV & CONTR WATER POLL

SAMPLING BEGAN, DATE:  2/ 3/87 (MAR  2, 1987), TIME: 1012, FREQ:   1
SAMPLING ENDED, DATE:  2/ 3/87 (MAR  2, 1987), TIME: 1012

DEPTH:    .00 METERS, TIDE:
NARRATIVE: #1 RAW WATER CRYSTAL SPRINGS LTD 162 MAL
           ONEY ST SYDNEY ROBERT McCHARLES NSDUE
                        ---- SAMPLE ANALYSIS -----
     .............PARAMETER ..........  ..... VALUE ..... UNITS
 1:  282 /FLUORENE.....................  L0.0001           MG/L
 2:  284 /PHENANTHRENE.................  L0.0001           MG/L
 3:  285 /PYRENE.......................  L0.00008          MG/L
 4:  286 /NAPHTHALENE..................  L0.0002           MG/L
 5:  294 /TRIPHENYLENE.................  L0.0001           MG/L
 6:  295 /FLUORANTHENE.................  L0.00003          MG/L
 7:  297 /ANTHRACENE...................  L0.0005           MG/L
 8:  298 /BENZO(GHI)PERYLENE...........  L0.00005          MG/L
 9:  299 /BENZO(A)PYRENE...............  L0.00001          MG/L
10:  300 /BENZO(E)PYRENE...............  L0.00006          MG/L
11:  301 /CHRYSENE.....................  L0.00008          MG/L
12:  302 /BENZO(K)FLUORANTHENE.........  L0.00003          MG/L
13:  303 /BENZO(B)FLUORANTHENE.........  L0.00001          MG/L
14:  304 /INDENO(1,2,3-CD)PYRENE.......  L0.00003          MG/L
15:  391 /BENZO(A)ANTHRACENE...........  L0.00002          MG/L
16:  646 /ACENAPHTHENE                   L0.0002           MG/L
17:  647 /ACENAPHTHYLENE                 L0.0005           MG/L
18:  648 /DIBENZ(AH)ANTHRACENE           L0.00001          MG/L
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* 870A028 - OUTSIDE AGENCIES                    STATUS AS OF MAR 11, 1987 *

REGISTERED ON: MAR  4, 1987,  BY :CHEMLAB

LOCATOR: SPECNS01/SPECIAL SAMPLES, N.S.

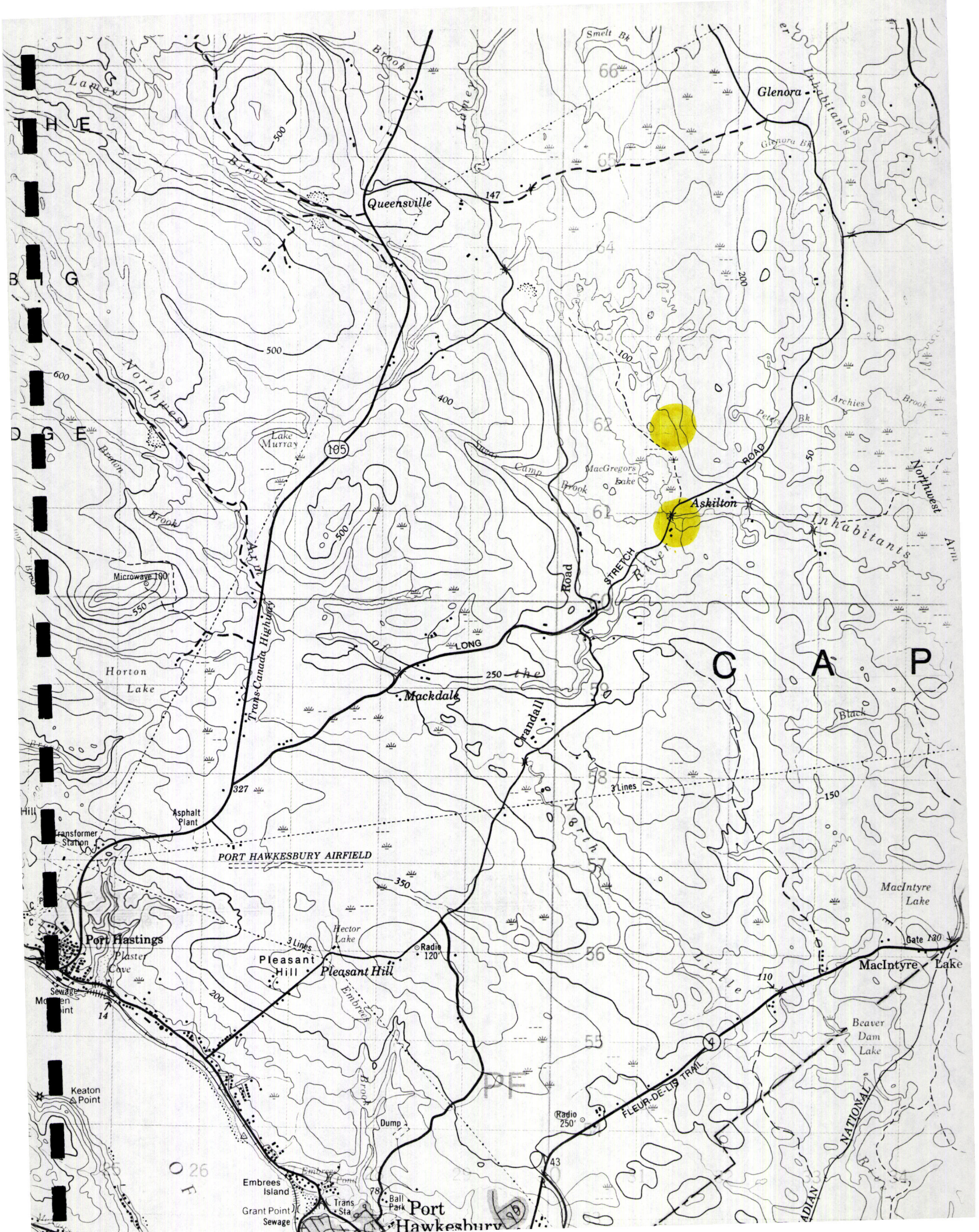
                                                              PROV: NS
PROJECT CODE: 265/LAB SUPPORT - PREV & CONTR WATER POLL

SAMPLING BEGAN, DATE:  2/ 3/87 (MAR  2, 1987), TIME: 1015, FREQ:   1
SAMPLING ENDED, DATE:  2/ 3/87 (MAR  2, 1987), TIME: 1015

DEPTH:    .00 METERS, TIDE:
NARRATIVE: #2 RAW WATER CRYSTAL SPRINGS LTD 162 MAL
           ONEY ST SYDNEY ROBERT McCHARLES NSDOE
                      ---- SAMPLE ANALYSIS ----
    .............PARAMETER ............ ...... VALUE ...... UNITS
 1: 282 /FLUORENE.....................   L0.0001              MG/L
 2: 284 /PHENANTHRENE.................   L0.0001              MG/L
 3: 285 /PYRENE.......................   L0.00008             MG/L
 4: 286 /NAPHTHALENE..................   L0.0002              MG/L
 5: 294 /TRIPHENYLENE.................   L0.0001              MG/L
 6: 295 /FLUORANTHENE.................   L0.00003             MG/L
 7: 297 /ANTHRACENE...................   L0.0005              MG/L
 8: 298 /BENZO(GHI)PERYLENE...........   L0.00005             MG/L
 9: 299 /BENZO(A)PYRENE...............   L0.00001             MG/L
10: 300 /BENZO(E)PYRENE...............   L0.00006             MG/L
11: 301 /CHRYSENE.....................   L0.00008             MG/L
12: 302 /BENZO(K)FLUORANTHENE.........   L0.00003             MG/L
13: 303 /BENZO(B)FLUORANTHENE.........   L0.00001             MG/L
14: 304 /INDENO(1,2,3-CD)PYRENE......    L0.00003             MG/L
15: 391 /BENZO(A)ANTHRACENE...........   L0.00002             MG/L
16: 646 /ACENAPHTHENE                    L0.0002              MG/L
17: 647 /ACENAPHTHYLENE                  L0.0005              MG/L
18: 648 /DIBENZ(AH)ANTHRACENE            L0.00003             MG/L
```

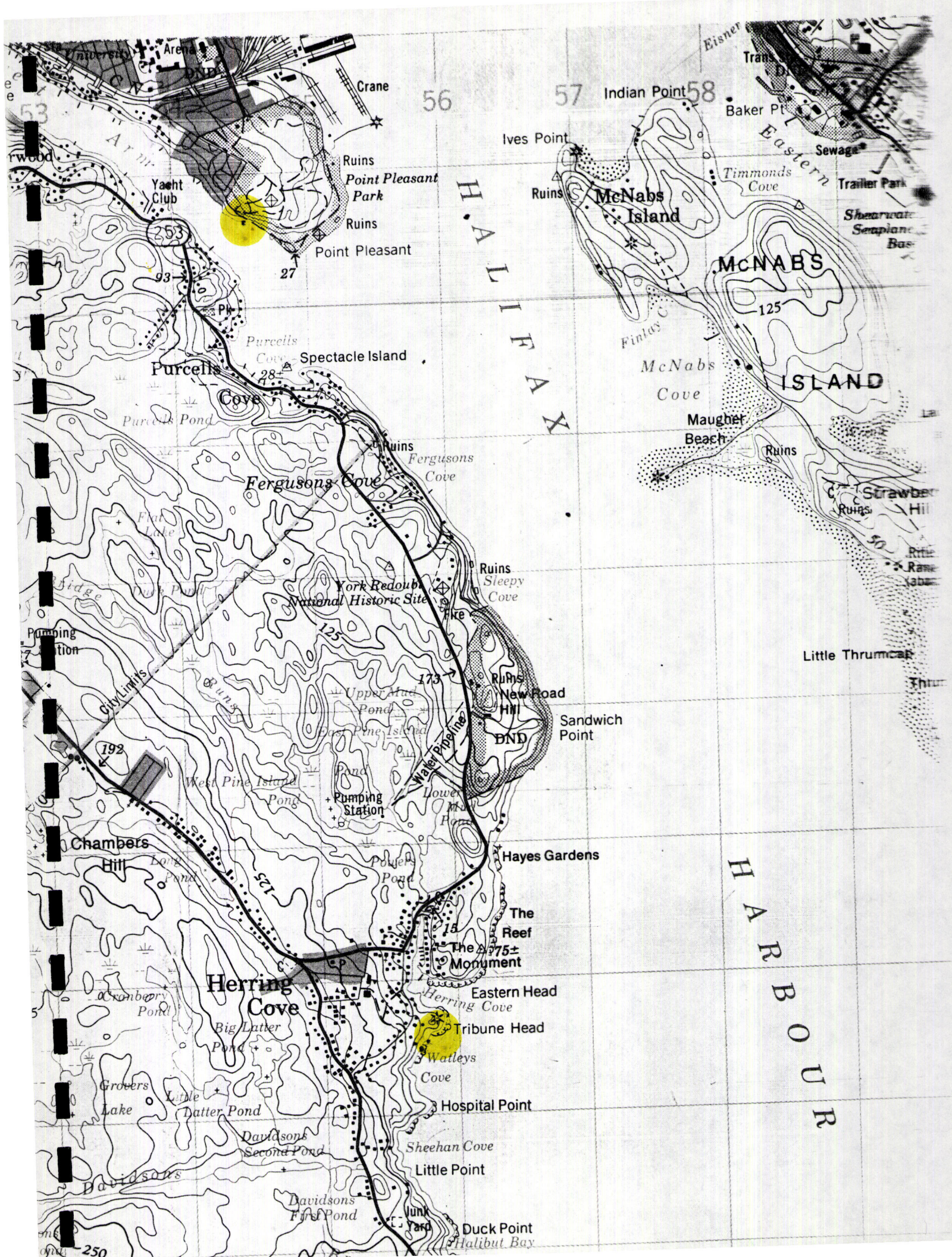
G

GEORGIA PACIFIC - SUGAR CAMP LAKE


Glenora
Queensville
Lake Murray
Askilton
MacGregors Lake
Northwest Inhabitants Arm
Microwave 190
Trans-Canada Highway
Mackdale
Crandall
Horton Lake
PORT HAWKESBURY AIRFIELD
Asphalt Plant
Transformer Station
Port Hastings
Plaster Cove
Pleasant Hill
Hector Lake
Radio 120'
Gate 130
MacIntyre Lake
Beaver Dam Lake
FLEUR-DE-LIS TRAIL
Radio 250'
Keaton Point
Embrees Island
Grant Point
Trans Sta
Ball Park
Port Hawkesbury
Dump
Sewage
Smelt Bk
Glenora Bk
Archies Brook
Petes Bk
Camp Brook
Black
Little
Embree
Northwest
Arm
Road
STRETCH
ROAD
LONG
the
3 Lines
147
105
14
43
78
327
250
350
150
110
100
200
400
500
550
600
50
55
56
57
58
59
60
61
62
63
64
65
66

GEORGIA PACIFIC - SUGAR CAMP LAKE

HALIFAX - HARBOUR (PT. PLEASANT, HERRING COVE)


Arena
Crane
Indian Point
Baker Pt
Ives Point
Ruins
Point Pleasant Park
Ruins
Point Pleasant
Yacht Club
Sewage
Trailer Park
Timmonds Cove
Eastern
McNabs Island
McNABS
ISLAND
Spectacle Island
Purcells Cove
Purcells Pond
Finlay
McNabs Cove
Maugher Beach
Ruins
Fergusons Cove
Ruins
Sleepy Cove
York Redoubt National Historic Site
Pumping Station
Little Thrumcap
City Limits
Ruins
New Road Hill
Sandwich Point
DND
Water Pipeline
Upper Mud Pond
Deep Pine Island
West Pine Island Pond
Pumping Station
Lower Mud Pond
Chambers Hill
Long Pond
Hayes Gardens
Powers Pond
The Reef
The Monument
175±
Herring Cove
Eastern Head
Cranberry Pond
Big Latter Pond
Tribune Head
Watleys Cove
Growers Lake
Little Latter Pond
Hospital Point
Davidsons Second Pond
Sheehan Cove
Little Point
Davidsons
Davidsons First Pond
Junk Yard
Duck Point
Halibut Bay
HALIFAX HARBOUR

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* 87PK061 - PAUL KLAAMAS                          STATUS AS OF DEC 18, 1987 *

REGISTERED ON: OCT 13, 1987,  BY :BOB G

LOCATOR: HFXHBR15/HALIFAX HARBOUR
                  HERRING COVE OUTFALL, MG 557345          PROV: NS
PROJECT CODE: 242/ENV. CONTROL FEDERAL FACILITIES

SAMPLING BEGAN, DATE: 13/10/87 (OCT 13, 1987), TIME: 1130, FREQ: 3
SAMPLING ENDED, DATE: 13/10/87 (OCT 13, 1987), TIME: 1430

DEPTH:    .00 METERS, TIDE:
NARRATIVE:

                        ---- SAMPLE ANALYSIS ----
    .............PARAMETER ..... ..... VALUE ..... UNITS
 1: 001 /PH.............................  6.9
 2: 001F/PH.............................  7.45
 3: 002 /TEMPERATURE....................  16.0                  DEGREES C.
 4: 005 /HARDNESS.......................  60.                   MG/L
 5: 015 /BIOCHEM. OXYGEN DEMAND (BOD)..  60.                   MG/L
 6: 020 /SUSPENDED SOLIDS (SS).........  140.                  MG/L
 7: 022 /MAGNESIUM (TOTAL).............  4.10                  MG/L
 8: 028 /AMMONIA-N (NH3-N).............  4.9                   MG/L
 9: 035 /SODIUM.........................  100.                  MG/L
10: 036 /CALCIUM (TOTAL)................  17.2                  MG/L
11: 043 /SILVER (TOTAL)................ L.02                   MG/L
12: 044 /ARSENIC (TOTAL)............... L0.05                  MG/L
13: 046 /CADMIUM (TOTAL)............... L0.01                  MG/L
14: 047 /CHROMIUM (TOTAL).............  0.05                  MG/L
15: 048 /COPPER (TOTAL)................  0.05                  MG/L
16: 049 /IRON (TOTAL)..................  4.84                  MG/L
17: 051 /LEAD (TOTAL).................. L0.02                  MG/L
18: 054 /ZINC (TOTAL)..................  0.08                  MG/L
19: 086 /SULFIDE....................... L0.15                  MG/L
20: 159 /NICKEL (TOTAL)................  0.02                  MG/L
21: 160 /MANGANESE (TOTAL).............  0.43                  MG/L
22: 162 /ALUMINUM (TOTAL).............  2.72                  MG/L
23: 201 /BERYLLIUM ..................... L0.01                  MG/L
24: 202 /VANADIUM .....................  0.02                  MG/L
25: 203 /BARIUM (BA) ..................  0.07                  MG/L
26: 237 /COBALT (CO) ................. L0.01                  MG/L
27: 259 /POTASSIUM.....................  6.95                  MG/L
28: 500 /BIOASSAY ..................... "DONE"
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* 87PK062 - PAUL KLAAMAS STATUS AS OF DEC 18, 1987 *

REGISTERED ON: OCT 13, 1987, BY :BOB G

LOCATOR: HFXHBR16/HALIFAX HARBOUR
PT. PLEASANT PK. OUTFALL, MG 545407 PROV: NS
PROJECT CODE: 242/ENV. CONTROL FEDERAL FACILITIES

SAMPLING BEGAN: DATE: 13/10/87 (OCT 13, 1987), TIME: 1200, FREQ: 3
SAMPLING ENDED, DATE: 13/10/87 (OCT 13, 1987), TIME: 1500

DEPTH: .00 METERS, TIDE:
NARRATIVE:

---- SAMPLE ANALYSIS ----

	PARAMETER	VALUE	UNITS
1:	001 /PH	7.0	
2:	001F/PH	7.45	
3:	002 /TEMPERATURE	16.0	DEGREES C.
4:	005 /HARDNESS	360.	MG/L
5:	015 /BIOCHEM. OXYGEN DEMAND (BOD)	65.	MG/L
6:	020 /SUSPENDED SOLIDS (SS)	30.	MG/L
7:	022 /MAGNESIUM (TOTAL)	69.2	MG/L
8:	028 /AMMONIA-N (NH3-N)	3.85	MG/L
9:	035 /SODIUM	560.	MG/L
10:	036 /CALCIUM (TOTAL)	32.6	MG/L
11:	043 /SILVER (TOTAL)	L.02	MG/L
12:	044 /ARSENIC (TOTAL)	L0.05	MG/L
13:	046 /CADMIUM (TOTAL)	L0.01	MG/L
14:	047 /CHROMIUM (TOTAL)	0.10	MG/L
15:	048 /COPPER (TOTAL)	0.05	MG/L
16:	049 /IRON (TOTAL)	1.58	MG/L
17:	051 /LEAD (TOTAL)	L0.02	MG/L
18:	054 /ZINC (TOTAL)	0.09	MG/L
19:	086 /SULFIDE	L0.15	MG/L
20:	159 /NICKEL (TOTAL)	0.01	MG/L
21:	160 /MANGANESE (TOTAL)	0.20	MG/L
22:	162 /ALUMINUM (TOTAL)	L0.025	MG/L
23:	201 /BERYLLIUM	L0.01	MG/L
24:	202 /VANADIUM	L0.01	MG/L
25:	203 /BARIUM (BA)	0.03	MG/L
26:	237 /COBALT (CO)	L0.01	MG/L
27:	259 /POTASSIUM	28.0	MG/L
28:	500 /BIOASSAY	*DONE*	

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* 87PK063 - PAUL KLAAMAS STATUS AS OF DEC 18, 1987 *

REGISTERED ON: OCT 14, 1987; BY :BOB G

LOCATOR: HFXHBR15/HALIFAX HARBOUR
HERRING COVE OUTFALL, MG 557345 PROV: NS
PROJECT CODE: 242/ENV. CONTROL FEDERAL FACILITIES

SAMPLING BEGAN, DATE: 14/10/87 (OCT 14, 1987), TIME: 930, FREQ: 4
SAMPLING ENDED, DATE: 14/10/87 (OCT 14, 1987), TIME: 1330

DEPTH: .00 METERS, TIDE:
NARRATIVE:

---- SAMPLE ANALYSIS ----

	PARAMETER	VALUE	UNITS
1:	001 /PH	6.7	
2:	001F/PH	7.35	
3:	002 /TEMPERATURE	16.0	DEGREES C.
4:	005 /HARDNESS	65.	MG/L
5:	015 /BIOCHEM. OXYGEN DEMAND (BOD)	80.	MG/L
6:	020 /SUSPENDED SOLIDS (SS)	75.	MG/L
7:	022 /MAGNESIUM (TOTAL)	4.44	MG/L
8:	028 /AMMONIA-N (NH3-N)	7.14	MG/L
9:	035 /SODIUM	90.	MG/L
10:	036 /CALCIUM (TOTAL)	19.0	MG/L
11:	043 /SILVER (TOTAL)	L.02	MG/L
12:	044 /ARSENIC (TOTAL)	0.06	MG/L
13:	046 /CADMIUM (TOTAL)	L0.01	MG/L
14:	047 /CHROMIUM (TOTAL)	L0.01	MG/L
15:	048 /COPPER (TOTAL)	0.12	MG/L
16:	049 /IRON (TOTAL)	2.14	MG/L
17:	051 /LEAD (TOTAL)	L0.02	MG/L
18:	054 /ZINC (TOTAL)	0.09	MG/L
19:	086 /SULFIDE	L0.15	MG/L
20:	159 /NICKEL (TOTAL)	0.01	MG/L
21:	160 /MANGANESE (TOTAL)	0.34	MG/L
22:	162 /ALUMINUM (TOTAL)	0.96	MG/L
23:	201 /BERYLLIUM	L0.01	MG/L
24:	202 /VANADIUM	L0.01	MG/L
25:	203 /BARIUM (BA)	0.08	MG/L
26:	237 /COBALT (CO)	L0.01	MG/L
27:	259 /POTASSIUM	5.60	MG/L
28:	500 /BIOASSAY	*DONE*	

****
* 87PK064 - PAUL KLAAMAS STATUS AS OF DEC 18, 1987 *

REGISTERED ON: OCT 14, 1987, BY :BOB G

LOCATOR: HFXHBR16/HALIFAX HARBOUR
PT. PLEASANT PK. OUTFALL, MG 545407 PROV: NS
PROJECT CODE: 242/ENV. CONTROL FEDERAL FACILITIES

SAMPLING BEGAN, DATE: 14/10/87 (OCT 14, 1987), TIME: 1000, FREQ: 4
SAMPLING ENDED, DATE: 14/10/87 (OCT 14, 1987), TIME: 1400

DEPTH: .00 METERS, TIDE:
NARRATIVE:

---- SAMPLE ANALYSIS ----

	PARAMETER	VALUE	UNITS
1:	001 /PH	7.1	
2:	001F/PH	7.4	
3:	002 /TEMPERATURE	16.0	DEGREES C.
4:	005 /HARDNESS	360.	MG/L
5:	015 /BIOCHEM. OXYGEN DEMAND (BOD)	75.	MG/L
6:	020 /SUSPENDED SOLIDS (SS)	30.	MG/L
7:	022 /MAGNESIUM (TOTAL)	68.3	MG/L
8:	028 /AMMONIA-N (NH3-N)	4.90	MG/L
9:	035 /SODIUM	550.	MG/L
10:	036 /CALCIUM (TOTAL)	32.1	MG/L
11:	043 /SILVER (TOTAL)	L.02	MG/L
12:	044 /ARSENIC (TOTAL)	L0.05	MG/L
13:	046 /CADMIUM (TOTAL)	L0.01	MG/L
14:	047 /CHROMIUM (TOTAL)	0.04	MG/L
15:	048 /COPPER (TOTAL)	0.05	MG/L
16:	049 /IRON (TOTAL)	1.53	MG/L
17:	051 /LEAD (TOTAL)	L0.02	MG/L
18:	054 /ZINC (TOTAL)	0.06	MG/L
19:	086 /SULFIDE	L0.15	MG/L
20:	159 /NICKEL (TOTAL)	0.02	MG/L
21:	160 /MANGANESE (TOTAL)	0.20	MG/L
22:	162 /ALUMINUM (TOTAL)	L0.025	MG/L
23:	201 /BERYLLIUM	L0.01	MG/L
24:	202 /VANADIUM	L0.01	MG/L
25:	203 /BARIUM (BA)	0.03	MG/L
26:	237 /COBALT (CO)	L0.01	MG/L
27:	259 /POTASSIUM	25.4	MG/L
28:	500 /BIOASSAY	*DONE*	

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* 87PK065 - PAUL KLAAMAS STATUS AS OF DEC 18, 1987 *

REGISTERED ON: OCT 15, 1987, BY :BOB G

LOCATOR: HFXHBR15/HALIFAX HARBOUR
HERRING COVE OUTFALL, MG 557345 PROV: NS
PROJECT CODE: 242/ENV. CONTROL FEDERAL FACILITIES

SAMPLING BEGAN: DATE: 15/10/87 (OCT 15, 1987), TIME: 900, FREQ: 5
SAMPLING ENDED: DATE: 15/10/87 (OCT 15, 1987), TIME: 1400

DEPTH: .00 METERS, TIDE:
NARRATIVE:

---- SAMPLE ANALYSIS ----

	PARAMETER	VALUE	UNITS
1:	001 /PH	6.6	
2:	001F/PH	6.75	
3:	002 /TEMPERATURE	17.0	DEGREES C.
4:	005 /HARDNESS	65.	MG/L
5:	015 /BIOCHEM. OXYGEN DEMAND (BOD)	80.	MG/L
6:	020 /SUSPENDED SOLIDS (SS)	40.	MG/L
7:	022 /MAGNESIUM (TOTAL)	4.44	MG/L
8:	028 /AMMONIA-N (NH3-N)	12.9	MG/L
9:	035 /SODIUM	95.	MG/L
10:	036 /CALCIUM (TOTAL)	19.5	MG/L
11:	043 /SILVER (TOTAL)	L.02	MG/L
12:	044 /ARSENIC (TOTAL)	0.09	MG/L
13:	046 /CADMIUM (TOTAL)	L0.01	MG/L
14:	047 /CHROMIUM (TOTAL)	0.04	MG/L
15:	048 /COPPER (TOTAL)	0.05	MG/L
16:	049 /IRON (TOTAL)	1.38	MG/L
17:	051 /LEAD (TOTAL)	L0.02	MG/L
18:	054 /ZINC (TOTAL)	0.08	MG/L
19:	086 /SULFIDE	L0.15	MG/L
20:	159 /NICKEL (TOTAL)	0.03	MG/L
21:	160 /MANGANESE (TOTAL)	0.43	MG/L
22:	162 /ALUMINUM (TOTAL)	0.39	MG/L
23:	201 /BERYLLIUM	L0.01	MG/L
24:	202 /VANADIUM	0.02	MG/L
25:	203 /BARIUM (BA)	0.05	MG/L
26:	237 /COBALT (CO)	L0.01	MG/L
27:	259 /POTASSIUM	7.90	MG/L
28:	500 /BIOASSAY	*DONE*	

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* 87PK066 - PAUL KLAAMAS                          STATUS AS OF DEC 18, 1987 *

REGISTERED ON: OCT 15, 1987,  BY :BOB G

LOCATOR: HFXHBR16/HALIFAX HARBOUR
                 PT. PLEASANT PK. OUTFALL, MG 545407        PROV: NS
PROJECT CODE: 242/ENV. CONTROL FEDERAL FACILITIES

SAMPLING BEGAN; DATE: 15/10/87 (OCT 15, 1987), TIME:  930, FREQ: 5
SAMPLING ENDED; DATE: 15/10/87 (OCT 15, 1987), TIME: 1430

DEPTH:    .00 METERS; TIME:
NARRATIVE:

                          ---- SAMPLE ANALYSIS ----
     .............PARAMETER ..... ..... VALUE ..... UNITS
 1: 001 /PH.............................  6.8
 2: 001F/PH.............................  7.1
 3: 002 /TEMPERATURE....................  17.0          DEGREES C.
 4: 005 /HARDNESS.......................  430.          MG/L
 5: 015 /BIOCHEM. OXYGEN DEMAND (BOD)..  75.           MG/L
 6: 020 /SUSPENDED SOLIDS (SS).........  40.           MG/L
 7: 022 /MAGNESIUM (TOTAL).............  83.1          MG/L
 8: 028 /AMMONIA-N (NH3-N).............  8.95          MG/L
 9: 035 /SODIUM.........................  630.          MG/L
10: 036 /CALCIUM (TOTAL)................  37.4          MG/L
11: 043 /SILVER (TOTAL)................. L.02           MG/L
12: 044 /ARSENIC (TOTAL)................ L0.05          MG/L
13: 046 /CADMIUM (TOTAL)................ L0.01          MG/L
14: 047 /CHROMIUM (TOTAL)...............  0.03          MG/L
15: 048 /COPPER (TOTAL).................  0.04          MG/L
16: 049 /IRON (TOTAL)...................  1.86          MG/L
17: 051 /LEAD (TOTAL)................... L0.02          MG/L
18: 054 /ZINC (TOTAL)...................  0.06          MG/L
19: 086 /SULFIDE........................ L0.15          MG/L
20: 159 /NICKEL (TOTAL).................  0.02          MG/L
21: 160 /MANGANESE (TOTAL).............  0.21          MG/L
22: 162 /ALUMINUM (TOTAL)............... L0.025         MG/L
23: 201 /BERYLLIUM ..................... L0.01          MG/L
24: 202 /VANADIUM ...................... L0.01          MG/L
25: 203 /BARIUM (BA) ....................  0.03          MG/L
26: 237 /COBALT (CO) .................... L0.01          MG/L
27: 259 /POTASSIUM.....................  32.0          MG/L
28: 500 /BIOASSAY ...................... 'DONE'
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Environment Canada Environnement Canada

MEMORANDUM NOTE DE SERVICE

DATE
December 2, 1987

FROM: / DE:
David Vaughan
Lab Technician, Laboratory Division
Environmental Protection
Environment Canada, Atlantic Region

Our file / Notre référence
4782-82/42

TO: / À:
Paul Klaamas
Water Pollution Control Division
Environmental Protection
Environment Canada, Atlantic Region

Your file / Votre référence

SUBJECT: / SUJET: **Bioassay Results - Herring Cove and Point Pleasant Park Sewage Samples**

During the period October 13 to October 15, 1987, our lab received six sewage samples for bioassay - three labelled Herring Cove and three labelled Point Pleasant Park.

Beginning October 14, 1987, two 96-hour acute lethal static bioassays were conducted on each sample, one using rainbow trout fingerling (Salmo gairdneri) as the test organism, the other using three-spine stickleback (Gasterosteus aculeatus). Results of the bioassays are shown in Table 1.

The Herring Cove samples yielded 4-day LC50 values ranging from 42% to 75%. The Point Pleasant Park samples were not acutely lethal to either test organism with the exception of the October 13, 1987 sample which gave a 4-day LC50 value of 75% when tested with rainbow trout fingerling. Overall, response from three-spine stickleback was quite similar to that obtained from rainbow trout fingerling.

The cause of the observed mortality is not evident from the chemical analysis results available at this time, although it does appear that unionized ammonia may have contributed to the lethality in several cases. In addition, sulfide cannot be ruled out as a toxicant because it could be toxic at levels below the present detection limit of 0.15 mg/l. Possibly the metal scan results will provide further information with regard to the cause of mortality, when they become available.

A copy of each Bioassay Report is attached which provides further test details.

J. David A. Vaughan

JDAV/gtb
Attachments (12)
cc - P. Hennebury
R. Gaudet
H.S. Samant
K.G. Doe
J. Turner (NSDOE)

TABLE 1

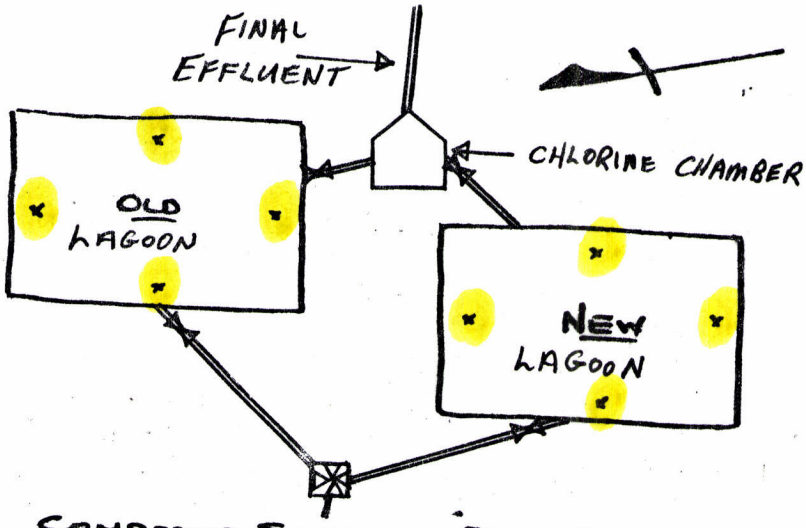
The Acute Lethality of Herring Cove and Point Pleasant Park Sewage Samples to Rainbow Trout and Three-Spine Stickleback

Sample (sewage outfall location)		96-Hour LC50 (95% conf. limits)	
		Rainbow Trout	Three-Spine Stickleback
Herring Cove	13 Oct. 87	42% (32-56%)	67% (32-100%)
" "	14 Oct. 87	52% (32-100%)	52% (32-100%)
" "	15 Oct. 87	75% (56-100%)	75% (56-100%)
Point Pleasant Park	13 Oct. 87	75% (56-100%)	non-acutely lethal
" "	14 Oct. 87	non-acutely lethal	non-acutely lethal
" "	15 Oct. 87	non-acutely lethal	non-acutely lethal

KEJIMKUJIK NATIONAL PARK

LOCATOR: KEJIMK 01 (NEW CELL)
KEJIMK 02 (OLD CELL)

PR. CODE: 242



1. COMPOSITE SAMPLES FOR EACH CELL
   a. BOD (015)
   b. SS (020)

2. GRAB SAMPLES FOR EACH CELL
   a. FECAL COLIFORM

3. FIELD ANALYSIS IN EACH CELL
   a. D.O. (003F)
   b. TEMP. (002F)
   c. pH (001F)

4. OBSERVATIONS
   a. COLOUR OF CELL CONTENTS
   b. AMOUNT OF AVAILABLE FREEBOARD
   c. PRESENCE OF SURFACE SCUM OR DEBRIS
   d. PRESENCE OF ODOURS
   e. CONDITION OF DIKES (ie. length of grass)
   f. PLANNED AMOUNT OF DRAW-DOWN
   g. OTHER

```
**********************************************************************
* 87PK067 - PAUL KLAAMAS                          STATUS AS OF NOV 23, 1987 *

REGISTERED ON: OCT 27, 1987;  BY :IAN N

LOCATOR: KEJIMK01/KEJIMKUJIK NAT'L PARK                        PROV: NS
                  NEW LAGOON
PROJECT CODE: 242/ENV. CONTROL FEDERAL FACILITIES

SAMPLING BEGAN; DATE: 27/10/87 (OCT 27, 1987); TIME: 1100, FREQ:   1
SAMPLING ENDED; DATE: 27/10/87 (OCT 27, 1987), TIME: 1100

DEPTH:    .33 METERS; TIDE:
NARRATIVE: GENERALLY EVERYTHING IN GOOD ORDER1

                        ---- SAMPLE ANALYSIS ----
    .............PARAMETER ..... ..... VALUE ..... UNITS
  1: 001 /PH.............................  6.8
  2: 001F/PH.............................  8.65
  3: 002F/TEMPERATURE....................  9.0          DEGREES C.
  4: 003F/OXYGEN DISSOLVED...............  4.98         MG/L
  5: 015 /BIOCHEM. OXYGEN DEMAND (BOD)..  60.           MG/L
  6: 018 /SOLIDS, TOTAL (TS).............  730.         MG/L
  7: 020 /SUSPENDED SOLIDS (SS).........  95.
```

****
* 87PK068 - PAUL KLAASMAS STATUS AS OF NOV 23, 1987 *

REGISTERED ON: OCT 27, 1987, BY :IAN M

LOCATOR: KEJIMK02/KEJIMKUJIK NAT'L PARK PROV: NS
OLD LAGOON
PROJECT CODE: 242/ENV. CONTROL FEDERAL FACILITIES

SAMPLING BEGAN, DATE: 27/10/87 (OCT 27, 1987), TIME: 1100, FREQ: 1
SAMPLING ENDED, DATE: 27/10/87 (OCT 27, 1987), TIME: 1100

DEPTH: .33 METERS, TIDE:
NARRATIVE: GENERALLY EVERYTHING IN GOOD ORDER1

---- SAMPLE ANALYSIS ----

	PARAMETER	VALUE	UNITS
1:	001 /PH	6.8	
2:	001F/PH	8.65	
3:	002F/TEMPERATURE	9.0	DEGREES C.
4:	003F/OXYGEN DISSOLVED	4.83	MG/L
5:	015 /BIOCHEM. OXYGEN DEMAND (BOD)	85.	MG/L
6:	018 /SOLIDS, TOTAL (TS)	1100.	MG/L
7:	020 /SUSPENDED SOLIDS (SS)	140.	MG/L

LITTLE NARROWS GYPSUM MINE


Melford
River Denys Centre
Camerons Brook
South Side River Denys
RIVER
Brook
Moneys Brook
River Denys
Big Bk
Kennedys Bk
McIntyre Brook
CANADIAN
DENYS
Cemetery
MacLeans
Open Pit Mine
Radio
Big Brook
Will Brook
Beaver Lakes
MacCuspies
MacPine Brook
MacINTOSHS MOUNTAIN
MacArthurs Lake
Ross
35
36
37
38
39
40
41
42
43
44
81
80
79
78
77
76
74
73
72
71
70
50
150
250
300
350
500
650
700
750
89
157

****
* S7RF047 - FIX PARKER STATUS 40 OF AUG 14, 1987 *

REGISTERED ON: JUL 23, 1987, BY :ANDRE

LOCATOR: SPEC 301/SPECIAL SAMPLES, N.S. PROV: NS

PROJECT CODE: 235/ENV. CONTROL METAL MINING

SAMPLING BEGAN: DATE: 23/ 7/87 (JUL 23, 1987), TIME: 0, FREQ: 1
SAMPLING ENDED: DATE: 23/ 7/87 (JUL 23, 1987), TIME: 0

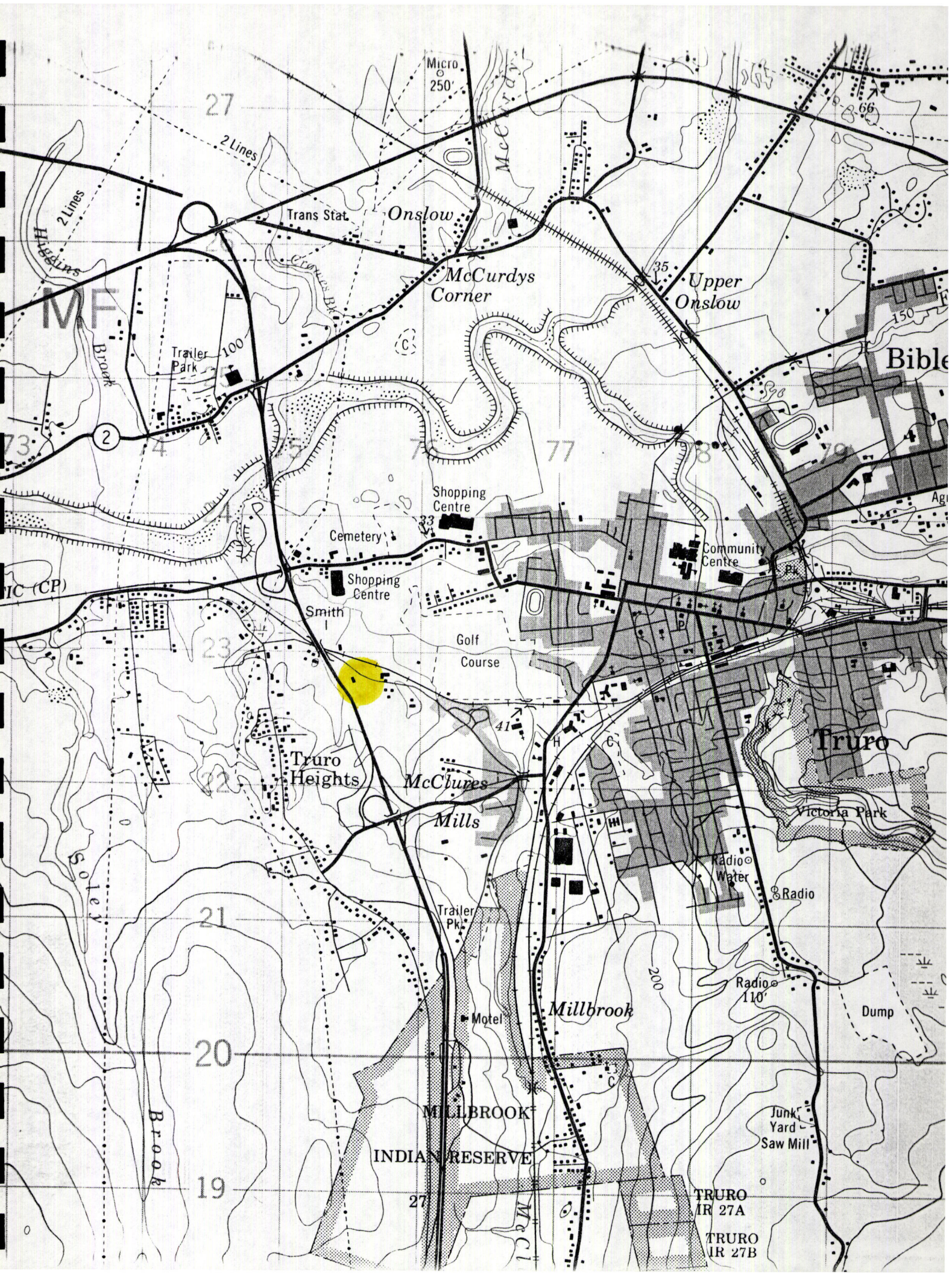
DEPTH: .00 METERS, TIDE:
NARRATIVE: LITTLE NARROWS GYPSUM MINE. EFFLUENT
FROM NEW SETTLING POND,MACAULAY ZONE

---- SAMPLE ANALYSIS ----

	PARAMETER	VALUE	UNITS
1:	001 /PH	7.4	
2:	001F/PH	7.0	
3:	005 /HARDNESS	960.	MG/L
4:	018 /SOLIDS, TOTAL (TS)	1900.	MG/L
5:	020 /SUSPENDED SOLIDS (SS)	L5.	MG/L
6:	022 /MAGNESIUM (TOTAL)	11.1	MG/L
7:	036 /CALCIUM (TOTAL)	366.	MG/L
8:	044 /ARSENIC (TOTAL)	L0.05	MG/L
9:	046 /CADMIUM (TOTAL)	L0.01	MG/L
10:	047 /CHROMIUM (TOTAL)	L0.01	MG/L
11:	048 /COPPER (TOTAL)	L0.01	MG/L
12:	049 /IRON (TOTAL)	0.44	MG/L
13:	051 /LEAD (TOTAL)	L0.02	MG/L
14:	054 /ZINC (TOTAL)	0.05	MG/L
15:	131 /TOTAL DISSOLVED SOLIDS (TDS)	1900.	MG/L
16:	159 /NICKEL (TOTAL)	L0.01	MG/L
17:	160 /MANGANESE (TOTAL)	1.37	MG/L
18:	162 /ALUMINUM (TOTAL)	L0.025	MG/L

M

MARITIME PROCESSING


Micro
250'
27
2 Lines
2 Lines
Higgins
Trans Stat.
Onslow
McCurdys
Corner
Upper
Onslow
35
66
150
Bible
MF
Brook
Trailer
Park
100
Crowes Br.
73
74
75
76
77
78
79
Shopping
Centre
33
Cemetery
Community
Centre
Pk
Shopping
Centre
Smith
Golf
Course
41
Truro
Truro
Heights
McClures
Mills
Victoria Park
Radio
Water
Radio
Soley
Trailer
Pk.
21
200
Radio
110'
Dump
Motel
Millbrook
20
MILLBROOK
INDIAN RESERVE
Junk
Yard
Saw Mill
Brook
19
27
TRURO
IR 27A
TRURO
IR 27B

****
* 87NS007 - NOVA SCOTIA STATUS AS OF JAN 11, 1988 *

REGISTERED ON: JUL 29, 1987, BY :NS

LOCATOR: MARPR001/MARITIME PROCESSING PROV: NS
FINAL EFFLUENT
NORMAL ANALYSIS: 13,15,16,20,1,28
PROJECT CODE: 265/LAB SUPPORT - PREV & CONTR WATER POLL

SAMPLING BEGAN, DATE: 28/ 7/87 (JUL 28, 1987), TIME: 1030, FREQ: 5
SAMPLING ENDED, DATE: 28/ 7/87 (JUL 28, 1987), TIME: 1430

DEPTH: .00 METERS, TIDE:
NARRATIVE: SEND COPY TO PENNY

---- SAMPLE ANALYSIS ----

	PARAMETER	VALUE	UNITS
1:	001F/PH	9.7	
2:	013 /OIL & GREASE (PET. ETHER)	28.	MG/L
3:	015 /BIOCHEM. OXYGEN DEMAND (BOD)	720.	MG/L
4:	016 /CHEMICAL OXYGEN DEMAND (COD)	830.	MG/L
5:	018 /SOLIDS, TOTAL (TS)	630.	MG/L
6:	020 /SUSPENDED SOLIDS (SS)	35.	MG/L
7:	026 /AMMONIA-N (NH3-N)	180.	MG/L
8:	156 /FLOW	"NO RESULTS"	IMP G/DAY
9:	481 /PRODUCTION	"NO RESULTS"	TONNES/DAY
10:	500 /BIOASSAY	"DONE"	

MEMORANDUM NOTE DE SERVICE

TO / A: P. Klaamas, Head
Municipal Wastes & Technology Transfer Section
Air & Water Branch

FROM / DE: J. David A. Vaughan
Aquatic Toxicology Section
Laboratory Division
Air & Water Branch

SECURITY - CLASSIFICATION - DE SÉCURITÉ	
OUR FILE/NOTRE RÉFÉRENCE	4875-85/2
YOUR FILE/VOTRE RÉFÉRENCE	
DATE	22 September 1987

SUBJECT / OBJET: BIOASSAY RESULTS - MARITIME PROCESSORS, TRURO, NOVA SCOTIA

On July 28, 1987, Penny McLeod of NSDOE collected a composite sample of final effluent from Maritime Processors Ltd., Truro, Nova Scotia.

On July 30, 1987, a 96-hour acute lethal static bioassay was begun on this sample, using rainbow trout fingerling of mean weight 3.0 ± 1.1 g as the test organism.

The effluent was acutely lethal to the test fish, yielding a 4-day LC50 value of 5.6% (95 % conf. limits: 3.2-10%).

Chemical analysis revealed that the sample contained 180 mg/L of ammonia-nitrogen, and had a pH of 9.7 (field pH). Both of these values are abnormally high for effluent from this source. The observed mortality is attributed to unionized ammonia.

A copy of the Bioassay Report is attached which provides additional test details.

J. David A. Vaughan

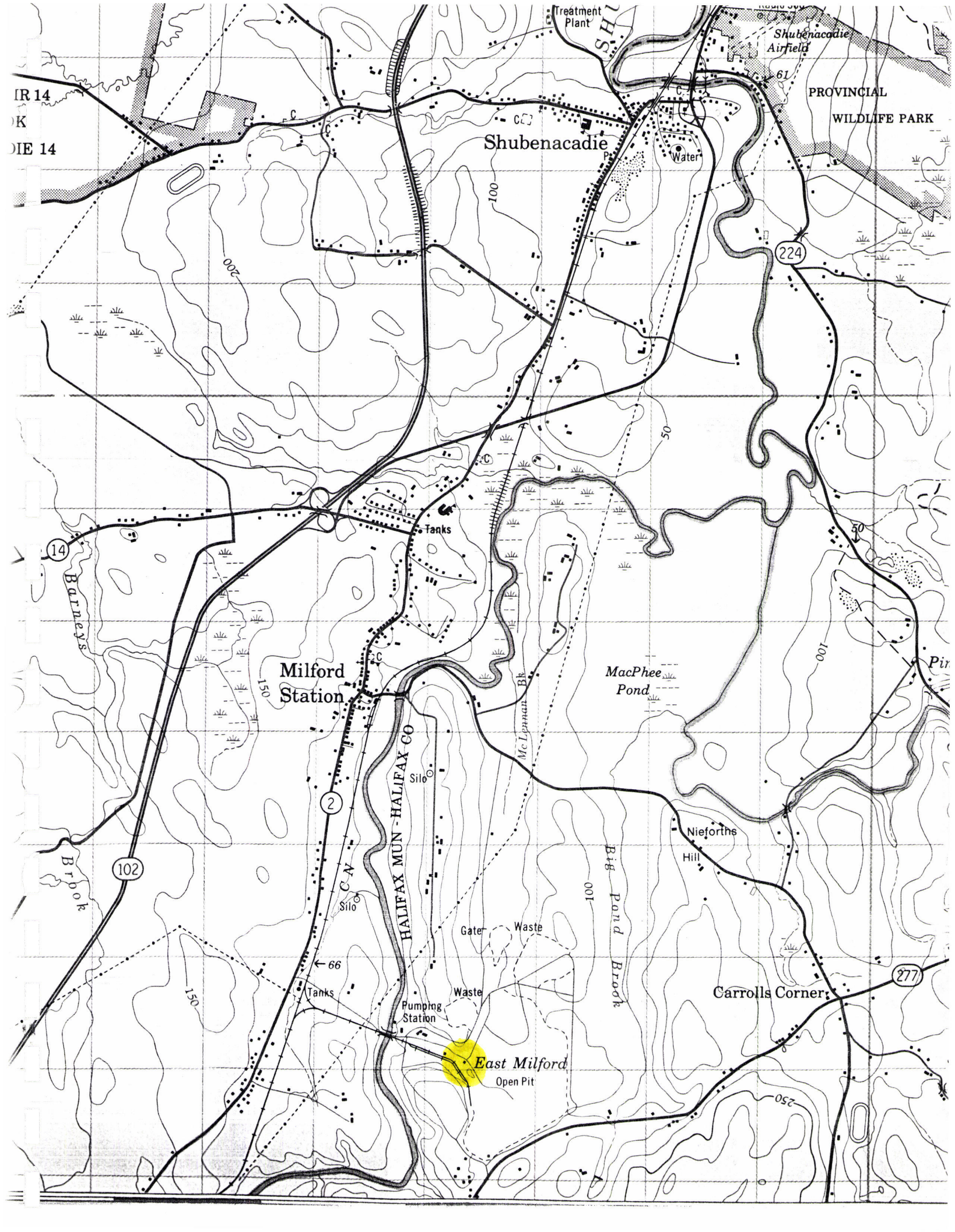
JDAV/ldl

Attachment (1)

cc: H. Samant
K. Doe
R. Parker
J. Turner, NSDOE
P. McLeod

N

NATIONAL GYPSUM


Treatment Plant
Shubenacadie Airfield
PROVINCIAL WILDLIFE PARK
Shubenacadie
Water
224
14
Barneys
Tanks
Milford Station
MacPhee Pond
McLennan Bk
Silo
2
102
Brook
C N
HALIFAX MUN - HALIFAX CO
Silo
Nieforths Hill
Big Pond Brook
Gate
Waste
66
Tanks
Waste
Pumping Station
East Milford
Open Pit
Carrolls Corner
277
100
50
150
200
250

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**********************************************************************
* 87RP053 - ROY PARKER                          STATUS AS OF DEC 16, 1987 *

REGISTERED ON: AUG 17, 1987,  BY :ANDRE

LOCATOR: SPECNS01/SPECIAL SAMPLES, N.S.
                                                          PROV: NS
PROJECT CODE: 235/ENV. CONTROL METAL MINING

SAMPLING BEGAN, DATE: 14/ 8/87 (AUG 14, 1987), TIME: 1030, FREQ:   1
SAMPLING ENDED, DATE: 14/ 8/87 (AUG 14, 1987), TIME: 1030

DEPTH:    .00 METERS, TIDE:
NARRATIVE: NATIONAL GYPSUM,MILFORD,NS
           FINAL EFFLUENT(JUST BEFORE RIVER)
                      ---- SAMPLE ANALYSIS ----
    .............PARAMETER ............ ...... VALUE ...... UNITS
 1: 001 /PH.............................  7.6
 2: 005 /HARDNESS.......................  1800.              MG/L
 3: 018 /SOLIDS, TOTAL (TS).............  2800.              MG/L
 4: 020 /SUSPENDED SOLIDS (SS)..........  L5.                MG/L
 5: 022 /MAGNESIUM (TOTAL)..............  37.6               MG/L
 6: 036 /CALCIUM (TOTAL)................  674.               MG/L
 7: 044 /ARSENIC (TOTAL)................  L0.05              MG/L
 8: 046 /CADMIUM (TOTAL)................  L.01               MG/L
 9: 047 /CHROMIUM (TOTAL)...............  .03                MG/L
10: 048 /COPPER (TOTAL).................  .01                MG/L
11: 049 /IRON (TOTAL)...................  .10                MG/L
12: 051 /LEAD (TOTAL)...................  L.02               MG/L
13: 054 /ZINC (TOTAL)...................  .01                MG/L
14: 131 /TOTAL DISSOLVED SOLIDS (TDS)...  2800.              MG/L
15: 159 /NICKEL (TOTAL).................  L.01               MG/L
16: 160 /MANGANESE (TOTAL)..............  .08                MG/L
17: 162 /ALUMINUM (TOTAL)...............  L.025              MG/L
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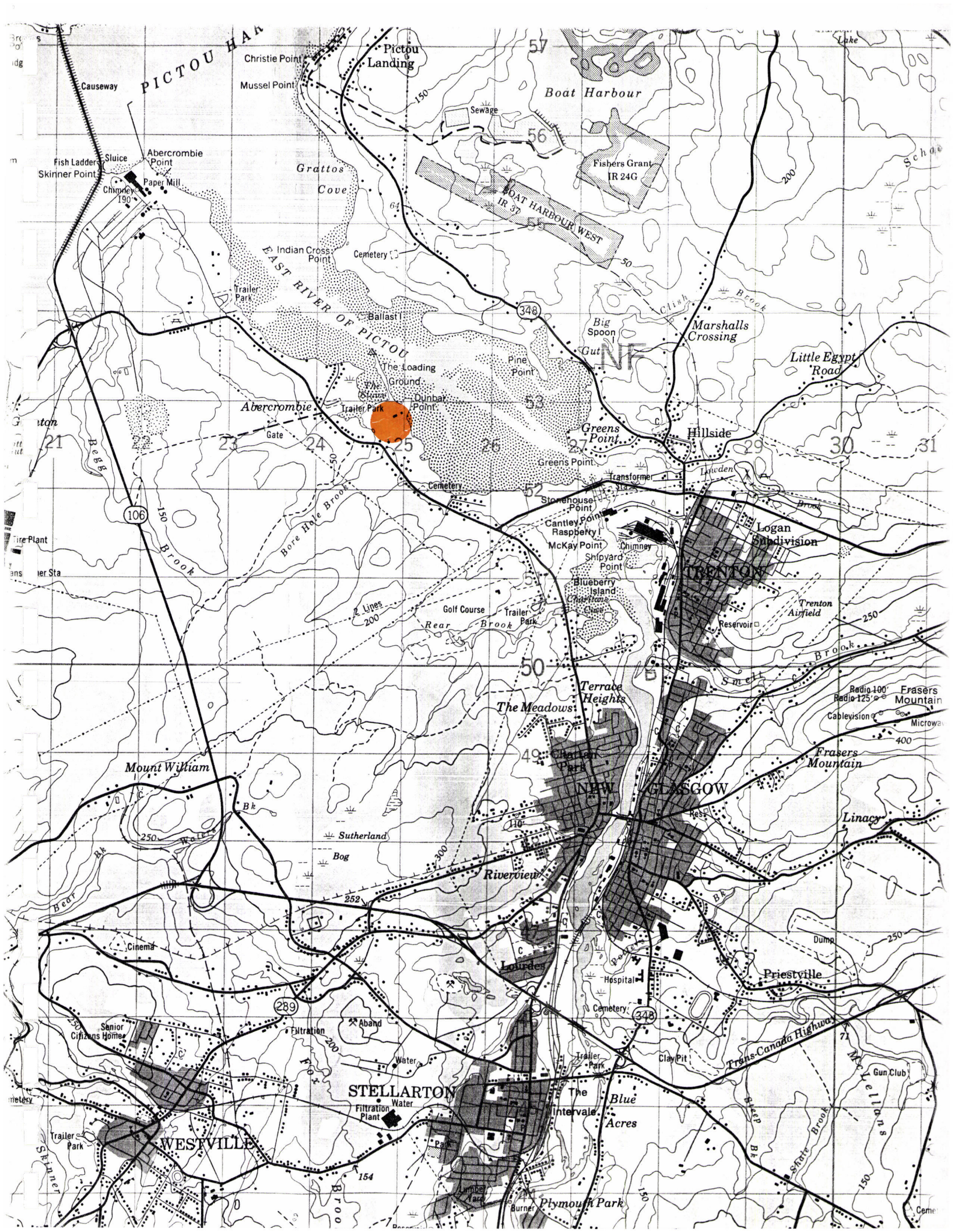
NOVA SCOTIA POWER CORPORATION (TRENTON)


PICTOU HARBOUR
Pictou Landing
Christie Point
Mussel Point
Causeway
Boat Harbour
Sewage
Fish Ladder
Skinner Point
Sluice
Abercrombie Point
Paper Mill
Chimney
190'
Grattos Cove
Fishers Grant IR 24G
BOAT HARBOUR WEST IR 37
Indian Cross Point
Cemetery
EAST RIVER OF PICTOU
Trailer Park
Ballast
348
Big Spoon Gut
NF
Marshalls Crossing
Clish Brook
Little Egypt Road
The Loading Ground
Pine Point
Dunbar Point
Abercrombie
Trailer Park
Gate
Greens Point
Hillside
Transformer Sta
Cemetery
Stonehouse Point
Cantley Point
Raspberry I
McKay Point
Shipyard Point
Logan Subdivision
TRENTON
Bore Hole Brook
106
Begg Brook
Blueberry Island
Golf Course
Trailer Park
Rear Brook
Trenton Airfield
Reservoir
Terrace Heights
The Meadows
Frasers Mountain
Radio 100
Radio 125
Cablevision
Mount William
Sutherland
Bog
Riverview
NEW GLASGOW
Linacy
Cinema
Lourdes
Hospital
Priestville
Dump
289
Senior Citizens Homes
Filtration
Aband
Water
Trans-Canada Highway
Clay Pit
Trailer Park
Gun Club
STELLARTON
Filtration Plant
Water
The Blue Intervale
Acres
WESTVILLE
Trailer Park
Park
154
Plymouth Park
Burner
Fox Brook
Skinner Brook
McLellans Brook
Sheep Bk
Power
57
56
55
53
52
50
49
64
110'
252
300
250
200
150
100
400
71

****
* 87NS001 - NOVA SCOTIA STATUS AS OF JAN 11, 1988 *

REGISTERED ON: JUN 23, 1987, BY :NS

LOCATOR: NSPCTR01/N.S.P.C. TRENTON PROV: NS
ASH LAGOON EFFLUENT
PROJECT CODE: 265/LAB SUPPORT - PREV & CONTR WATER POLL

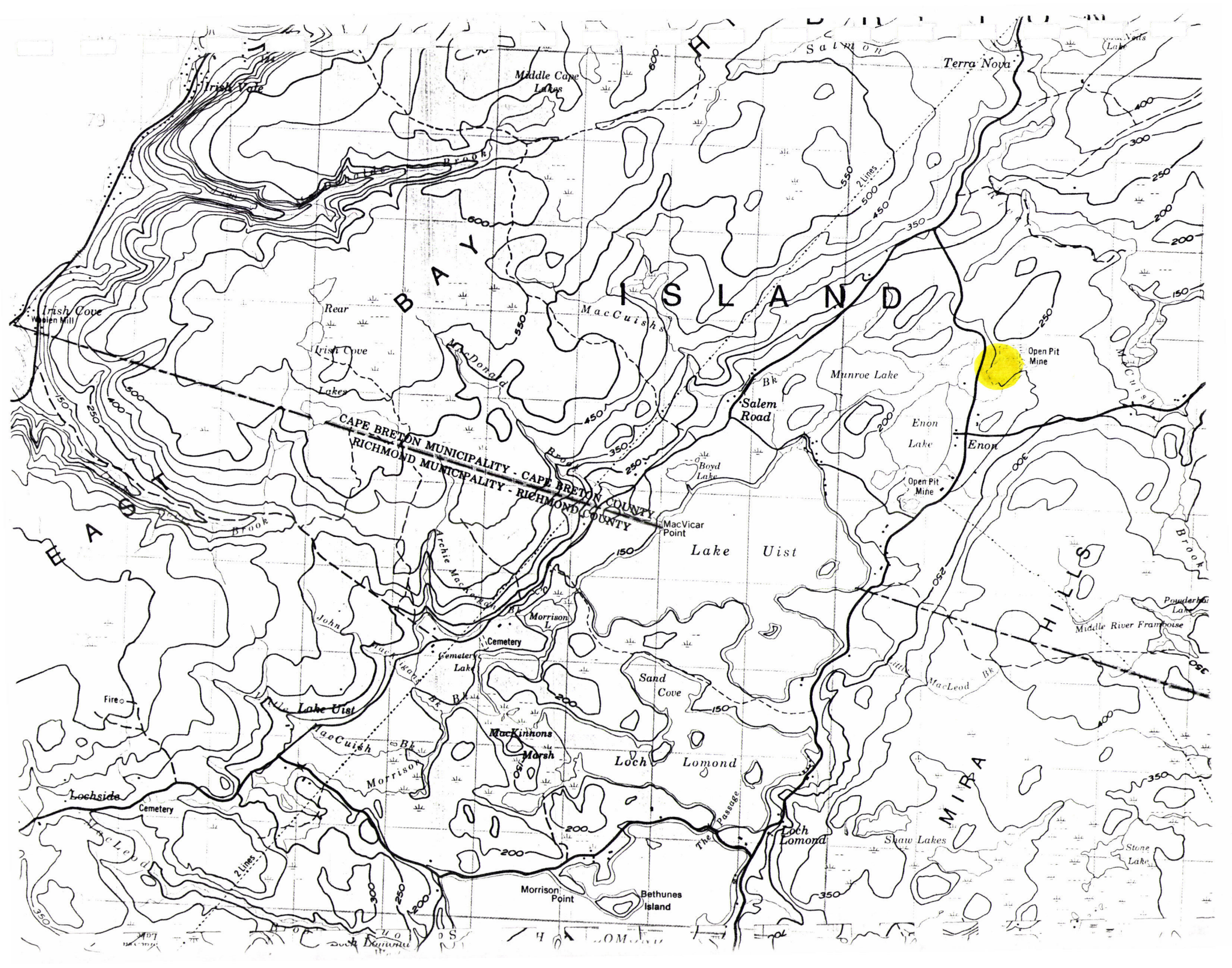
SAMPLING BEGAN, DATE: 22/ 6/87 (JUN 22, 1987), TIME: 1330, FREQ: 1
SAMPLING ENDED, DATE: 22/ 6/87 (JUN 22, 1987), TIME: 1330

DEPTH: .00 METERS, TIDE:
NARRATIVE:

---- SAMPLE ANALYSIS ----

	PARAMETER	VALUE	UNITS
1:	001 /PH	7.4	
2:	001F/PH	6.0	
3:	013 /OIL & GREASE (PET. ETHER)	4.	MG/L
4:	020 /SUSPENDED SOLIDS (SS)	30.	MG/L
5:	046 /CADMIUM (TOTAL)	L.01	MG/L
6:	048 /COPPER (TOTAL)	.02	MG/L
7:	049 /IRON (TOTAL)	.13	MG/L
8:	051 /LEAD (TOTAL)	.02	MG/L
9:	054 /ZINC (TOTAL)	.07	MG/L

NOVEX MILL, LAKE ENON


Irish Vale
Middle Cape Lakes
Salmon
Terra Nova
Irish Cove
Woolen Mill
Rear
Irish Cove
Lakes
MacDonald
BAY
ISLAND
MacCuish's
Munroe Lake
Salem Road
Open Pit Mine
Enon Lake
Enon
CAPE BRETON MUNICIPALITY - CAPE BRETON COUNTY
RICHMOND MUNICIPALITY - RICHMOND COUNTY
Boyd Lake
MacVicar Point
Lake Uist
Archie MacKeigan
Morrison L.
Cemetery
Cemetery Lake
Sand Cove
MacKinnons Marsh
Loch Lomond
Lochside
Cemetery
Fire
Lake Uist
MacCuish Bk
Morrison Bk
The Passage
Morrison Point
Bethunes Island
Shaw Lakes
MIRA
HILLS
Middle River Framboise
MacLeod Bk
Stone Lake
2 Lines
Brook
Bk

****
* 87RP049 - ROY PARKER STATUS AS OF AUG 14, 1987 *

REGISTERED ON: JUL 23, 1987, BY :ANDRE

LOCATOR: NOVEXM04/NOVEX MILL LAKE ENON
FINAL EFFLUENT PROV: NS
NORMAL ANALYSIS: 46,44,48,51,159,20,1
PROJECT CODE: 235/ENV. CONTROL METAL MINING

SAMPLING BEGAN, DATE: 22/ 7/87 (JUL 22, 1987), TIME: 1305, FREQ: 1
SAMPLING ENDED: DATE: 22/ 7/87 (JUL 22, 1987), TIME: 1305

DEPTH: .00 METERS, TIDE:
NARRATIVE: SEEPAGE FROM OLD PIT INTO LAKE
ENON

---- SAMPLE ANALYSIS ----

	PARAMETER	VALUE	UNITS
1:	001 /PH	7.9	
2:	001F/PH	7.2	
3:	005 /HARDNESS	140.	MG/L
4:	018 /SOLIDS, TOTAL (TS)	310.	MG/L
5:	020 /SUSPENDED SOLIDS (SS)	L5.	MG/L
6:	022 /MAGNESIUM (TOTAL)	6.4	MG/L
7:	036 /CALCIUM (TOTAL)	43.7	MG/L
8:	044 /ARSENIC (TOTAL)	L0.05	MG/L
9:	046 /CADMIUM (TOTAL)	L0.01	MG/L
10:	047 /CHROMIUM (TOTAL)	L0.01	MG/L
11:	048 /COPPER (TOTAL)	L0.01	MG/L
12:	049 /IRON (TOTAL)	0.01	MG/L
13:	051 /LEAD (TOTAL)	L0.02	MG/L
14:	054 /ZINC (TOTAL)	0.08	MG/L
15:	131 /TOTAL DISSOLVED SOLIDS (TDS)	310.	MG/L
16:	159 /NICKEL (TOTAL)	0.01	MG/L
17:	160 /MANGANESE (TOTAL)	0.01	MG/L
18:	1e2 /ALUMINUM (TOTAL)	L0.025	MG/L

NYSTONE MILL, DEBERT

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**********************************************************************
* 87RP054 - ROY PARKER                          STATUS AS OF DEC 16, 1987 *

REGISTERED ON: AUG 17, 1987,  BY :ANDRE

LOCATOR: SPECNS01/SPECIAL SAMPLES, N.S.
                                                          PROV: NS

PROJECT CODE: 235/ENV. CONTROL METAL MINING

SAMPLING BEGAN; DATE: 14/ 8/87 (AUG 14, 1987); TIME: 1315, FREQ:   1
SAMPLING ENDED; DATE: 14/ 8/87 (AUG 14, 1987); TIME: 1315

DEPTH:    .00 METERS, TIDE:
NARRATIVE: NYSTONE MILL,DEBERT INDUSTRIAL PARK
           FINAL EFFLUENT
                      ---- SAMPLE ANALYSIS ----
    .............PARAMETER ..........  ..... VALUE ..... UNITS
 1: 001 /PH.............................  11.7
 2: 005 /HARDNESS.......................  2100.              MG/L
 3: 018 /SOLIDS, TOTAL (TS).............  4060.              MG/L
 4: 020 /SUSPENDED SOLIDS (SS).........  110.               MG/L
 5: 022 /MAGNESIUM (TOTAL).............  6.58               MG/L
 6: 036 /CALCIUM (TOTAL)................  847.               MG/L
 7: 044 /ARSENIC (TOTAL)................ L0.05               MG/L
 8: 046 /CADMIUM (TOTAL)................ L.01                MG/L
 9: 047 /CHROMIUM (TOTAL)............... L.01                MG/L
10: 048 /COPPER (TOTAL).................  .01                MG/L
11: 049 /IRON (TOTAL)...................  26.0               MG/L
12: 051 /LEAD (TOTAL)...................  .11                MG/L
13: 054 /ZINC (TOTAL)...................  .01                MG/L
14: 131 /TOTAL DISSOLVED SOLIDS (TDS)..  3950.              MG/L
15: 159 /NICKEL (TOTAL)................ L.01                MG/L
16: 160 /MANGANESE (TOTAL).............  2.37               MG/L
17: 162 /ALUMINUM (TOTAL)..............  4.02               MG/L
18: 203 /BARIUM (BA) ..................  8.31               MG/L
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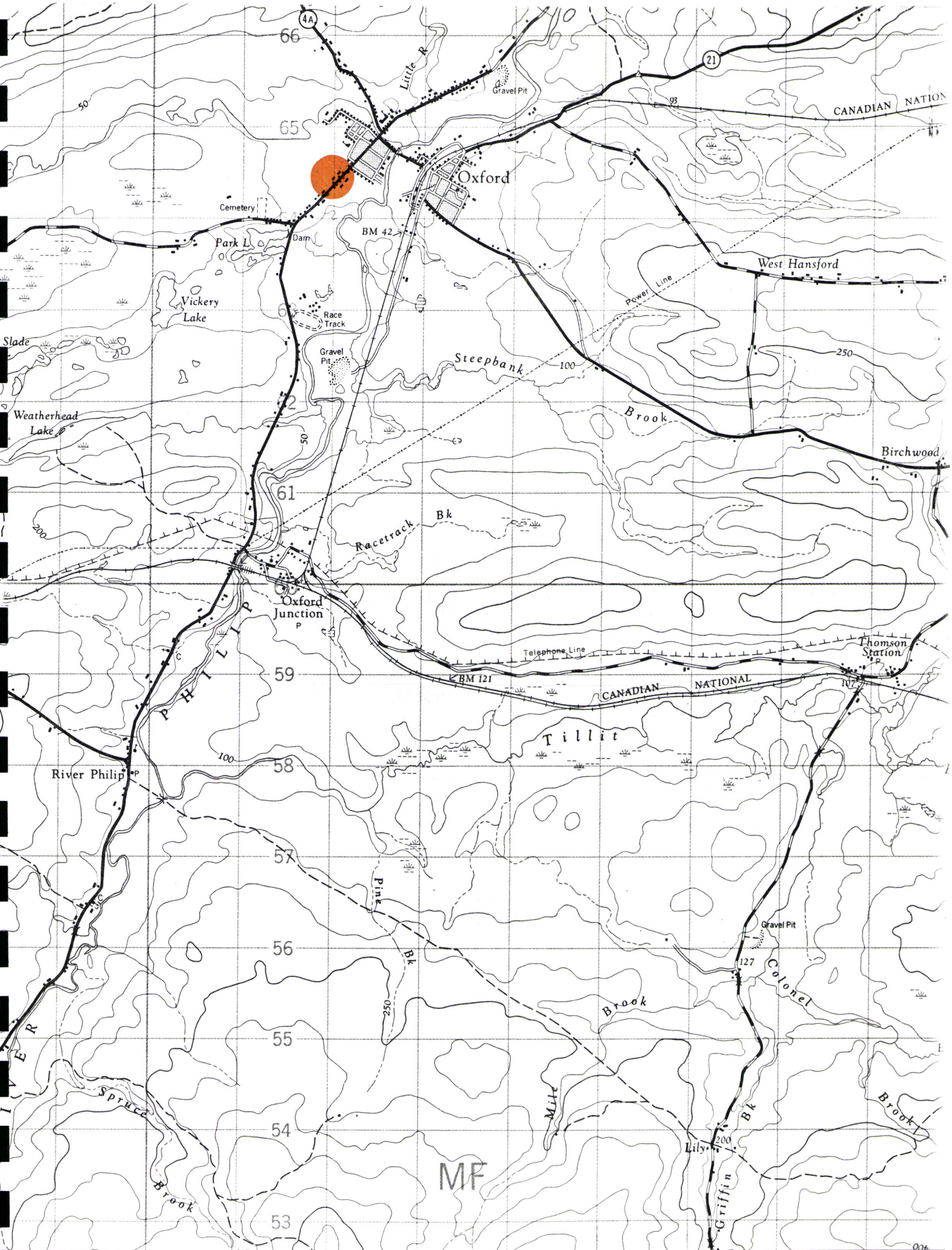
OXFORD FROZEN FOODS LTD.


Oxford
Little R
Gravel Pit
CANADIAN NATION
Cemetery
Park L
Dam
BM 42
West Hansford
Power Line
Vickery Lake
Race Track
Slade
Gravel Pit
Steepbank
Brook
Weatherhead Lake
Birchwood
Racetrack Bk
Oxford Junction
P
Telephone Line
Thomson Station
BM 121
CANADIAN NATIONAL
Tillit
River Philip
P
Pine Bk
Gravel Pit
Colonel Brook
Mile Bk
Spruce Brook
Lily
Griffin Brook
MF

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**********************************************************************************
* 87NS022 - NOVA SCOTIA                                  STATUS AS OF JAN 18, 1988 *

REGISTERED ON: JAN  1, 19 0,  BY :NS

LOCATOR: OXFOOX01/OXFORD FROZEN FOODS
                  FINAL EFFLUENT NO TREATMENT                          PROV: NS
NORMAL ANALYSIS: 15,20,1,28,16
PROJECT CODE: 265/LAB SUPPORT - PREV & CONTR WATER POLL

SAMPLING BEGAN, DATE:  4/11/87 (NOV  4, 1987), TIME: 1000, FREQ: 2
SAMPLING ENDED, DATE:  4/11/87 (NOV  4, 1987), TIME: 1130

DEPTH:    .00 METERS, TIDE:
NARRATIVE: BEFORE LAGOONS COPY TO PENNY

                        ---- SAMPLE ANALYSIS ----
    .............PARAMETER ............ ...... VALUE ...... UNITS
 1: 001F/PH.............................  4.0
 2: 013 /OIL & GREASE (PET. ETHER)......  8.                    MG/L
 3: 015 /BIOCHEM. OXYGEN DEMAND (BOD)..  1200.                  MG/L
 4: 016 /CHEMICAL OXYGEN DEMAND (COD)..  2000.                  MG/L
 5: 018 /SOLIDS, TOTAL (TS).............  1000.                  MG/L
 6: 020 /SUSPENDED SOLIDS (SS).........  270.                   MG/L
 7: 028 /AMMONIA-N (NH3-N)..............  0.6                    MG/L
 8: 500 /BIOASSAY ......................  'DONE'
```

Environment Canada Environnement Canada

MEMORANDUM NOTE DE SERVICE

DATE
December 11, 1987

FROM: D. Vaughan
DE: Laboratory Division
Air & Water Branch, EP, Atlantic Region
Conservation and Protection

Our file Notre reference
4875-85/2

TO: P. Klaamas
À: Water Pollution Control Division
Air & Water Branch, EP, Atlantic Region
Conservation and Protection

Your file Votre reference

SUBJECT:
SUJET: **BIOASSAY RESULTS - OXFORD FROZEN FOODS**

On November 4, 1987, P. McLeod of NSDOE collected a 2-hour composite sample of final effluent from Oxford Frozen Foods Ltd., Oxford, Nova Scotia.

On November 6, 1987, a 96-hour acute lethal static bioassay was begun on this sample, using rainbow trout fingerling of mean weight 8.5 ± 2.1 g as the test organism.

The effluent was acutely lethal to the test fish, yielding a 4-day LC50 value of 5.6% (95% conf. limits: 3.2 - 10%). The cause of the observed mortality is not evident from the chemical analysis results.

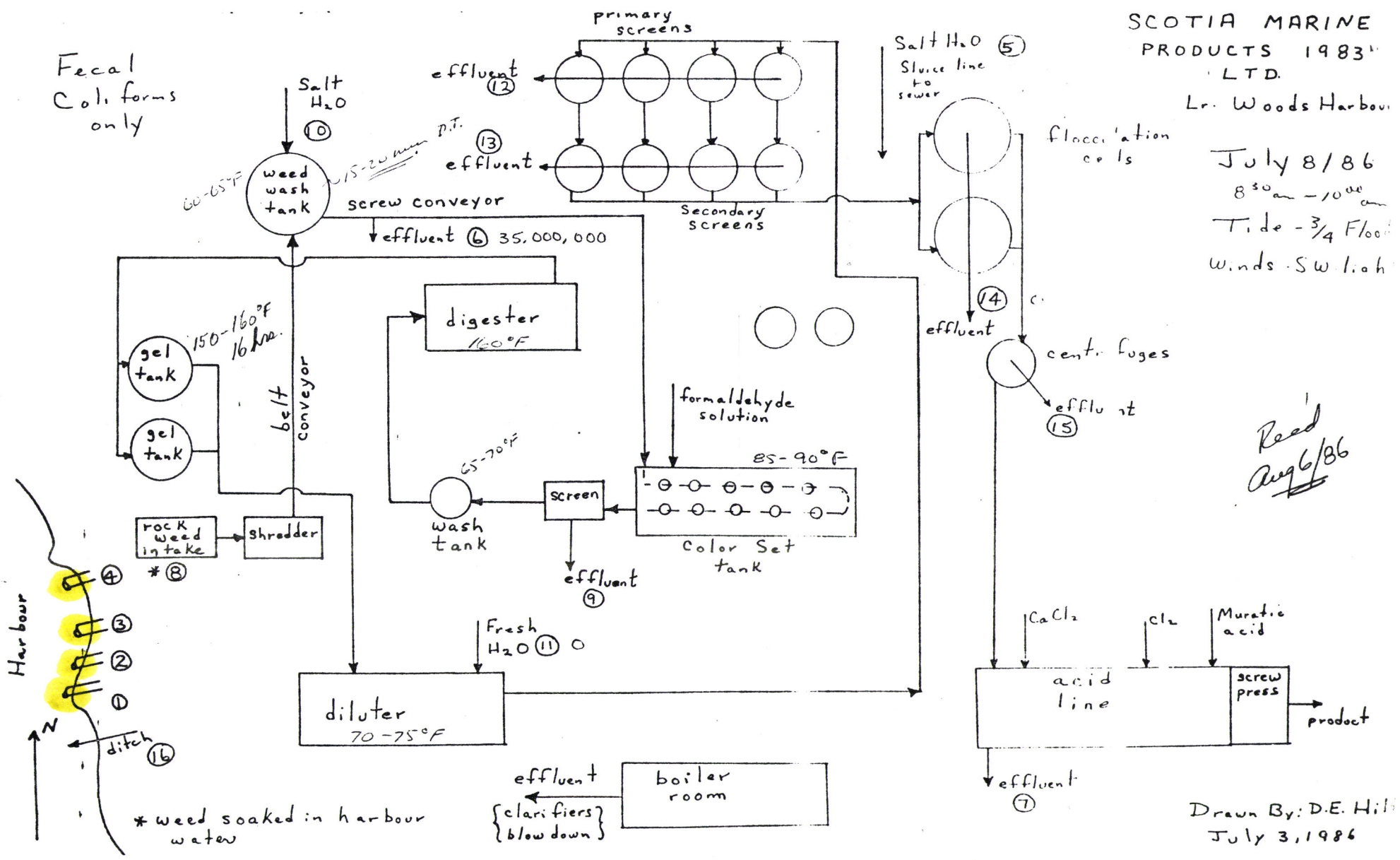
A copy of the bioassay report is attached which provides additional test details.

J. David A. Vaughan

JDAV/dg

cc: H. Samant
K. Doe
J. Turner, NSDOE
P. McLeod, NSDOE
R. Parker

SCOTIA MARINE PRODUCTS


Fecal Coli forms only
Salt H₂O
10
60-65°F
weed wash tank
15-20 min
P.T.
primary screens
effluent 12
effluent 13
Secondary screens
screw conveyor
effluent 6 35,000,000
Salt H₂O 5
Sluice line to sewer
Floccu'ation coils
14
effluent
centr. fuges
effluent 15
digester 160°F
150-160°F 16 hrs.
gel tank
gel tank
belt conveyor
formaldehyde solution
85-90°F
65-70°F
wash tank
screen
Color Set tank
effluent 9
rock weed intake
shredder
*8
Harbour
4
3
2
1
N
ditch 16
Fresh H₂O 11
diluter 70-75°F
CaCl₂
Cl₂
Muratic acid
acid line
screw press
product
effluent 7
effluent
{clarifiers blow down}
boiler room
* weed soaked in harbour water
SCOTIA MARINE PRODUCTS 1983 LTD.
Lr. Woods Harbour
July 8/86
8:50 am - 10:00 am
Tide - 3/4 Flood
Winds SW light
Read Aug 6/86
Drawn By: D.E. Hill
July 3, 1986

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**********************************************************************
* 87PK013 - PAUL KLAAMAS                        STATUS AS OF AUG 11, 1987 *

REGISTERED ON: JUN 15, 1987,  BY :BOB G

LOCATOR: SCOTMR01/SCOTIA MARINE PRODUCTS
                  FINAL EFFLUENT SOAK TANKS                    PROV: NS
NORMAL ANALYSIS: 15,20,1:165
PROJECT CODE: 240/ENV. CONTROL SITE FISHERIES ACT

SAMPLING BEGAN, DATE: 12/ 6/87 (JUN 12, 1987), TIME: 1500, FREQ:   1
SAMPLING ENDED, DATE: 12/ 6/87 (JUN 12, 1987), TIME: 1500

DEPTH:    .00 METERS, TIDE:
NARRATIVE: SEWER #1.FINE PARTICLE REMOVAL BY
           POLYMER AND DEFUSED AIR.
                      ---- SAMPLE ANALYSIS ----
    ............PARAMETER ............ ...... VALUE ...... UNITS
 1: 001 /PH.............................  8.7
 2: 015 /BIOCHEM. OXYGEN DEMAND (BOD)..  1300.              MG/L
 3: 020 /SUSPENDED SOLIDS (SS).........  6800.              MG/L
 4: 165Y/FORMALDEHYDE (ACETYL ACETONE)   1.6                MG/L
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**********************************************************************
* 87PK014 - PAUL KLAAMAS                          STATUS AS OF AUG 11, 1987 *

REGISTERED ON: JUN 15, 1987,  BY :BOB G

LOCATOR: SCOTMR02/SCOTIA MARINE PRODUCTS
                  DRAIN 2 BOILER FLOC                          PROV: NS
PROJECT CODE: 240/ENV. CONTROL SITE FISHERIES ACT

SAMPLING BEGAN, DATE: 12/ 6/87 (JUN 12, 1987), TIME: 1515, FREQ:   1
SAMPLING ENDED, DATE: 12/ 6/87 (JUN 12, 1987), TIME: 1515

DEPTH:    .00 METERS, TIDE:
NARRATIVE: SEWER #2.

                        ---- SAMPLE ANALYSIS ----
    .............PARAMETER ..... ..... VALUE..... UNITS
 1: 001 /PH.............................  4.6
 2: 015 /BIOCHEM. OXYGEN DEMAND (BOD).. L10.          MG/L
 3: 020 /SUSPENDED SOLIDS (SS).........  300.         MG/L
 4: 165Y/FORMALDEHYDE (ACETYL ACETONE)  L0.5          MG/L
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**********************************************************************
* 87PK015 - PAUL KLAAMAS                          STATUS AS OF AUG 11, 1987 *

REGISTERED ON: JUN 15, 1987,  BY :BOB G

LOCATOR: SCOTMR03/SCOTIA MARINE PRODUCTS
                  DRAIN 3 PROCESS EFFLUENT                    PROV: NS
PROJECT CODE: 240/ENV. CONTROL SITE FISHERIES ACT

SAMPLING BEGAN, DATE: 12/ 6/87 (JUN 12, 1987), TIME: 1530, FREQ:   1
SAMPLING ENDED, DATE: 12/ 6/87 (JUN 12, 1987), TIME: 1530

DEPTH:    .00 METERS, TIDE:
NARRATIVE: SEWER #3.

                        ---- SAMPLE ANALYSIS ----
    ....+.....PARAMETER ..... ..... VALUE ..... UNITS
 1: 001 /PH.............................  4.6
 2: 015 /BIOCHEM. OXYGEN DEMAND (BOD).. L10.          MG/L
 3: 020 /SUSPENDED SOLIDS (SS).........  380.         MG/L
 4: 165Y/FORMALDEHYDE (ACETYL ACETONE)  L0.5          MG/L
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**********************************************************************
* 87PK016 -- PAUL KLAAMAS                          STATUS AS OF AUG 11, 1987 *

REGISTERED ON: JUN 15, 1987,  BY :BOB G

LOCATOR: SCOTMR04/SCOTIA MARINE PRODUCTS
                  DRAIN 4 PROCESS EFFLUENT                    PROV: NS
PROJECT CODE: 240/ENV. CONTROL SITE FISHERIES ACT

SAMPLING BEGAN, DATE: 12/ 6/87 (JUN 12, 1987), TIME: 1545, FREQ:   1
SAMPLING ENDED, DATE: 12/ 6/87 (JUN 12, 1987), TIME: 1545

DEPTH:    .00 METERS, TIDE:
NARRATIVE: SEWER #4

                        ---- SAMPLE ANALYSIS ----
    .............PARAMETER ............ ...... VALUE ...... UNITS
 1: 001 /PH.............................  6.3
 2: 015 /BIOCHEM. OXYGEN DEMAND (BOD)..  290.              MG/L
 3: 020 /SUSPENDED SOLIDS (SS).........  720.              MG/L
 4: 165Y/FORMALDEHYDE (ACETYL ACETONE)   35.00             MG/L
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Government of Canada / Gouvernement du Canada

MEMORANDUM **NOTE DE SERVICE**

TO / A

Paul Klaamas, Head
Municipal Wastes & Technology Transfer Section
Air & Water Branch
Conservation and Protection

FROM / DE

J. David A. Vaughan
Aquatic Toxicology Section
Laboratory Division
Air & Water Branch

SECURITY - CLASSIFICATION - DE SÉCURITÉ	
OUR FILE - N/RÉFÉRENCE	4705-82/2
YOUR FILE - V/RÉFÉRENCE	
DATE	31 July 1987

SUBJECT / OBJET BIOASSAY RESULTS - PROTAN SCOTIA MARINE CANADA LTD.

On June 12, 1987, Bob Gaudet collected a grab sample from each of sewers 1 through 4 from the Protan Scotia Marine Canada Ltd. Plant, Woods Harbour, Nova Scotia.

On June 13, 1987, a 96-hour acute lethal static bioassay was begun on each of these samples following the "Standard Procedure for Testing the Acute Lethality of Liquid Effluents" (Report EPS-1-WP-80-1). Rainbow Trout fingerling were used as the test organism for Sewers 1, 2 and 3. Three-spined stickleback were used as the test organism for Sewer 4, as it had a salinity of 15 parts per thousand and is discharged into salt water.

Sewers 1, 2 and 3 were acutely lethal to the test fish, each yielding a 4-day LC50 value of 18% (95% confidence limits: 10-32%). Sewer 4 was non-acutely lethal to three-spine stickleback in the 4-day test.

A copy of each Bioassay Report is attached which provides additional test details.

J. David A. Vaughan

J. David A. Vaughan

JDAV/ldl

Attachment (4)

cc: P. Hennebury
R. Gaudet
H. Samant
K. Doe
J. Turner, NSDOE
R. Parker

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* 87PK017 STATUS AS OF MAR 08. 1988 *

REGISTERED ON: SEP 11, 1987, BY: BOB G

LOCATOR: SCOTMR 1/SCOTIA MARINE PRODUCTS PROV: NS
FINAL EFFLUENT SOAK TANKS

PROJECT CODE: 240

SAMPLING BEGAN, DATE: JUN 29, 1987, TIME: 830, FREQ: 800
SAMPLING ENDED, DATE: JUN 29, 1987, TIME: 1630

DEPTH: 0.0 METERS, TIDE:
NARRATIVE: SEWER #1

SAMPLE ANALYSIS

	PARAMETER		VALUE	UNITS
1:	001 /PH	-	6.60000	N/A
2:	001F/PH	-	8.40000	N/A
3:	002 /TEMPERATURE	-	18.00000	DEGREE
4:	005 /HARDNESS TOTAL CACO3	-	2500.00000	MG/L
5:	015 /BOD BIOCHEMICAL OXYGEN DEMAND	-	1300.00000	MG/L
6:	016 /COD CHEMICAL OXYGEN DEMAND	-	4200.00000	MG/L
7:	020 /RESIDUE NON-FILTERABLE	-	3800.00000	MG/L
8:	021 /RESIDUE VOLATILE/NONFILTERABLE	-	2900.00000	MG/L
9:	022 /MAGNESIUM TOTAL	-	417.00000	MG/L
10:	028 /NITROGEN-AMMONIA (NH3-N)	-	.30000	MG/L
11:	036 /CALCIUM	-	311.00000	MG/L
12:	044 /ARSENIC (TOTAL)	L	.05000	MG/L
13:	046 /CADMIUM (TOTAL)	L	.01000	MG/L
14:	048 /COPPER (TOTAL)	L	.01000	MG/L
15:	049 /IRON (TOTAL)	-	.36000	MG/L
16:	051 /LEAD (TOTAL)	L	.02000	MG/L
17:	054 /ZINC (TOTAL)	-	.19000	MG/L
18:	086 /SULFIDE	******************		MG/L
19:	160 /MANGANESE (TOTAL)	-	.14000	MG/L
20:	162 /ALUMINUM (TOTAL)	L	.02500	MG/L
21:	165Y/FORMALDEHYDE (ACETYL ACETONE)	L	.50000	MG/L
22:	237 /COBALT (CO)	L	.01000	MG/L

87PK018 STATUS AS OF MAR 08, 1988 *

REGISTERED ON: JUL 20, 1987, BY: BOB G

LOCATOR: SCOTMR 2/SCOTIA MARINE PRODUCTS PROV: NS
DRAIN 2 BOILER FLOC

PROJECT CODE: 240

SAMPLING BEGAN, DATE: JUN 29, 1987, TIME: 830, FREQ: 800
SAMPLING ENDED, DATE: JUN 29, 1987, TIME: 1630

DEPTH: 0.0 METERS, TIDE:
NARRATIVE: SEWER #2

--- SAMPLE ANALYSIS ---

	PARAMETER		VALUE	UNITS
1:	001 /PH	-	5.10000	N/A
2:	001F/PH	-	5.80000	N/A
3:	002 /TEMPERATURE	"	**********	DEGREE
4:	005 /HARDNESS TOTAL CACO3	-	130.00000	MG/L
5:	015 /BOD BIOCHEMICAL OXYGEN DEMAND	L	10.00000	MG/L
6:	016 /COD CHEMICAL OXYGEN DEMAND	-	150.00000	MG/L
7:	020 /RESIDUE NON-FILTERABLE	-	690.00000	MG/L
8:	021 /RESIDUE VOLATILE/NONFILTERABLE	-	300.00000	MG/L
9:	022 /MAGNESIUM TOTAL	-	25.60000	MG/L
10:	028 /NITROGEN-AMMONIA (NH3-N)	-	.30000	MG/L
11:	036 /CALCIUM	-	9.10000	MG/L
12:	044 /ARSENIC (TOTAL)	-	.32000	MG/L
13:	046 /CADMIUM (TOTAL)	L	.01000	MG/L
14:	048 /COPPER (TOTAL)	L	.01000	MG/L
15:	049 /IRON (TOTAL)	-	4.96000	MG/L
16:	051 /LEAD (TOTAL)	L	.02000	MG/L
17:	054 /ZINC (TOTAL)	-	.06000	MG/L
18:	086 /SULFIDE	"	**********	MG/L
19:	160 /MANGANESE (TOTAL)	-	.05000	MG/L
20:	162 /ALUMINUM (TOTAL)	-	128.00000	MG/L
21:	165Y/FORMALDEHYDE (ACETYL ACETONE)	-	1.30000	MG/L
22:	237 /COBALT (CO)	L	.01000	MG/L

87PK019 STATUS AS OF MAR 08, 1988

REGISTERED ON: JUL 20, 1987, BY: BOB G

LOCATOR: SCOTMR 3/SCOTIA MARINE PRODUCTS PROV: NB
DRAIN 3 PROCESS EFFLUENT
PROJECT CODE: 240

SAMPLING BEGAN, DATE: JUN 29, 1987, TIME: 830, FREQ: 800
SAMPLING ENDED, DATE: JUN 29, 1987, TIME: 1630

DEPTH: 0.0 METERS, TIDE:
NARRATIVE: SEWER #3

--- SAMPLE ANALYSIS ---

	PARAMETER		VALUE	UNITS
1:	001 /PH	-	5.90000	N/A
2:	001F/PH	-	6.40000	N/A
3:	002 /TEMPERATURE	"	**********	DEGREE
4:	005 /HARDNESS TOTAL CACO3	-	140.00000	MG/L
5:	015 /BOD BIOCHEMICAL OXYGEN DEMAND	L	10.00000	MG/L
6:	016 /COD CHEMICAL OXYGEN DEMAND	-	200.00000	MG/L
7:	020 /RESIDUE NON-FILTERABLE	-	980.00000	MG/L
8:	021 /RESIDUE VOLATILE/NONFILTERABLE	-	400.00000	MG/L
9:	022 /MAGNESIUM TOTAL	-	28.10000	MG/L
10:	028 /NITROGEN-AMMONIA (NH3-N)	-	.00000	MG/L
11:	036 /CALCIUM	-	11.00000	MG/L
12:	044 /ARSENIC (TOTAL)	-	.40000	MG/L
13:	046 /CADMIUM (TOTAL)	L	.01000	MG/L
14:	048 /COPPER (TOTAL)	-	.04000	MG/L
15:	049 /IRON (TOTAL)	-	4.10000	MG/L
16:	051 /LEAD (TOTAL)	L	.00000	MG/L
17:	054 /ZINC (TOTAL)	-	.07000	MG/L
18:	086 /SULFIDE	"	**********	MG/L
19:	160 /MANGANESE (TOTAL)	-	.07000	MG/L
20:	162 /ALUMINUM (TOTAL)	-	179.00000	MG/L
21:	165Y/FORMALDEHYDE (ACETYL ACETONE)	L	.50000	MG/L
22:	237 /COBALT (CO)	L	.01000	MG/L

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* 87PK020 STATUS AS OF MAR 08, 1988 *

REGISTERED ON: JUL 20, 1987, BY: BOB G

LOCATOR: SCOTMR 4/SCOTIA MARINE PRODUCTS PROV: NS
DRAIN 4 PROCESS EFFLUENT

PROJECT CODE: 240

SAMPLING BEGAN, DATE: JUN 29, 1987, TIME: 830, FREQ: 800
SAMPLING ENDED, DATE: JUN 29, 1987, TIME: 1630

DEPTH: 0.0 METERS, TIDE:
NARRATIVE: SEWER #4

--- SAMPLE ANALYSIS ---

	PARAMETER		VALUE	UNITS
1:	001 /PH	–	5.40000	N/A
2:	001F/PH	–	6.80000	N/A
3:	002 /TEMPERATURE	*	**********	DEGREE
4:	005 /HARDNESS TOTAL CACO3	–	3100.00000	MG/L
5:	015 /BOD BIOCHEMICAL OXYGEN DEMAND	–	320.00000	MG/L
6:	016 /COD CHEMICAL OXYGEN DEMAND	–	1000.00000	MG/L
7:	020 /RESIDUE NON-FILTERABLE	–	1100.00000	MG/L
8:	021 /RESIDUE VOLATILE/NONFILTERABLE	–	770.00000	MG/L
9:	022 /MAGNESIUM TOTAL	–	501.00000	MG/L
10:	028 /NITROGEN-AMMONIA (NH3-N)	–	.30000	MG/L
11:	036 /CALCIUM	–	428.00000	MG/L
12:	044 /ARSENIC (TOTAL)	L	.05000	MG/L
13:	046 /CADMIUM (TOTAL)	L	.01000	MG/L
14:	048 /COPPER (TOTAL)	L	.01000	MG/L
15:	049 /IRON (TOTAL)	–	1.20000	MG/L
16:	051 /LEAD (TOTAL)	L	.02000	MG/L
17:	054 /ZINC (TOTAL)	–	.13000	MG/L
18:	086 /SULFIDE	*	**********	MG/L
19:	160 /MANGANESE (TOTAL)	–	.01000	MG/L
20:	162 /ALUMINUM (TOTAL)	L	.02500	MG/L
21:	165Y/FORMALDEHYDE (ACETYL ACETONE)	–	2.80000	MG/L
22:	237 /COBALT (CO)	L	.01000	MG/L

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**********************************************************************
* 87PK021 - PAUL KLAAMAS                          STATUS AS OF SEP 14, 1987 *

REGISTERED ON: JUL 20, 1987,  BY :BOB G

LOCATOR: SCOTMR01/SCOTIA MARINE PRODUCTS
                  FINAL EFFLUENT SOAK TANKS                    PROV: NS
NORMAL ANALYSIS: 15,20,1,165
PROJECT CODE: 240/ENV. CONTROL SITE FISHERIES ACT

SAMPLING BEGAN, DATE: 30/ 6/87 (JUN 30, 1987), TIME:  830, FREQ: 8
SAMPLING ENDED, DATE: 30/ 6/87 (JUN 30, 1987), TIME: 1630

DEPTH:    .00 METERS, TIDE:
NARRATIVE: SEWER #1

                        ---- SAMPLE ANALYSIS ----
    .............PARAMETER ..... ..... VALUE ..... UNITS
 1: 001 /PH.............................  6.5
 2: 001F/PH.............................  8.4
 3: 002 /TEMPERATURE.................... "NO RESULTS"          DEGREES C.
 4: 005 /HARDNESS.......................  3700.               MG/L
 5: 015 /BIOCHEM. OXYGEN DEMAND (BOD)..  1500.               MG/L
 6: 016 /CHEMICAL OXYGEN DEMAND (COD)..  3800.               MG/L
 7: 020 /SUSPENDED SOLIDS (SS).........  3000.               MG/L
 8: 021 /VOLATILE SUSPENDED SOLIDS.....  2300.               MG/L
 9: 022 /MAGNESIUM (TOTAL).............  537.                MG/L
10: 028 /AMMONIA-N (NH3-N).............  0.3                 MG/L
11: 036 /CALCIUM (TOTAL)...............  595.                MG/L
12: 044 /ARSENIC (TOTAL)............... L.05                 MG/L
13: 046 /CADMIUM (TOTAL)............... L.01                 MG/L
14: 048 /COPPER (TOTAL)................ L.01                 MG/L
15: 049 /IRON (TOTAL)..................  .67                 MG/L
16: 051 /LEAD (TOTAL).................. L.02                 MG/L
17: 054 /ZINC (TOTAL)..................  .33                 MG/L
18: 086 /SULFIDE....................... "NO RESULTS"          MG/L
19: 158F/FLOW..........................  89500.              IMP G/DAY
20: 160 /MANGANESE (TOTAL).............  .27                 MG/L
21: 162 /ALUMINUM (TOTAL).............. L.025                MG/L
22: 165Y/FORMALDEHYDE (ACETYL ACETONE)  L0.5                 MG/L
23: 237 /COBALT (CO) .................. L.01                 MG/L
24: 500 /BIOASSAY ..................... "DONE"
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* 87PK022 - PAUL KLAAMAS                        STATUS AS OF SEP 14, 1987 *

REGISTERED ON: JUL 20, 1987,  BY :BOB G

LOCATOR: SCOTMR02/SCOTIA MARINE PRODUCTS
                  DRAIN 2 BOILER FLOC                          PROV: NS
PROJECT CODE: 240/ENV. CONTROL SITE FISHERIES ACT

SAMPLING BEGAN, DATE: 30/ 6/87 (JUN 30, 1987), TIME:  830, FREQ: 8
SAMPLING ENDED, DATE: 30/ 6/87 (JUN 30, 1987), TIME: 1630

DEPTH:    .00 METERS, TIDE:
NARRATIVE: SEWER #2

                        ---- SAMPLE ANALYSIS ----
    .............PARAMETER ............. ...... VALUE ...... UNITS
 1: 001 /PH.............................  6.3
 2: 001F/PH.............................  5.8
 3: 002 /TEMPERATURE.................... "NO RESULTS"          DEGREES C.
 4: 005 /HARDNESS.......................  150.                 MG/L
 5: 015 /BIOCHEM. OXYGEN DEMAND (BOD).. L10.                  MG/L
 6: 016 /CHEMICAL OXYGEN DEMAND (COD)..  180.                 MG/L
 7: 020 /SUSPENDED SOLIDS (SS).........  590.                 MG/L
 8: 021 /VOLATILE SUSPENDED SOLIDS.....  270.                 MG/L
 9: 022 /MAGNESIUM (TOTAL).............  29.2                 MG/L
10: 028 /AMMONIA-N (NH3-N).............  0.3                  MG/L
11: 036 /CALCIUM (TOTAL)...............  12.1                 MG/L
12: 044 /ARSENIC (TOTAL)...............  .34                  MG/L
13: 046 /CADMIUM (TOTAL)............... L.01                  MG/L
14: 048 /COPPER (TOTAL)................ L.01                  MG/L
15: 049 /IRON (TOTAL)..................  4.15                 MG/L
16: 051 /LEAD (TOTAL).................. L.02                  MG/L
17: 054 /ZINC (TOTAL)..................  .07                  MG/L
18: 086 /SULFIDE....................... "NO RESULTS"          MG/L
19: 158F/FLOW..........................  27150.               IMP G/DAY
20: 160 /MANGANESE (TOTAL).............  .06                  MG/L
21: 162 /ALUMINUM (TOTAL)..............  121.                 MG/L
22: 165Y/FORMALDEHYDE (ACETYL ACETONE)  L0.5                  MG/L
23: 237 /COBALT (CO) .................. L.01                  MG/L
24: 500 /BIOASSAY ..................... "DONE"
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* 87PK023 - PAUL KLAAMAS                          STATUS AS OF SEP 14, 1987 *

REGISTERED ON: JUL 20, 1987,  BY :BOB G

LOCATOR: SCOTMR03/SCOTIA MARINE PRODUCTS
                  DRAIN 3 PROCESS EFFLUENT                        PROV: NS
PROJECT CODE: 240/ENV. CONTROL SITE FISHERIES ACT

SAMPLING BEGAN, DATE: 30/ 6/87 (JUN 30, 1987), TIME:  830, FREQ: 8
SAMPLING ENDED, DATE: 30/ 6/87 (JUN 30, 1987), TIME: 1630

DEPTH:    .00 METERS, TIDE:
NARRATIVE: SEWER #3

                          ---- SAMPLE ANALYSIS ----
    .............PARAMETER ............. ..... VALUE ..... UNITS
 1: 001 /PH.............................  6.2
 2: 001F/PH.............................  6.4
 3: 002 /TEMPERATURE.................... "NO RESULTS"          DEGREES C.
 4: 005 /HARDNESS.......................  150.                 MG/L
 5: 015 /BIOCHEM. OXYGEN DEMAND (BOD).. L10.                  MG/L
 6: 016 /CHEMICAL OXYGEN DEMAND (COD)..  200.                 MG/L
 7: 020 /SUSPENDED SOLIDS (SS).........  490.                 MG/L
 8: 021 /VOLATILE SUSPENDED SOLIDS.....  230.                 MG/L
 9: 022 /MAGNESIUM (TOTAL).............  29.7                 MG/L
10: 028 /AMMONIA-N (NH3-N).............  0.2                  MG/L
11: 036 /CALCIUM (TOTAL)...............  12.5                 MG/L
12: 044 /ARSENIC (TOTAL)...............  .47                  MG/L
13: 046 /CADMIUM (TOTAL)............... L.01                  MG/L
14: 048 /COPPER (TOTAL)................  .01                  MG/L
15: 049 /IRON (TOTAL)..................  4.60                 MG/L
16: 051 /LEAD (TOTAL).................. L.02                  MG/L
17: 054 /ZINC (TOTAL)..................  .06                  MG/L
18: 086 /SULFIDE....................... "NO RESULTS"          MG/L
19: 158F/FLOW..........................  158400.              IMP G/DAY
20: 160 /MANGANESE (TOTAL).............  .06                  MG/L
21: 162 /ALUMINUM (TOTAL)..............  129.                 MG/L
22: 165Y/FORMALDEHYDE (ACETYL ACETONE)  L0.5                  MG/L
23: 237 /COBALT (CO) .................. L.01                  MG/L
24: 500 /BIOASSAY ..................... "DONE".
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* 87PK024 - PAUL KLAAMAS STATUS AS OF SEP 14, 1987 *

REGISTERED ON: JUL 20, 1987; BY :BOB G

LOCATOR: SCOTMR04/SCOTIA MARINE PRODUCTS
DRAIN 4 PROCESS EFFLUENT PROV: NS
PROJECT CODE: 240/ENV. CONTROL SITE FISHERIES ACT

SAMPLING BEGAN, DATE: 30/ 6/87 (JUN 30, 1987), TIME: 830, FREQ: 8
SAMPLING ENDED, DATE: 30/ 6/87 (JUN 30, 1987), TIME: 1630

DEPTH: .00 METERS, TIDE:
NARRATIVE: SEWER #4

---- SAMPLE ANALYSIS ----

	PARAMETER	VALUE	UNITS
1:	001 /PH	5.2	
2:	001F/PH	6.8	
3:	002 /TEMPERATURE	"NO RESULTS"	DEGREES C.
4:	002F/TEMPERATURE	20.	DEGREES C.
5:	005 /HARDNESS	3000.	MG/L
6:	015 /BIOCHEM. OXYGEN DEMAND (BOD)	280.	MG/L
7:	016 /CHEMICAL OXYGEN DEMAND (COD)	980.	MG/L
8:	020 /SUSPENDED SOLIDS (SS)	320.	MG/L
9:	021 /VOLATILE SUSPENDED SOLIDS	250.	MG/L
10:	022 /MAGNESIUM (TOTAL)	485.	MG/L
11:	028 /AMMONIA-N (NH3-N)	0.3	MG/L
12:	036 /CALCIUM (TOTAL)	417.	MG/L
13:	044 /ARSENIC (TOTAL)	L.05	MG/L
14:	046 /CADMIUM (TOTAL)	L.01	MG/L
15:	048 /COPPER (TOTAL)	L.01	MG/L
16:	049 /IRON (TOTAL)	.91	MG/L
17:	051 /LEAD (TOTAL)	L.02	MG/L
18:	054 /ZINC (TOTAL)	.12	MG/L
19:	086 /SULFIDE	"NO RESULTS"	MG/L
20:	158F/FLOW	589000.	IMP G/DAY
21:	160 /MANGANESE (TOTAL)	.09	MG/L
22:	162 /ALUMINUM (TOTAL)	L.025	MG/L
23:	165Y/FORMALDEHYDE (ACETYL ACETONE)	5.8	MG/L
24:	237 /COBALT (CO)	L.01	MG/L
25:	500 /BIOASSAY	"DONE"	

Government of Canada / Gouvernement du Canada

MEMORANDUM **NOTE DE SERVICE**

TO / A

P. Klaamas, Head
Municipal Wastes & Technology Transfer Section
Air & Water Branch
Environmental Protection

FROM / DE

J. David A. Vaughan
Aquatic Toxicology Section
Laboratory Division
Air & Water Branch

SECURITY - CLASSIFICATION - DE SÉCURITÉ	
OUR FILE/NOTRE RÉFÉRENCE	4705-82/2
YOUR FILE/VOTRE RÉFÉRENCE	
DATE	1 September 1987

SUBJECT / OBJET BIOASSAY RESULTS - PROTAN SCOTIA MARINE

On June 30, 1987, Bob Gaudet collected a grab sample from each of Sewers 1 through 4 from the Protan Scotia Marine Canada Ltd. plant, Woods Harbour, Nova Scotia.

On July 2, 1987, a 96-hour acute lethal static bioassay was begun on each of these samples following the "Standard Procedure for Testing the Acute Lethality of Liquid Effluents" (Report EPS-1-WP-80-1). In addition, a bioassay was conducted on a flow-proportioned mix of sewers 1,2,3 and 4, following the same test procedure. The bioassay results are shown below:

Sample	Salinity (ppt)	Test Organism	Result
Sewer 1	14	Three-spine Stickleback	Not acutely lethal
Sewer 2	1	rainbow trout	4 day LC50 = 30% (95% conf. limits: 18-100%)
Sewer 3	1	rainbow trout	4 day LC50 = 19% (95% conf. limits: 10-32%)
Sewer 4	14	Three-spine Stickleback	Not acutely lethal
Flow-proportioned mix of Sewers 1, 2,3 and 4	12	Three-spine Stickleback	Not acutely lethal

../2

Chemical analysis of composite samples collected the same day revealed that Sewers 2 and 3 contained 121 and 129 mg/L total aluminum respectively. I consider it very likely that dissolved aluminum is the cause of the observed mortality and suggest that dissolved as well as total aluminum be measured on subsequent samples from this company.

A copy of each Bioassay Report is attached which provides further test details.

J. David A. Vaughan

JDAV/ldl

Attachment (5)

cc: P. Hennebury
R. Gaudet
H. Samant
K. Doe
J. Turner, NSDOE
R. Parker

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**********************************************************************************
* 87PK036 - PAUL KLAAMAS                                  STATUS AS OF DEC 18, 1987 *

REGISTERED ON: AUG 20, 1987,  BY :IAN M

LOCATOR: SCOTMR02/SCOTIA MARINE PRODUCTS
                  DRAIN 2 BOILER FLOC                                  PROV: NS
PROJECT CODE: 240/ENV. CONTROL SITE FISHERIES ACT

SAMPLING BEGAN, DATE: 19/ 8/87 (AUG 19, 1987), TIME:  815, FREQ: 4
SAMPLING ENDED, DATE: 19/ 8/87 (AUG 19, 1987), TIME: 1215

DEPTH:    .00 METERS, TIDE: LR
NARRATIVE: VARIABLE FLOW RATES !

                          ---- SAMPLE ANALYSIS ----
    .............PARAMETER ..... ..... VALUE ..... UNITS
 1: 001F/PH..................... 6.4
 2: 022 /MAGNESIUM (TOTAL)...... 42.3                  MG/L
 3: 022D/MAGNESIUM (DISSOLVED).. 39.8                  MG/L
 4: 029 /CYANIDE (CN)........... L0.02                 MG/L
 5: 036 /CALCIUM (TOTAL)........ 11.5                  MG/L
 6: 043 /SILVER (TOTAL)......... L.02                  MG/L
 7: 044 /ARSENIC (TOTAL)........ 0.21                  MG/L
 8: 044D/ARSENIC(DISSOLVED)..... 0.10                  MG/L
 9: 046 /CADMIUM (TOTAL)........ L0.01                 MG/L
10: 046D/CADMIUM DISSOLVED...... L0.01                 MG/L
11: 047 /CHRONIUM (TOTAL)....... 0.04                  MG/L
12: 047D/CHROMIUM(DISSOLVED).... 0.06                  MG/L
13: 048 /COPPER (TOTAL)......... L0.01                 MG/L
14: 048D/COPPER DISSOLVED....... L0.01                 MG/L
15: 049 /IRON (TOTAL)........... 3.96                  MG/L
16: 049D/IRON DISSOLVED......... 0.13                  MG/L
17: 051 /LEAD (TOTAL)........... L0.02                 MG/L
18: 051D/LEAD DISSOLVED......... L0.02                 MG/L
19: 052 /ANTIMONY (TOTAL)....... *DISS.=0.36MG/L,TOTA  MG/L
20: 054 /ZINC (TOTAL)........... 0.04                  MG/L
21: 054D/ZINC DISSOLVED......... 0.01                  MG/L
22: 086 /SULFIDE................ L0.16                 MG/L
23: 159 /NICKEL (TOTAL)......... L0.01                 MG/L
24: 159D/NICKEL DISSOLVED....... L0.01                 MG/L
25: 160 /MANGANESE (TOTAL)...... L0.01                 MG/L
26: 160D/MANGANESE(DISSOLVED)... 0.05                  MG/L
27: 162 /ALUMINUM (TOTAL)....... 42.1                  MG/L
28: 162D/ALUMINUM(DISSOLVED).... 0.42                  MG/L
29: 207 /TIN (SN) .............. L.05                  MG/L
30: 500 /BIOASSAY .............. *DONE*
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**********************************************************************
* 87PK037 - PAUL KLAAMAS                          STATUS AS OF DEC 18, 1987 *

REGISTERED ON: AUG 20, 1987,  BY :IAN M

LOCATOR: SCOTMR03/SCOTIA MARINE PRODUCTS
                  DRAIN 3 PROCESS EFFLUENT                    PROV: NS
PROJECT CODE: 240/ENV. CONTROL SITE FISHERIES ACT

SAMPLING BEGAN, DATE: 19/ 8/87 (AUG 19, 1987), TIME:  815, FREQ: 4
SAMPLING ENDED, DATE: 19/ 8/87 (AUG 19, 1987), TIME: 1215

DEPTH:    .00 METERS, TIDE: LR
NARRATIVE:

                        ---- SAMPLE ANALYSIS ----
    .............PARAMETER ..... ..... VALUE ..... UNITS
 1: 001F/PH..................... 8.3
 2: 022 /MAGNESIUM (TOTAL)..... 39.7                 MG/L
 3: 022D/MAGNESIUM (DISSOLVED)..... 37.0             MG/L
 4: 029 /CYANIDE (CN)..... 0.19                      MG/L
 5: 036 /CALCIUM (TOTAL)..... 11.3                   MG/L
 6: 043 /SILVER (TOTAL)..... L.02                    MG/L
 7: 044 /ARSENIC (TOTAL)..... 0.29                   MG/L
 8: 044D/ARSENIC(DISSOLVED)..... 0.09                MG/L
 9: 046 /CADMIUM (TOTAL)..... L0.01                  MG/L
10: 046D/CADMIUM DISSOLVED..... L0.01                MG/L
11: 047 /CHROMIUM (TOTAL)..... 0.03                  MG/L
12: 047D/CHROMIUM(DISSOLVED)..... L0.01              MG/L
13: 048 /COPPER (TOTAL)..... L0.01                   MG/L
14: 048D/COPPER DISSOLVED..... L0.01                 MG/L
15: 049 /IRON (TOTAL)..... 6.65                      MG/L
16: 049D/IRON DISSOLVED..... 0.04                    MG/L
17: 051 /LEAD (TOTAL)..... L0.02                     MG/L
18: 051D/LEAD DISSOLVED..... L0.02                   MG/L
19: 052 /ANTIMONY (TOTAL)..... 'DISS.=0.20MG/L,TOTA  MG/L
20: 054 /ZINC (TOTAL)..... 0.07                      MG/L
21: 054D/ZINC DISSOLVED..... L0.01                   MG/L
22: 086 /SULFIDE..... L0.16                          MG/L
23: 159 /NICKEL (TOTAL)..... 0.04                    MG/L
24: 159D/NICKEL DISSOLVED..... L0.01                 MG/L
25: 160 /MANGANESE (TOTAL)..... 0.04                 MG/L
26: 160D/MANGANESE(DISSOLVED)..... 0.05              MG/L
27: 162 /ALUMINUM (TOTAL)..... 65.2                  MG/L
28: 162D/ALUMINUM(DISSOLVED)..... L0.025             MG/L
29: 207 /TIN (SN) ..... L.05                         MG/L
30: 500 /BIOASSAY ..... 'DONE'
```

Government of Canada / Gouvernement du Canada

MEMORANDUM **NOTE DE SERVICE**

TO / A

Paul Klaamas, Head
Municipal Wastes & Technology
Transfer Section
Air & Water Branch

FROM / DE

J. David A. Vaughan '87 SEP 21 PM 2 13
Aquatic Toxicology Section
Laboratory Division
Air & Water Branch

SECURITY - CLASSIFICATION - DE SÉCURITÉ	
OUR FILE/NOTRE REFERENCE	4705-82/2
YOUR FILE/VOTRE REFERENCE	
DATE	17 September 1987

SUBJECT / OBJET **BIOASSAY RESULTS - PROTAN SCOTIA MARINE**

On August 19, 1987, Ian McLeod collected a grab sample from each of Sewers 1 and 2 at the Protan Scotia Marine Canada Ltd. plant, Woods Harbour, Nova Scotia.

On August 20, 1987, two 96-hour acute lethal static bioassays were begun on each sample. Rainbow trout fingerling were used as the test organism in one assay, three-spine stickleback were used in the other.

Neither sample was acutely lethal to either test organism.

A copy of each Bioassay Report is attached which provides additional test details.

J. David A. Vaughan

JDAV/ldl

Attachment (4)

cc: P. Hennebury
H. Samant
K. Doe
J. Turner, NSDOE
R. Parker

REAPPRAISAL OF BACTERIOLOGICAL WATER QUALITY OF WOODS HARBOUR AND SHAG HARBOUR

(NOVA SCOTIA SHELLFISH GROWING AREA 15)

Environmental Protection
Environment Canada
Atlantic Region
Canada

March, 1981

FOREWORD

This report presents results of routine bacteriological water quality surveys of shellfish growing areas in the Maritimes carried out by the Environmental Protection Service. The objective of these surveys is to determine if the water quality is acceptable for the harvesting of shellfish. From a public health standpoint, the principal purpose is to detect the occurrence of disease-causing organisms that may be accumulated by shellfish if domestic sewage or animal wastes reach their environment.

The public health safety of shellfish and shellfish harvesting waters in Canada is judged presently by bacteriological standards. These standards require that the "most probable numbers (MPN) of fecal coliforms in water not exceed a median of 14 per 100 ml and that no more than 10% of the samples exceed 43 fecal coliforms per 100 ml in areas approved for the harvesting of shellfish".

It should be emphasized that bacteriological examination of shellfish growing waters is used only as an adjunct to the sanitary survey to show the extent of fecal pollution affecting an area. Fecal contamination is often intermittent and may not be revealed by the bacteriological examination of a single water sample. The most a bacteriological report can prove is that, at the time of examination, bacteria indicating fecal pollution did or did not grow under laboratory conditions from a sample of water. Therefore, if a sanitary survey shows that the waters in a shellfish growing area are obviously subject to contamination from direct fecal wastes, radionuclides or harmful industrial wastes, the shellfish area should be closed irrespective of the results of bacteriological analyses.

1. INTRODUCTION

A reappraisal of the bacteriological water quality of Woods Harbour and Shag Harbour in Nova Scotia (Figure 1) was conducted by the Department of the Environment (Environmental Protection) during the period July 1 to September 23, 1987. The purpose of the survey was to reassess whether the sanitary and bacteriological water quality conditions within these two harbours are acceptable for the harvesting of bivalve molluscan shellfish for direct marketing in accordance to the criteria established by the National Shellfish Sanitation Program (NSSP, 1986).

Earlier investigations of the study area by Environmental Protection and the Department of Fisheries and Oceans in 1986 had found that the water quality in Woods Harbour was subjected to fecal contamination, as indicated by high fecal coliform counts in the harbour waters. As a result, a section of the harbour was recommended to be closed to the harvesting of shellfish for direct marketing (Figure 2). The source of fecal coliform identified to have potential impact on the water quality in Woods Harbour were individual homes in the community with inadequate disposal systems, effluents discharged from a rockweek plant, several fish plants, and the Evelyn Richardson Memorial Elementary School wastewater treatment system at Maggie Garrons Point.

A pollution source survey conducted by the Nova Scotia Department of Health (August 1986) had identified many existing on-site sewage disposal systems in Woods Harbour were not functioning properly. Relatively high fecal coliform counts were found in water samples collected from highway ditches and streams.

Recently, the rockweed processing plant has taken the measures necessary to control the multiplication of fecal coliform bacteria in its plant, and to reduce the level of fecal coliform being discharged to the harbour, as stipulated under the Ministerial Order of the Nova Scotia Department of the Environment.

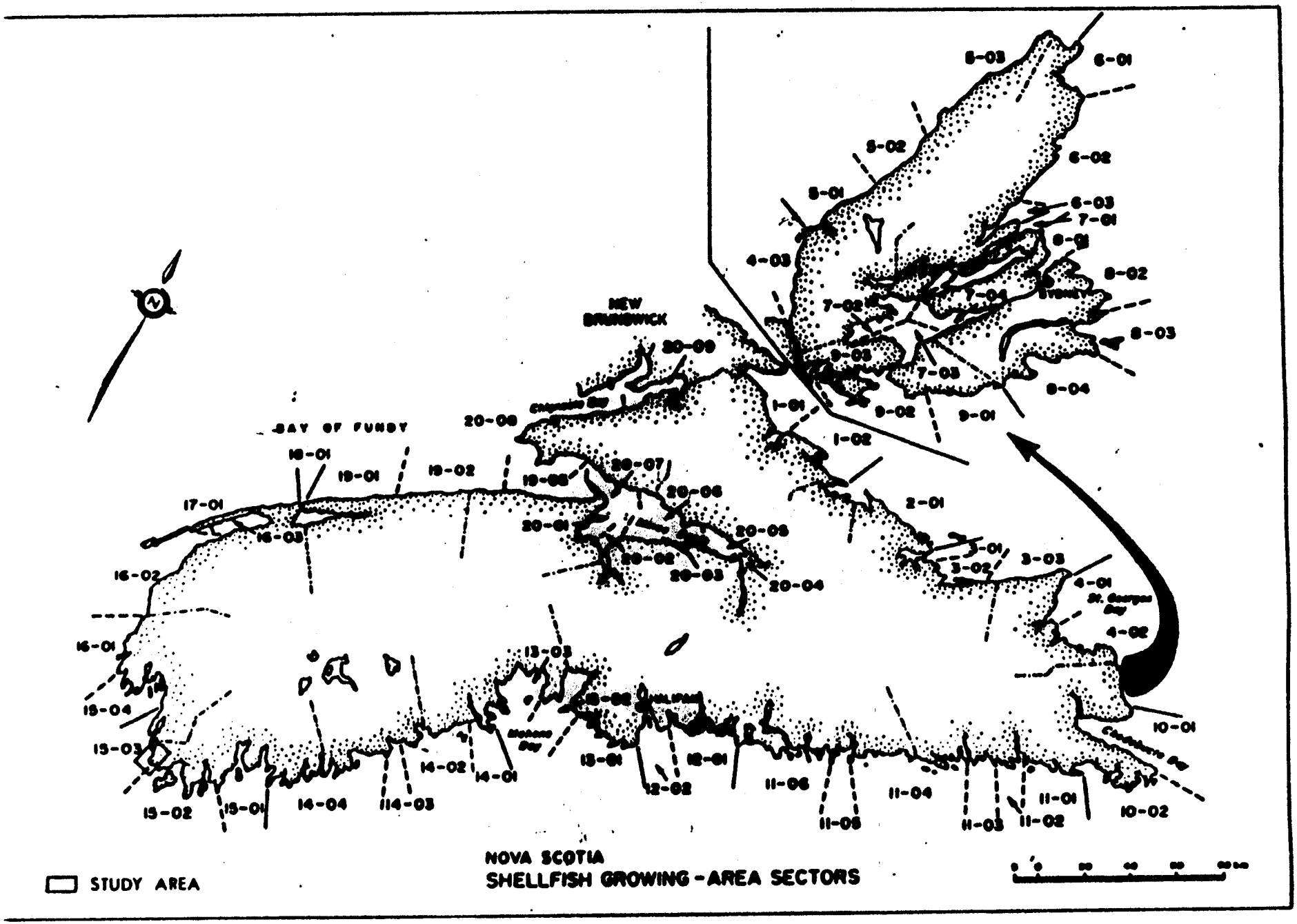


Figure 1. Location of Survey Area

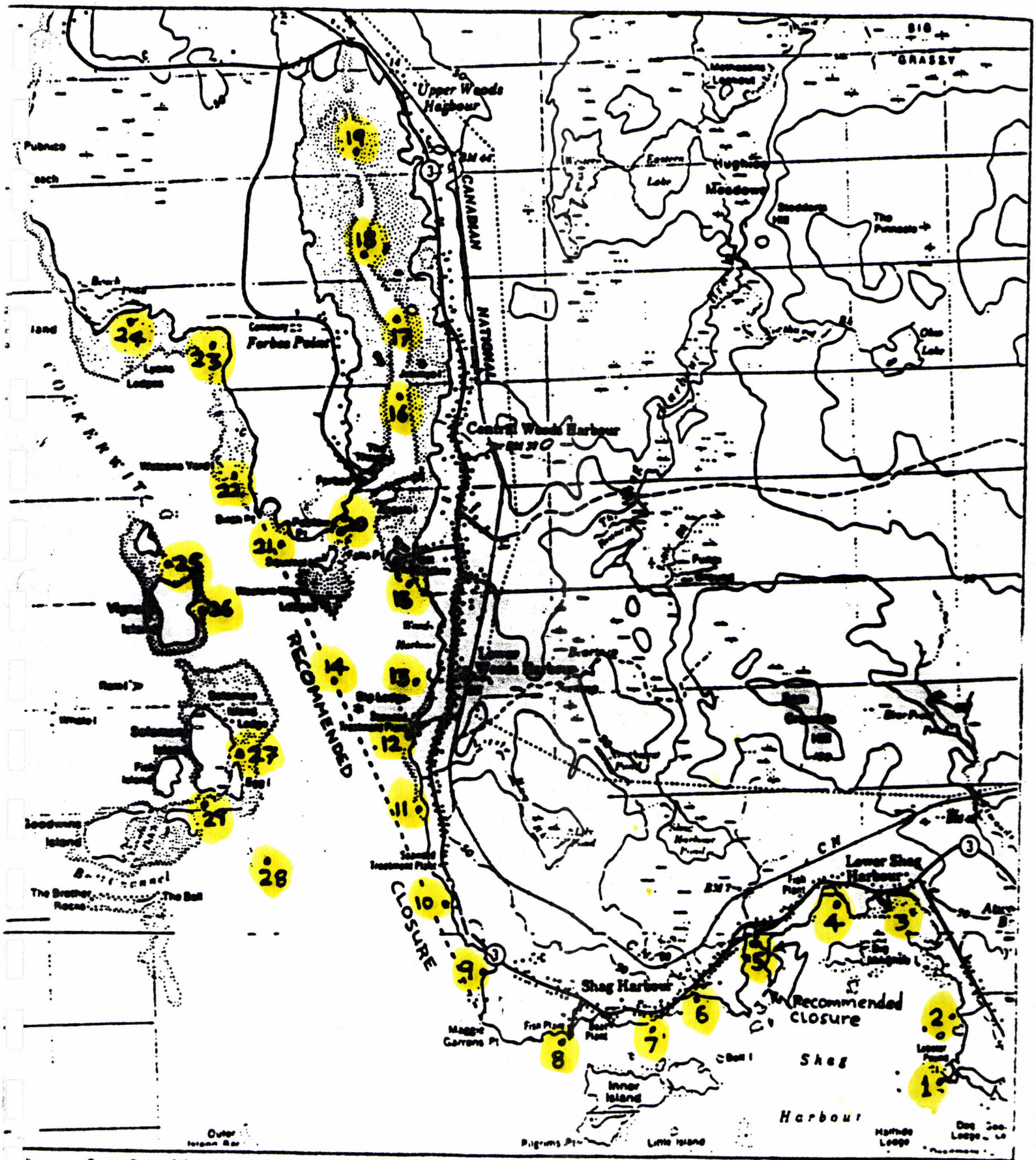


Figure 2. Sampling Locations and Recommended Closure Lines, Woods Harbour and Shag Harbour

2. BACTERIOLOGICAL WATER QUALITY

Water samples were collected at 29 sites established in Woods Harbour and Shag Harbour (Figure 2) on four occasions, from July 1 to September 23, 1987. A total of 112 water samples were collected from these sites and analyzed for fecal coliform levels using the multiple tube fermentation technique, as described in the APHA Recommended Procedure for the Examination of Seawater and Shellfish (1985). The bacteriological results obtained for both the 1986 and 1987 surveys are presented in Tables 1 and 2, respectively. The precipitation data recorded at Charlesville, Nova Scotia, for the survey period are shown in Table 3. Table 4 summarizes the salinity measurements taken at each station.

2.1 Woods Harbour

Fecal coliform results indicate that bacteriological water quality in Woods Harbour has improved since the 1986 survey, but it still does not meet the NSSP criteria for an approved shellfish growing area. A significant increase in fecal coliform counts in the waters on September 23, 1987, following heavy rainfall, indicate that the area is very sensitive to runoff pollution. As 1987 was an extremely dry summer (Table 3), most of the water samples were collected under dry weather conditions. Therefore, the bacteriological data presented here does not reflect the adverse contamination profile of the harbour waters. In fact, a further deterioration in bacteriological water quality can be expected in the harbour if the samples were collected during a high flow period when surface runoff might flush accumulated fecal contaminants to the ocean.

The improvement in the bacteriological effluent quality of the rockweed processing plant is reflected in the reduction of fecal coliform levels in the Woods Harbour water. The impact of wastewater discharge from the rockweed processing plant during the survey period appeared to be limited only to station 12, which is in the immediate vicinity of the outfalls near the wharf at Lower Woods Harbour. It is unlikely that the effluent from the rockweed plant is adversely affecting the bacteriological water quality in Upper Woods Harbour. This is supported by the data obtained from the verification of fecal coliform

species isolated from the rockweed plant wastewaters and at various locations in the harbour (Table 5). The predominent fecal coliform biotypes isolated from the rockweed plant wastewaters were Klebsiella sp. (50%). Klebsiella sp. also made up a large percentage (59.4%) of fecal coliform flora at stations 11, 12 and 13 in Lower Woods Harbour. The presence of this substantial number of Klebsiella organisms in the vicinity of the rockweed plant outfalls is probably due to the influence of the wastewaters discharging from the plant. The distribution of fecal coliform biotypes in Upper Woods Harbour waters is significantly different from those observed in the vicinity of the rockweed plant outfalls. The high percentage of E. coli (84.6%) isolated from the waters in Upper Woods Harbour indicate that the fecal coliform organisms originated from localized sources and probably from domestic wastes. It is very unlikely that they are generated fom the rockweed plant.

Bacteriological water quality in Lyons Bay and the outer islands (Vigneau, Solomans, Goodwins) was satisfactory for the harvesting of shellfish for direct marketing.

2.2 Shag Harbour

Bacteriological water quality along the shoreline of Shag Harbour was satisfactory, with the exception of stations 3, 4 and 5, where moderately high fecal coliform counts were recorded. These high fecal coliform counts probably originated fromn localized sources. Most of the houses along the highway are well back from the shoreline and do not appear to produce any serious sources of contamination to the harbour.

3. RECOMMENDATIONS

The waters in Woods Harbour from Maggie Garron Point to Birch Point should remain closed to the harvesting of shellfish for direct marketing. Additional shellfish closures should be implemented in the vicinity of stations 3, 4 and 5 in Shag Harbour (Figure 3).

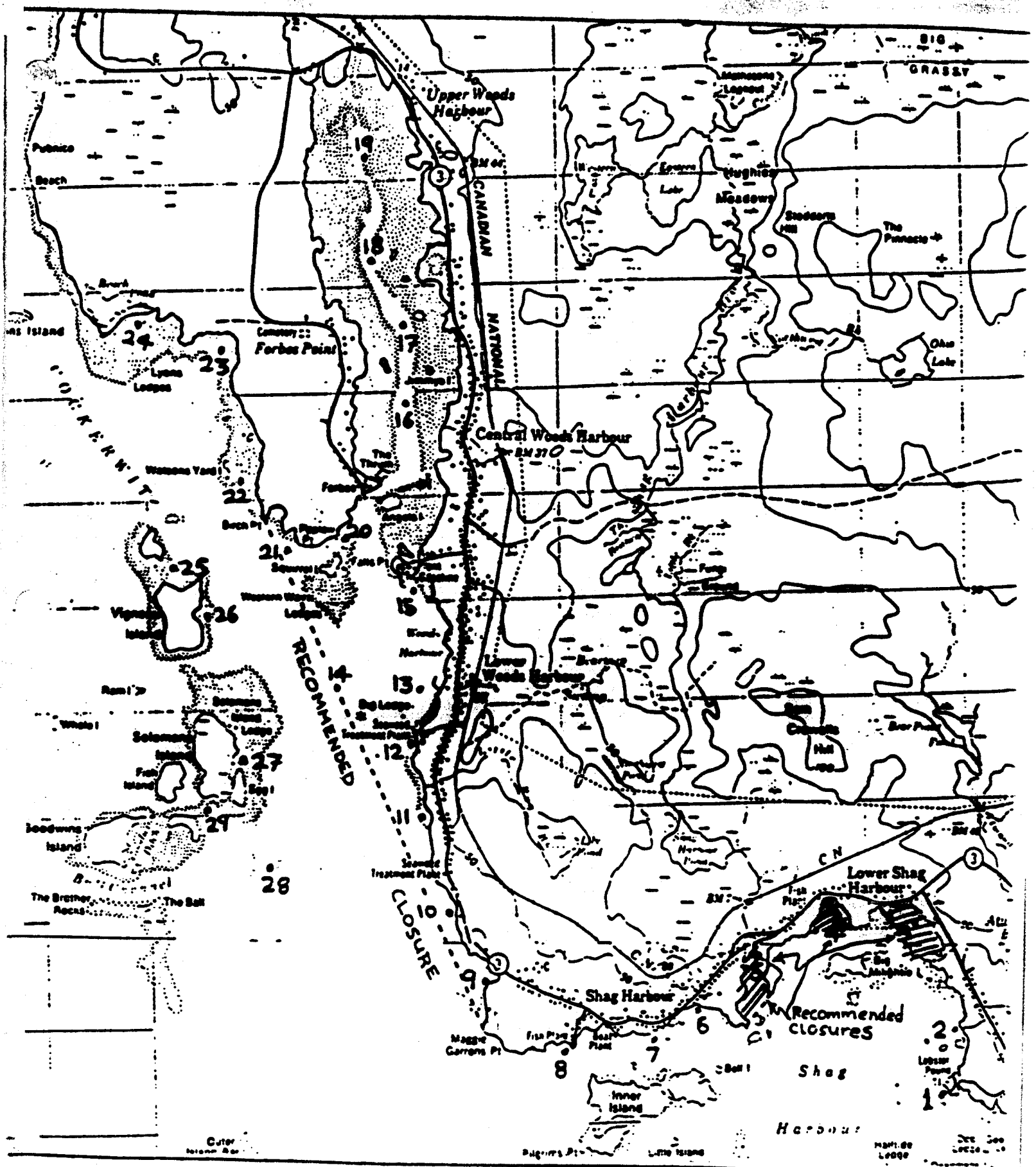


Figure 3. Recommended Shellfish Closures in Woods Harbour and Shag Harbour

It is also recommended that an effort should be made to alleviate the pollution problems in the community. Consideration should be given to relocating the mussel culture operation in Upper Woods harbour to an approved site, such as Lyons Bay.

4. REFERENCES

American Public Health Association. 1985. "Recommended Procedures for the Examination of Seawater and Shellfish". APHA, 15th Edition, Washington, D.C. 144 pp.

NSSP. 1986. "National Shellfish Sanitation Program, Manual of Operations, Part I". U.S. Dept. of Health and Human Services, Public Health Service, Washington, D.C.

Richard, B.R. 1986. "A Preliminary Sanitary and Bacteriological Water Quality Survey of Nova Scotia Shellfish Growing Area, Sectors 15-03 and 15-02 - Woods Harbour and Shag Harbour". Environmental Protection Manuscript Report No. AR-86-4.

Table 1. Fecal Coliforms, Tidal Stage and Water Temperature, Woods Harbour and Shag Harbour, Nova Scotia, 1986

STATION	June 24	July 15	July 16	July 17	July 21	July 22	July 23	% Samples >43 MPN	90th Percentile	Median
1	-	L2	L2	L2	-	13	L2	0	L7.5	L2
2	-	L2	L2	L2	-	L2	2	0	L2	L2
3	-	L2	L2	5	-	2	L2	0	3.5	L2
4	-	L2	L2	-	-	13	13	0	13	170
5	-	110	22	280	-	240	170	80.0	260	7.5
6	-	L2	L2	2	-	5	L2	0	3.5	L2
7	-	L2	L2	L2	-	L2	4	0	L3.0	L2
8	-	L2	L2	L2	-	L2	L2	0	L2	L2
9	240	L2	L2	L2	130	5	L2	28.6	163	L2
10	49	L2	L2	17	140	5	2	28.6	76.3	5
11	240	L2	L2	49	70	33	79	57.1	127.3	44
12	≥2400	33	≥2400	240	70	350	≥2400	85.7	≥2400	350
13	≥2400	L2	L2	46	49	79	8	57.1	≥ 775.3	46
14	13	L2	4	L2	2	5	L2	0	23	L2
15	23	L2	L2	L2	23	2	L2	0	23	L2
16	70	L2	5	5	33	2	8	14.3	44.1	5
17	64	-	5	5	49	13	23	33.3	55.0	18
18	22	L2	7	L2	130	2	4	14.3	54.4	4
19	33	L2	8	5	170	11	23	14.3	74.1	11
20	49	L2	L2	2	22	5	8	14.3	30.1	5
21	27	L2	L2	L2	-	2	L2	0	12.0	L2
22	-	L2	L2	L2	-	L2	L2	0	L2	L2
23	-	L2	L2	L2	-	5	L2	0	L3.5	L2
24	-	L2	L2	L2	-	2	5	0	3.5	L2
25	-	17	L2	L2	-	2	23	0	20.0	2
26	-	L2	L2	L2	-	2	L2	0	L2	L2
27	-	2	L2	L2	-	L2	L2	0	L2	L2
28	17	L2	L2	L2	-	2	2	0	L2	L2
29	-	L2	L2	L2	-	2	L2	0	L2	L2
TIDE:		HR-HF	LR-HR	LT-LR	HF	HF-HF	HR			
Mean Water Temp. (°C)		15	13	15	13	13	13			

LT: Low-Tide
LF: Low Falling Tide
LR: Low Rising Tide
MF: Mid Falling Tide
MR: Mid Rising Tide
HF: High Falling Tide
HR: High Rising Tide

L = Less than

TABLE 2 - FECAL COLIFORMS, TIDAL STAGE AND WATER TEMPERATURE, WOODS HARBOUR AND SHAG HARBOUR, NOVA SCOTIA, 1987

Station	July 1	July 28	Aug 21	Sept 23
1	5	L2	L2	L2
2	L2	L2	5	4
3	L2	L2	79	8
4	L2	L2	2400	33
5	21	170	280	240
6	2	2	2	5
7	8	2	5	5
8	2	L2	17	2
9	L2	L2	8	L2
10	L2	7	2	8
11	8	L2	7	13
12	5	2400	110	240
13	8	L2	2	33
14	L2	L2	2	L2
15	L2	L2	L2	33
16	L2	L2	L2	7
17	L2	L2	L2	22
18	L2	L2	L2	8
19	L2	L2	2	17
20	L2	L2	L2	17
21	L2	L2	L2	2
22	L2	L2	L2	7
23	L2	2	L2	8
24	L2	L2	2	5
25	2	L2	L2	L2
26	L2	L2	L2	5
27	L2	-	L2	L2
28	L2	-	L2	L2
29	L2	-	L2	L2
Tide:	MR-HF	HF	HF	H
Mean Water Temp. (°C)	13	12	14.5	13

L = Less Than.

TABLE 3

PRECIPITATION DATA (mm), CHARLESVILLE' SHELBURNE CO., NOVA SCOTIA, 1986 AND 1987

DATE	1986		1987			
	JUNE	JULY	JUNE	JULY	AUGUST	SEPTEMBER
1	0.3	-	-	-*	-	3.0
2	13.3	61.0	-	-	1.0	5.0
3	-	1.0	-	6.5	2.0	-
4	-	-	-	0.2	4.4	-
5	29.0	10.0	3.7	15.4	0.4	-
6	27.0	1.5	6.4	-	0.2	-
7	12.0	4.7	-	0.4	-	-
8	9.0	-	10.6	0.4	-	1.4
9	-	-	0.2	-	-	21.8
10	-	-	1.2	0.3	0.3	0.6
11	13.5	-	-	-	-	0.6
12	-	10.0	2.3	-	-	-
13	9.3	76.0	-	0.5	-	-
14	10.0	15.0	6.6	0.5	0.2	43.0
15	-	-*	-	0.2	-	1.0
16	4.0	-*	1.0	1.2	0.2	-
17	-	5.0*	0.8	-	-	-
18	-	-	-	-	-	-
19	-	2.0	0.4	0.8	0.2	0.3
20	23.5	1.8	-	0.2	-	1.3
21	-	0.6*	-	2.2	0.4	5.3
22	2.5	-*	2.0	0.8	-*	0.3
23	1.5	-*	18.0	-	1.5	0.2
24	0.2*	0.5	4.2	0.2	-	0.2
25	-	-	-	-	-	0.2
26	-	-	-	0.9	-	0
27	15.0	22.6	10.0	0.6	-	0.2
28	9.2	11.6	0.2	1.0*	3.3	0'
29	-	-	-	0.4	9.6	0.2
30	-	35.0	-	0.4	0.2	0.2
31	-	1.0	-	10.6	-	-
TOTAL	179.3	259.3	67.6.	43.7	37.4	132.8

* Sampling Day

TABLE 4

SUMMARY OF SALINITY DATA FOR WATER SAMPLES

WOODS HARBOUR AND SHAG HARBOUR, NOVA SCOTIA, 1986 AND 1987

Sample Station	1986		1987	
	No. of Samples	Salinity Range (‰)	No. of Samples	Salinity Range (‰)
1	5	29 - 31	4	28 - 30
2	5	29 - 31	4	28 - 30
3	5	29 - 31	4	27 - 30
4	4	29 - 31	4	26 - 30
5	5	25 - 29	4	27 - 30
6	5	28 - 31	4	28 - 30
7	5	29 - 30	4	29 - 30
8	5	29 - 30	4	28 - 30
9	7	29 - 30	4	28 - 30
10	7	29 - 30	4	28 - 30
11	7	28 - 30	4	28 - 30
12	7	28 - 30	4	25 - 30
13	7	28 - 30	4	28 - 30
14	7	28 - 30	4	29 - 30
15	7	28 - 30	4	28 - 30
16	7	28 - 30	4	28 - 30
17	7	28 - 30	4	26 - 30
18	7	28 - 30	4	28 - 30
19	7	28 - 30	4	27 - 30
20	7	28 - 30	4	29 - 30
21	6	28 - 30	4	29 - 30
22	6	28 - 30	4	29 - 30
23	6	28 - 30	4	29 - 30
24	6	28 - 30	4	29 - 31
25	6	28 - 30	3	29 - 30
26	6	28 - 30	3	29 - 30
27	6	28 - 30	3	29 - 30

TABLE 5 - DISTRIBUTION OF FECAL COLIFORM BIOTYPES IN WOODS HARBOUR

Location	No. of Isolates	*E. coli*		*Klebsiella sp.*		*Enterobacter sp.*		*Citrobacter sp.*	
		No.	%	No.	%	No.	%	No.	%
Rockweed Plant Wastewaters	150	56	(37.3)	75	(50.0)	9	(6)	10	(0.7)
Lower Woods Harbour Waters (Stations 11, 12, 13)	96	27	(28.1)	57	(59.4)	1	(1)	11	(11.4)
Central Woods Harbour Waters (Stations 16, 20)	15	13	(86.7)	2	(13.3)	0		0	
Upper Woods Harbour Waters (Stations 17, 18, 19)	26	22	(84.6)	4	(15.4)	0		0	
Lyons Beach (Station 24)	5	5	(100)	0		0		0	

SHELBURNE HARBOUR, CONTINENTAL SEAFOODS LTD.

```
**********************************************************************
* 87PK060 - PAUL KLAAMAS                          STATUS AS OF JAN 29, 1988 *

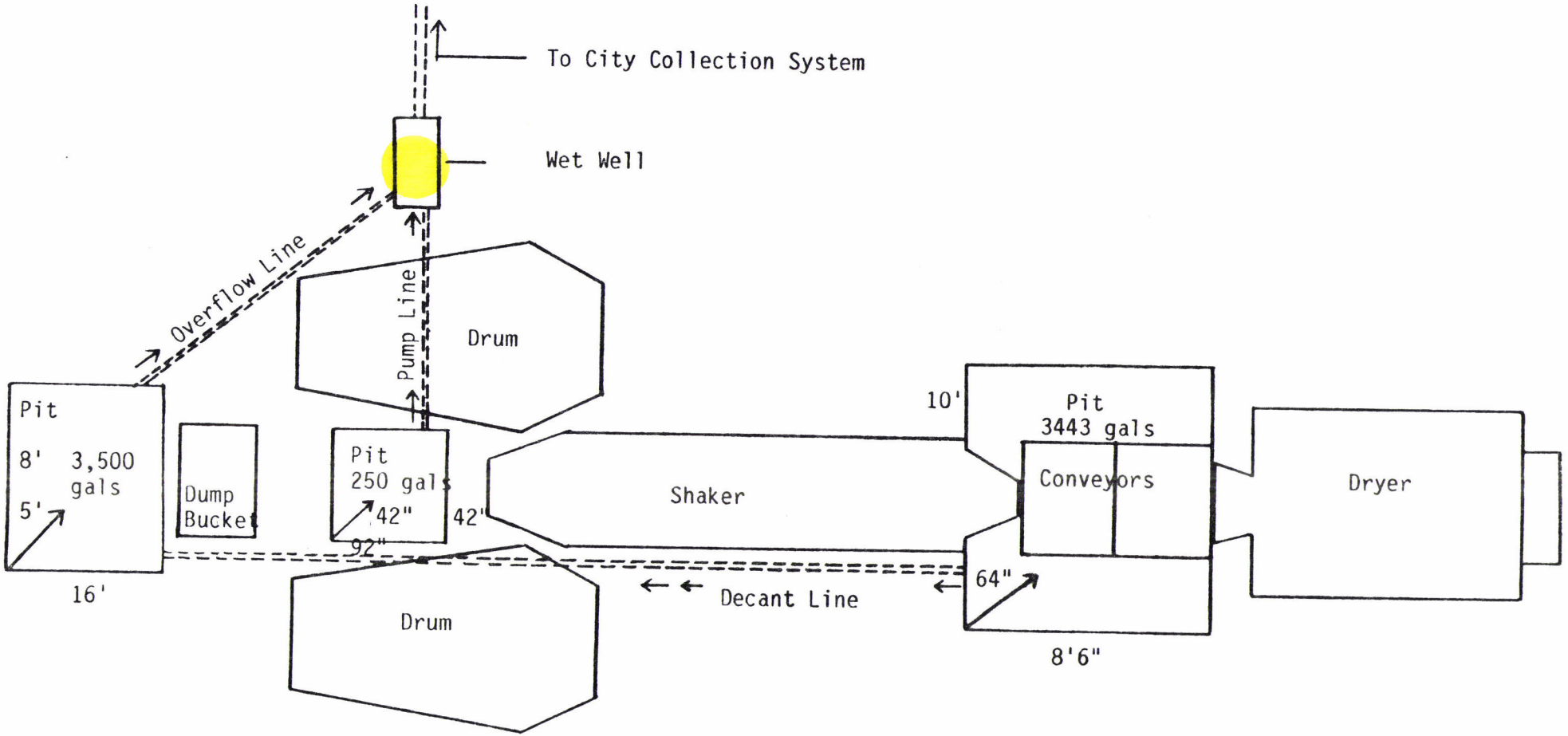
REGISTERED ON: SEP 29, 1987;  BY :IAN M

LOCATOR: SPECNS01/SPECIAL SAMPLES, N.S.
                                                              PROV: NS
PROJECT CODE: 238/ENV. CONTROL URBAN ACTIVITIES

SAMPLING BEGAN, DATE: 16/ 7/87 (JUL 16, 1987), TIME:    0, FREQ:   1
SAMPLING ENDED, DATE: 16/ 7/87 (JUL 16, 1987), TIME:    0

DEPTH:    .00 METERS, TIDE:
NARRATIVE: SHELB. HBR.;EFFL. PLUME FROM CONTINENTAL
           SEAFOODS
                        ---- SAMPLE ANALYSIS ----
    .............PARAMETER ..... ..... VALUE ..... UNITS
 1: 013 /OIL & GREASE (PET. ETHER).....  50.          MG/L
 2: 016 /CHEMICAL OXYGEN DEMAND (COD)..  830.         MG/L
 3: 022 /MAGNESIUM (TOTAL).............  929.         MG/L
 4: 026 /NITRATE-N (NO3-N)..............L2.0          MG/L
 5: 028 /AMMONIA-N (NH3-N).............  0.74         MG/L
 6: 036 /CALCIUM (TOTAL)...............  216.         MG/L
 7: 044 /ARSENIC (TOTAL)...............L.05           MG/L
 8: 046 /CADMIUM (TOTAL)...............L.01           MG/L
 9: 047 /CHROMIUM (TOTAL)..............  .05          MG/L
10: 048 /COPPER (TOTAL)................  0.05         MG/L
11: 049 /IRON (TOTAL)..................  .02          MG/L
12: 050 /MERCURY (TOTAL)...............  0.00025      MG/L
13: 051 /LEAD (TOTAL)..................L.02           MG/L
14: 054 /ZINC (TOTAL)..................  .02          MG/L
15: 084 /PHOSPHATE PHOSPHORUS TOTAL.... "NO SAMPLE FOUND"  MG/L
16: 159 /NICKEL (TOTAL)................L.01           MG/L
17: 160 /MANGANESE (TOTAL).............L.01           MG/L
18: 162 /ALUMINUM (TOTAL)..............L.025          MG/L
19: 201 /BERYLLIUM .....................L.01          MG/L
20: 202 /VANADIUM ......................L.01          MG/L
21: 203 /BARIUM (BA) ...................L.01          MG/L
22: 204 /BISMUTH (BI) ..................."NO RESULT"  MG/L
23: 205 /LITHIUM (LI) ..................  .08         MG/L
24: 206 /MOLYBDENUM (MO) ..............L.01           MG/L
25: 207 /TIN (SN) ......................L.05          MG/L
```

S I V A C O



SIVACO MARITIMES
GALVANIZING SYSTEM (Not to Scale)

```
**********************************************************************
* 88PH008 - PHIL HENNEBURY                    STATUS AS OF APR  3, 1988 *

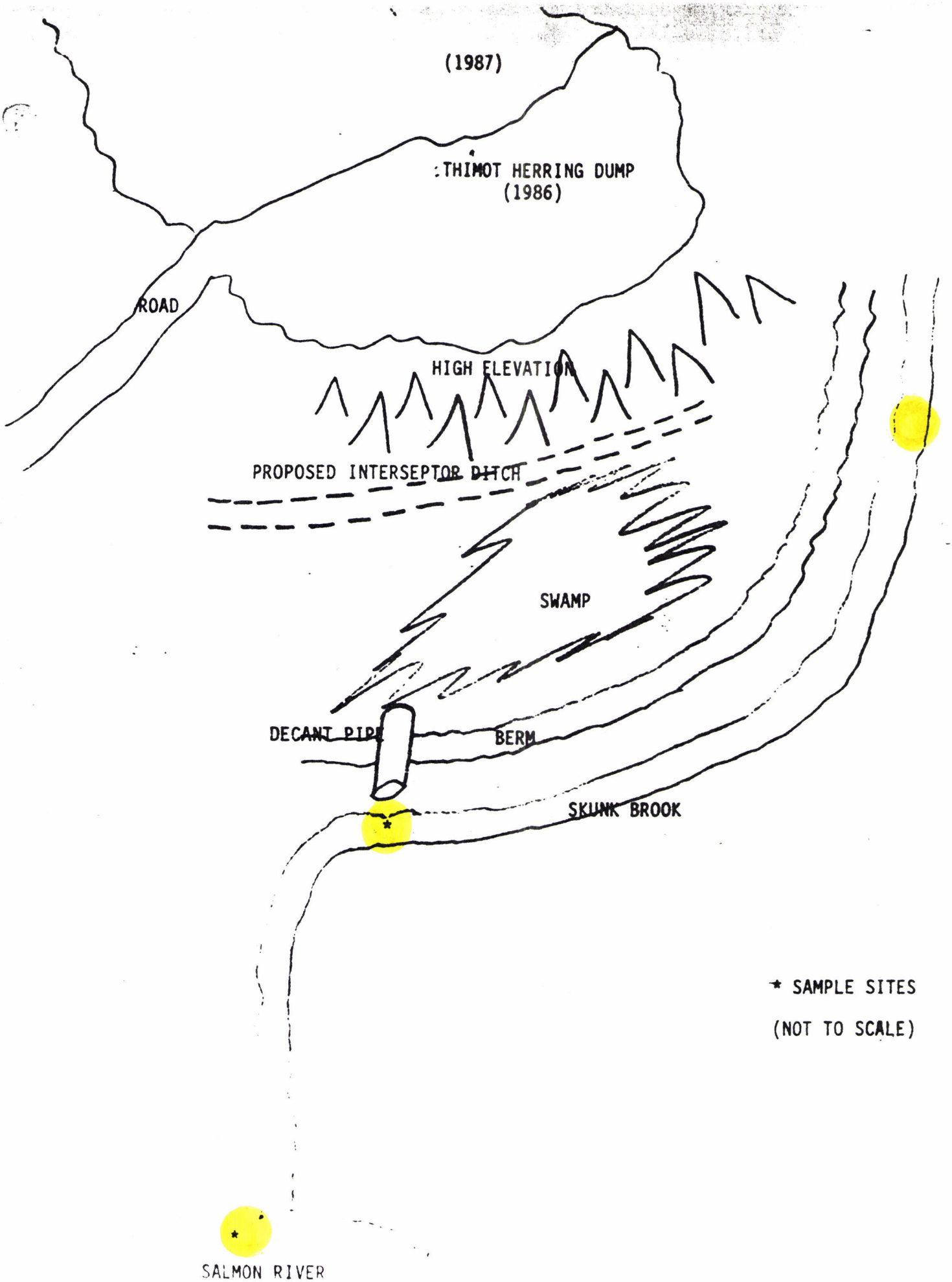
REGISTERED ON: MAR  3, 1988,  BY :BOB G

LOCATOR: SIVACO01/SIVACO-BURNSIDEINDUSTRIAL PARK
                  FINAL EFFL                                  PROV: NS
PROJECT CODE: 233/COAL & PEAT MINING METALLURGICAL

SAMPLING BEGAN, DATE:  3/ 3/88 (MAR  3, 1988), TIME: 1030, FREQ:   1
SAMPLING ENDED, DATE:  3/ 3/88 (MAR  3, 1988), TIME: 1030

DEPTH:    .00 METERS, TIDE:
NARRATIVE: SAMPLE TAKEN DURING DUMP FROM GALVINIZIN
           OPERATION(55 GALS. COMBINED TO EFFLUENT.
                     ---- SAMPLE ANALYSIS ----
    .............PARAMETER ..... ..... VALUE ..... UNITS
 1: 001 /PH.............................  6.5
 2: 001F/PH.............................  6.8
 3: 020 /SUSPENDED SOLIDS (SS).........  1000.            MG/L
 4: 029 /CYANIDE (CN)..................  L0.02            MG/L
 5: 029H/CYANIDE(OXIDIZABLE)            L0.02            MG/L
 6: 046 /CADMIUM (TOTAL)...............  L0.01            MG/L
 7: 047 /CHROMIUM (TOTAL)..............  0.02             MG/L
 8: 048 /COPPER (TOTAL)................  0.46             MG/L
 9: 049 /IRON (TOTAL)..................  21.5             MG/L
10: 051 /LEAD (TOTAL)..................  7.84             MG/L
11: 054 /ZINC (TOTAL)..................  1490.            MG/L
12: 158 /FLOW..........................  25000.           IMP G/DAY
13: 159 /NICKEL (TOTAL)................  0.22             MG/L
14: 162 /ALUMINUM (TOTAL)..............  0.54             MG/L
```

SKUNK BROOK HERRING DUMP, DIGBY CO.


(1987)
THIMOT HERRING DUMP
(1986)
ROAD
HIGH ELEVATION
PROPOSED INTERSEPTOR DITCH
SWAMP
DECANT PIPE
BERM
SKUNK BROOK
SALMON RIVER
* SAMPLE SITES
(NOT TO SCALE)

```
**********************************************************************
* STDA02I - OUTSIDE AGENCIES                    STATUS AS OF MAR 17, 1987 *

REGISTERED ON: FEB  9, 1987,  BY :MAUREEN

LOCATOR: SPECNS01/SPECIAL SAMPLES, N.S.
                                                          PROV: NS
PROJECT CODE: 265/LAB SUPPORT - PREV & CONTR WATER POLL

SAMPLING BEGAN, DATE:  3/ 2/87 (FEB  3, 1987), TIME:    0, FREQ:   1
SAMPLING ENDED: DATE:  3/ 2/87 (FEB  3, 1987), TIME:    0

DEPTH:    .00 METERS, TIDE:
NARRATIVE: SKUNK BROOK-DIGBY CO.SAMPLE #5
           RESULTS TO DON RILEY
                      ---- SAMPLE ANALYSIS ----
    ............PARAMETER ............ ...... VALUE ...... UNITS
 1: 013 /OIL & GREASE (PET. ETHER)..... *NO RESULTS*          MG/L
 2: 016 /CHEMICAL OXYGEN DEMAND (COD)..  480.                 MG/L
 3: 026 /NITRATE-N (NO3-N)............. <0.005               MG/L
 4: 028 /AMMONIA-N (NH3-N).............  39.2                 MG/L
 5: 062 /CARBON, TOTAL (TC).............  160.                 MG/L
```

```
**********************************************************************
* 8704024 - OUTSIDE AGENCIES                    STATUS AS OF MAR 27, 1987 *

REGISTERED ON: FEB  9, 1987,  BY :MAUREEN

LOCATOR: SPECNS01/SPECIAL SAMPLES, N.S.
                                                          PROV: NS

PROJECT CODE: 265/LAB SUPPORT - PREV & CONTR WATER POLL

SAMPLING BEGAN, DATE:  3/ 2/87 (FEB  3, 1987), TIME:    0, FREQ:   1
SAMPLING ENDED, DATE:  3/ 2/87 (FEB  3, 1987), TIME:    0

DEPTH:    .00 METERS, TIDE:
NARRATIVE: SKUNK BROOK-DIGBY CO.-SAMPLE 30
           RESULTS TO DON RILEY
                      ----- SAMPLE ANALYSIS -------
     ..........PARAMETER ..........  ..... VALUE ..... UNITS
 1: 013 /OIL & GREASE (PET. ETHER)..... "NO RESULTS"      MG/L
 2: 016 /CHEMICAL OXYGEN DEMAND (COD)..  520.             MG/L
 3: 026 /NITRATE-N (NO3-N)............. L0.005           MG/L
 4: 029 /AMMONIA-N (NH3-N).............  40.6             MG/L
 5: 062 /CARBON, TOTAL (TC).............  180.            MG/L
```

```
**********************************************************************
* S70A025 - OUTSIDE AGENCIES                    STATUS AS OF MAR 27, 1987 *

REGISTERED ON: FEB  9, 1987,  BY :MAUREEN

LOCATOR: SPECNS01/SPECIAL SAMPLES, N.S.
                                                          PROV: NS
PROJECT CODE: 265/LAB SUPPORT - PREV & CONTR WATER POLL

SAMPLING BEGAN: DATE:  3/ 2/87 (FEB  3, 1987), TIME:    0, FREQ:   1
SAMPLING ENDED: DATE:  3/ 2/87 (FEB  3, 1987), TIME:    0

DEPTH:    .00 METERS, TIDE:
NARRATIVE: SKUNK BROOK-DIGBY CO.-SAMPLE #1
           RESULTS TO DON RILEY
                      ---- SAMPLE ANALYSIS ----
    .............PARAMETER ............. ...... VALUE ..... UNITS
 1: 013 /OIL & GREASE (PET. ETHER).....  1.                  MG/L
 2: 016 /CHEMICAL OXYGEN DEMAND (COD)..  600.                MG/L
 3: 026 /NITRATE-N (NO3-N).............  0.02                MG/L
 4: 025 /AMMONIA-N (NH3-N).............  0.55                MG/L
 5: 062 /CARBON, TOTAL (TC).............  15.                 MG/L
```

```
**********************************************************************
* S79A026 - OUTSIDE AGENCIES                    STATUS AS OF MAR 27, 1987 *

REGISTERED ON: FEB  9, 1987,  BY :MAUREEN

LOCATOR: SPECNS01/SPECIAL SAMPLES, N.S.
                                                              PROV: NS
PROJECT CODE: 265/LAB SUPPORT - PREV & CONTR WATER POLL

SAMPLING BEGAN, DATE:  3/ 2/87 (FEB  3, 1987), TIME:    0, FREQ:   1
SAMPLING ENDED, DATE:  3/ 2/87 (FEB  3, 1987), TIME:    0

DEPTH:    .00 METERS, TIDE:
NARRATIVE: SKUNK BROOK-DIGBY CO.SAMPLE #2
           RESULTS TO DON RILEY
                      ---- SAMPLE ANALYSIS ----
    ..............PARAMETER ..............  ....... VALUE .......  UNITS
 1: 013 /OIL & GREASE (PET. ETHER)......  "NO RESULTS"             MG/L
 2: 016 /CHEMICAL OXYGEN DEMAND (COD)...  L40.                     MG/L
 3: 026 /NITRATE-N (NO3-N)..............  L0.005                   MG/L
 4: 029 /AMMONIA-N (NH3-N)..............   40.9                    MG/L
 5: 062 /CARBON, TOTAL (TC).............   190.                    MG/L
```

STIRLING MINE

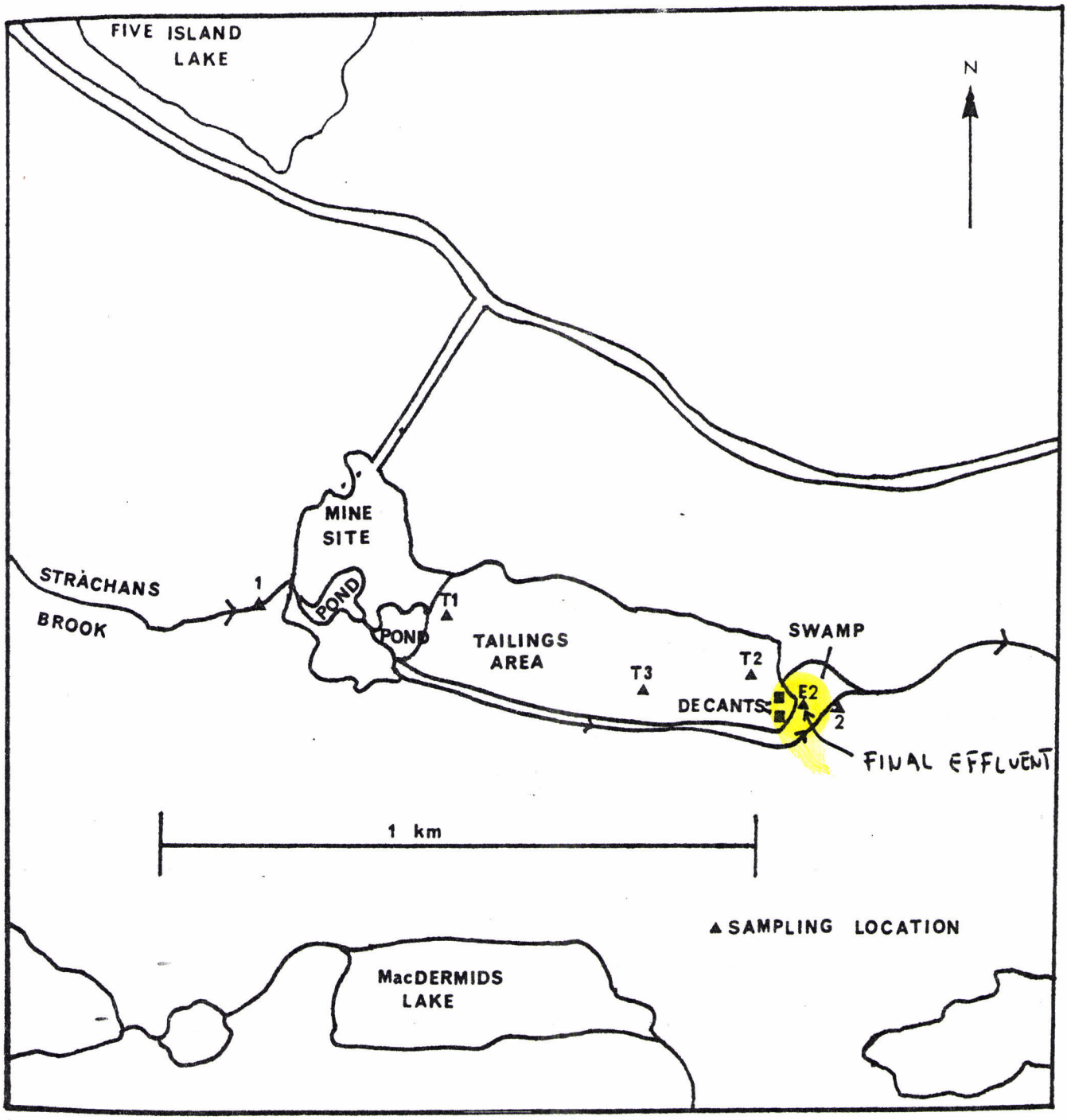


Figure 2 -- Stirling Mine Site, Richmond County, N.S.

****
* 87RP050 - ROY PARKER STATUS AS OF AUG 14, 1987 *

REGISTERED ON: JUL 23, 1987, BY :ANDRE

LOCATOR: SPECNS01/SPECIAL SAMPLES, N.S.

PROV: NS

PROJECT CODE: 235/ENV. CONTROL METAL MINING

SAMPLING BEGAN: DATE: 22/ 7/87 (JUL 22, 1987) TIME: 1030 PERI: 1
SAMPLING ENDED: DATE: 22/ 7/87 (JUL 22, 1987) TIME: 1030

DEPTH: .00 METERS, TIDE:
NARRATIVE: STIRLING MINE, STRACHANS BROOK
JUST ABOVE MINE

---- SAMPLE ANALYSIS ----

	PARAMETER	VALUE	UNITS
1:	001 /PH	6.9	
2:	001F/PH	6.8	
3:	005 /HARDNESS	11.	MG/L
4:	018 /SOLIDS, TOTAL (TS)	24.	MG/L
5:	020 /SUSPENDED SOLIDS (SS)	L5.	MG/L
6:	022 /MAGNESIUM (TOTAL)	0.95	MG/L
7:	022D/MAGNESIUM (DISSOLVED)	0.98	MG/L
8:	036 /CALCIUM (TOTAL)	2.91	MG/L
9:	036D/CALCIUM (DISSOLVED)	2.82	MG/L
10:	044 /ARSENIC (TOTAL)	L0.05	MG/L
11:	044D/ARSENIC(DISSOLVED)	0.07	MG/L
12:	046 /CADMIUM (TOTAL)	L0.01	MG/L
13:	046D/CADMIUM DISSOLVED	L0.01	MG/L
14:	047 /CHROMIUM (TOTAL)	L0.01	MG/L
15:	047D/CHROMIUM(DISSOLVED)	0.05	MG/L
16:	048 /COPPER (TOTAL)	L0.01	MG/L
17:	048D/COPPER DISSOLVED	L0.01	MG/L
18:	049 /IRON (TOTAL)	0.96	MG/L
19:	049D/IRON DISSOLVED	0.38	MG/L
20:	051 /LEAD (TOTAL)	0.04	MG/L
21:	051D/LEAD DISSOLVED	0.05	MG/L
22:	054 /ZINC (TOTAL)	0.02	MG/L
23:	054D/ZINC DISSOLVED	0.02	MG/L
24:	131 /TOTAL DISSOLVED SOLIDS (TDS)	24.	MG/L
25:	159 /NICKEL (TOTAL)	L0.01	MG/L
26:	159D/NICKEL DISSOLVED	0.12	MG/L
27:	160 /MANGANESE (TOTAL)	0.05	MG/L
28:	160D/MANGANESE(DISSOLVED)	0.02	MG/L
29:	162 /ALUMINUM (TOTAL)	0.08	MG/L
30:	162D/ALUMINUM(DISSOLVED)	L0.025	MG/L

```
**********************************************************************
* 87RP051 - ROY PARKER                          STATUS AS OF AUG 14, 1987 *

REGISTERED ON: JUL 23, 1987,  BY :ANDRE

LOCATOR: SPECNS01/SPECIAL SAMPLES, N.S.
                                                          PROV: NS
PROJECT CODE: 235/ENV. CONTROL METAL MINING

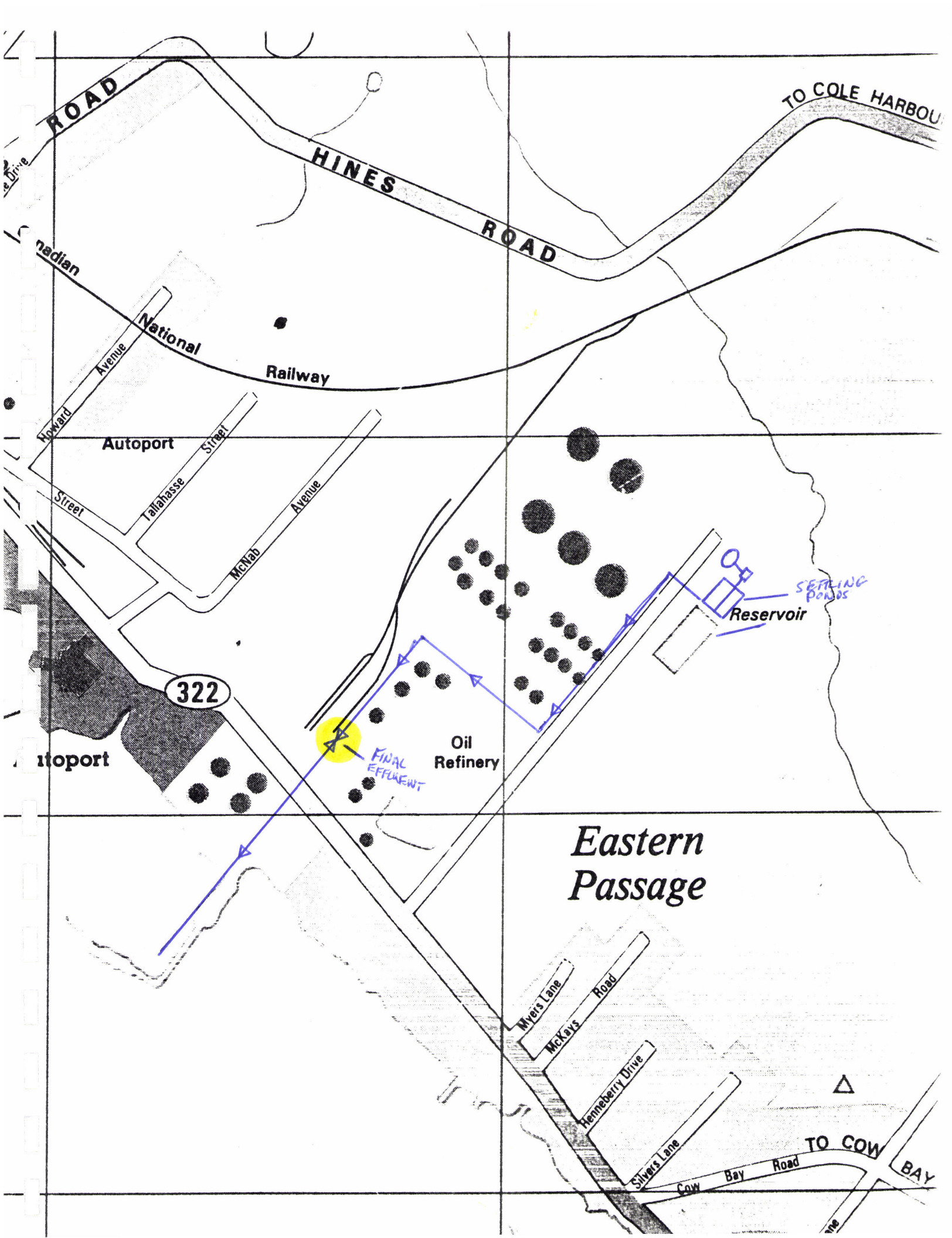
SAMPLING BEGAN: DATE: 22/ 7/87 (JUL 22, 1987), TIME: 1105, FREQ:   1
SAMPLING ENDED, DATE: 22/ 7/87 (JUL 22, 1987), TIME: 1105

DEPTH:    .00 METERS, TIDE:
NARRATIVE: STIRLING MINE, STRACHANS BROOK JUST
           BELOW TAILINGS POND
                      ---- SAMPLE ANALYSIS ----
    .............PARAMETER ..... ..... VALUE ..... UNITS
 1: 001 /PH.............................  7.1
 2: 001F/PH.............................  7.1
 3: 005 /HARDNESS.......................  55.                    MG/L
 4: 018 /SOLIDS, TOTAL (TS).............  110.                   MG/L
 5: 020 /SUSPENDED SOLIDS (SS)..........  L5.                    MG/L
 6: 022 /MAGNESIUM (TOTAL).............  4.85                   MG/L
 7: 022D/MAGNESIUM (DISSOLVED).........  4.91                   MG/L
 8: 036 /CALCIUM (TOTAL)................  14.3                   MG/L
 9: 036D/CALCIUM (DISSOLVED)............  12.8                   MG/L
10: 044 /ARSENIC (TOTAL)................ L0.05                   MG/L
11: 044D/ARSENIC(DISSOLVED).............. L0.05                   MG/L
12: 046 /CADMIUM (TOTAL)................ L0.01                   MG/L
13: 046D/CADMIUM DISSOLVED.............. L0.01                   MG/L
14: 047 /CHROMIUM (TOTAL)............... L0.02                   MG/L
15: 047D/CHROMIUM(DISSOLVED)............  0.02                   MG/L
16: 048 /COPPER (TOTAL).................  L0.01                  MG/L
17: 048D/COPPER DISSOLVED...............  0.02                   MG/L
18: 049 /IRON (TOTAL)...................  0.15                   MG/L
19: 049D/IRON DISSOLVED.................  0.26                   MG/L
20: 051 /LEAD (TOTAL)................... L0.02                   MG/L
21: 051D/LEAD DISSOLVED.................  0.06                   MG/L
22: 054 /ZINC (TOTAL)...................  0.18                   MG/L
23: 054D/ZINC DISSOLVED.................  0.18                   MG/L
24: 131 /TOTAL DISSOLVED SOLIDS (TDS)..  110.                    MG/L
25: 159 /NICKEL (TOTAL)................. L0.01                   MG/L
26: 159D/NICKEL DISSOLVED...............  0.4                    MG/L
27: 160 /MANGANESE (TOTAL)..............  0.20                   MG/L
28: 160D/MANGANESE(DISSOLVED)...........  0.20                   MG/L
29: 162 /ALUMINUM (TOTAL)............... L0.025                  MG/L
30: 162D/ALUMINUM(DISSOLVED)............ L0.025                  MG/L
```

T

TEXACO OIL REFINERY

TEXACO OIL REFINERY


ROAD
HINES ROAD
TO COLE HARBOU
Railway
Avenue
Autoport
Street
Tallahasse
Avenue
McNab
322
SETTLING PONDS
Reservoir
FINAL EFFLUENT
Oil Refinery
Eastern Passage
Myers Lane
Road
McKays
Henneberry Drive
Silvers Lane
TO COW BAY
Cow Bay Road

```
**********************************************************************
* 87PH001 - PHIL HENNEBURY                        STATUS AS OF JUN 12, 1987 *

REGISTERED ON: FEB  4, 1987,  BY :PHIL H

LOCATOR: TEXAC001/TEXACO REFINERY                              PROV: NS
                  FINAL EFFLUENT
NORMAL ANALYSIS: 1,12,13,20,86
PROJECT CODE: 240/ENV. CONTROL SITE FISHERIES ACT

SAMPLING BEGAN, DATE: 30/ 1/87 (JAN 30, 1987), TIME: 1000, FREQ: 1
SAMPLING ENDED, DATE: 30/ 1/87 (JAN 30, 1987), TIME: 1000

DEPTH:    .00 METERS, TIDE:
NARRATIVE: SAMPLE COLLECTED BY N.S.D.O.E.

                        ---- SAMPLE ANALYSIS ----
    .............PARAMETER ............. ..... VALUE ..... UNITS
 1: 001 /PH............................. 6.7
 2: 012 /PHENOLS........................ 0.015          MG/L
 3: 013 /OIL & GREASE (PET. ETHER)..... 4.4            MG/L
 4: 020 /SUSPENDED SOLIDS (SS)......... 23.             MG/L
 5: 028 /AMMONIA-N (NH3-N).............. 5.4            MG/L
 6: 086 /SULFIDE........................ L0.15          MG/L
 7: 500 /BIOASSAY ...................... "DONE"
```

```
**********************************************************************
* 87LG001 - LEGAL SAMPLES                        STATUS AS OF JUN 12, 1987 *

REGISTERED ON: JAN 27, 1987,  BY :BOB G

LOCATOR: TEXAC001/TEXACO REFINERY
                  FINAL EFFLUENT                                PROV: NS
NORMAL ANALYSIS: 1,12,13,20,86
PROJECT CODE: 234/ENV. CONTROL CHEMICAL INDUSTRIES

SAMPLING BEGAN, DATE: 26/ 1/87 (JAN 26, 1987), TIME: 1610, FREQ:   1
SAMPLING ENDED, DATE: 26/ 1/87 (JAN 26, 1987), TIME: 1610

DEPTH:    .00 METERS, TIDE:
NARRATIVE: LEGAL SURVEY(RCR-21.2)(FLOW-460s/p/m/imp
           TOTAL DISCHARGE FROM BIO UNIT.
                      ---- SAMPLE ANALYSIS ----
    .............PARAMETER ............ ...... VALUE ..... UNITS
 1: 001 /PH.............................  7.4
 2: 001F/PH.............................  7.4
 3: 012 /PHENOLS........................  0.038              MG/L
 4: 013 /OIL & GREASE (PET. ETHER)......  2.                 MG/L
 5: 020 /SUSPENDED SOLIDS (SS)..........  13.                MG/L
 6: 028 /AMMONIA-N (NH3-N)..............  7.0                MG/L
 7: 086 /SULFIDE........................ L0.15               MG/L
 8: 500 /BIOASSAY ...................... 'DONE'
```

```
**********************************************************************
* 87LG002 - LEGAL SAMPLES                        STATUS AS OF JUN 12, 1987 *

REGISTERED ON: JAN 28, 1987,  BY :BOB G

LOCATOR: TEXACO01/TEXACO REFINERY
                  FINAL EFFLUENT                                PROV: NS
NORMAL ANALYSIS: 1,12,13,20,86
PROJECT CODE: 234/ENV. CONTROL CHEMICAL INDUSTRIES

SAMPLING BEGAN, DATE: 27/ 1/87 (JAN 27, 1987), TIME: 1550, FREQ:   1
SAMPLING ENDED, DATE: 27/ 1/87 (JAN 27, 1987), TIME: 1550

DEPTH:    .00 METERS, TIDE:
NARRATIVE: LEGAL SURVEY(RCR-21.2)(FLOW-410imp/s/f/m
           TOTAL EFFLUENT FROM BIO SETTLING POND.
                      ---- SAMPLE ANALYSIS ----
    .............PARAMETER ............ ...... VALUE ...... UNITS
 1: 001 /PH.............................  7.5
 2: 001F/PH.............................  7.4
 3: 012 /PHENOLS........................  0.025              MG/L
 4: 013 /OIL & GREASE (PET. ETHER)......  3.0                MG/L
 5: 020 /SUSPENDED SOLIDS (SS).........  17.                MG/L
 6: 028 /AMMONIA-N (NH3-N).............  5.9                MG/L
 7: 086 /SULFIDE........................ L0.15              MG/L
 8: 500 /BIOASSAY ...................... "DONE"
```

****
* 87JK001 - J.K. (SUE) DAY STATUS AS OF JUN 12, 1987 *

REGISTERED ON: JAN 22, 1987, BY :BOB G

LOCATOR: TEXAC001/TEXACO REFINERY
FINAL EFFLUENT PROV: NS
NORMAL ANALYSIS: 1,12,13,20,86
PROJECT CODE: 234/ENV. CONTROL CHEMICAL INDUSTRIES

SAMPLING BEGAN, DATE: 22/ 1/87 (JAN 22, 1987), TIME: 1430, FREQ: 1
SAMPLING ENDED, DATE: 22/ 1/87 (JAN 22, 1987), TIME: 1430

DEPTH: .00 METERS, TIDE:
NARRATIVE: COMBINED STORM WATER AND TREATED
PROCESS EFFLUENT

		---- SAMPLE ANALYSIS ----	
	PARAMETER	VALUE	UNITS
1:	001 /PH	9.1	
2:	001F/PH	9.3	
3:	012 /PHENOLS	1.3	MG/L
4:	013 /OIL & GREASE (PET. ETHER)	4.	MG/L
5:	020 /SUSPENDED SOLIDS (SS)	30.	MG/L
6:	028 /AMMONIA-N (NH3-N)	9.52	MG/L
7:	086 /SULFIDE	L0.15	MG/L
8:	500 /BIOASSAY	"DONE"	

```
**********************************************************************
* 87JK013 - J.K. (SUE) DAY                          STATUS AS OF JUN 12, 1987 *

REGISTERED ON: MAY  4, 1987,  BY :BOB G

LOCATOR: TEXAC001/TEXACO REFINERY                                  PROV: NS
                  FINAL EFFLUENT
NORMAL ANALYSIS: 1,12,13,20,86
PROJECT CODE: 234/ENV. CONTROL CHEMICAL INDUSTRIES

SAMPLING BEGAN, DATE: 29/ 1/87 (JAN 29, 1987), TIME: 1100, FREQ:   1
SAMPLING ENDED, DATE: 29/ 1/87 (JAN 29, 1987), TIME: 1100

DEPTH:    .00 METERS, TIDE:
NARRATIVE: SAMPLE TAKEN BY STEVE SKIPPER OF
           N.S.D.O.E.
                        ---- SAMPLE ANALYSIS ----
    .............PARAMETER ............. ..... VALUE ..... UNITS
 1: 500 /BIOASSAY ..................... *DONE*
```

of Canada du Canada **MEMORANDUM** **NOTE DE SERVICE**

TO / A: M. Guilcher, Chief
Water Pollution Control Division
Air & Water Branch
Conservation and Protection

FROM / DE: J. David A. Vaughan
Aquatic Toxicology Section
Laboratory & Shellfish Division

SECURITY - CLASSIFICATION - DE SECURITE:

OUR FILE - N/REFERENCE: 4810-37/T106

YOUR FILE - V/REFERENCE:

DATE: 1 May 1987

SUBJECT / OBJET: BIOASSAY RESULTS - TEXACO CANADA REFINERY

During the period January 22, 1987-January 30, 1987, our bioassay lab received six samples of final effluent from the Texaco Canada Inc. Refinery at Eastern Passage, Nova Scotia. Three of the samples were identified as legal samples (see Table 1). In these three cases, continuity of possession was maintained and both the walk-in-cooler and bioassay lab were kept locked unless I was present.

A 96-hour static bioassay was conducted on each sample, following as closely as practical the "Standard Procedure for Testing the Acute Lethality of Liquid Effluents" (Report EPS-1-WP-80-1). Rainbow trout fingerling (Salmo gairdneri Richardson) were used as the test organism. Results of the bioassays are summarized in Table 1.

The January 22, 1987 and January 24, 1987 samples were acutely lethal to the test fish, each yielding a 4-day LC50 value (the calculated concentration lethal to 50% of exposed fish in 4 days) of 75% (95% confidence limits: 56-100%). The remaining samples were non-acutely lethal to the test fish. There was no control mortality.

Chemical analysis revealed that the January 22, 1987 sample contained 9.52 mg/l ammonia-nitrogen. The observed mortality is attributed to the presence of this toxicant.

Chemical analysis was not performed on the January 24, 1987 sample. Although the test pH of 9.6 (100% concentration) was very near the 4-day LC50 value for fingerling rainbow trout, undoubtly severely stressing the fish, it would not account for the rapid (2-3 hrs.) mortality observed. An additional toxicant (I suspect ammonia) must have been present.

A copy of each Bioassay Report is attached which provides additional test details.

J. David A. Vaughan

JDAV/ldl

cc: A. MacKinnon R. Gaudet K. Doe J. Turner, NSDOE
P. Henneburv H. Samant R. Parker

Attachment (6)

Table 1

BIOASSAY RESULTS - TEXACO CANADA REFINERY

Date Collected		Effluent	Result
22 January 1987	1430	Final	4-day LC50 = 75% (95% conf. limits: 56-100%)
24 January 1987	1200	Final*	4-day LC50 = 75% (95% conf. limits: 56-100%)
26 January 1987	1610	Final*	no mortality at 100% concentration (duplicated)
27 January 1987	1550	Final*	no mortality at 100% concentration (duplicated)
29 January 1987	1100	Final	no mortality at 100% concentration
30 January 1987	1000	Final	no mortality at 100% concentration

*Legal Samples

W

WOODEN'S RIVER

****
* 870A038 - OUTSIDE AGENCIES STATUS AS OF JUN 10, 1987 *

REGISTERED ON: JUN 9, 1987, BY :MAUREEN

LOCATOR: SPECNS01/SPECIAL SAMPLES, N.S.

PROV: NS

PROJECT CODE: 265/LAB SUPPORT - PREV & CONTR WATER POLL

SAMPLING BEGAN, DATE: 8/ 6/87 (JUN 8, 1987), TIME: 700, FREQ: 1
SAMPLING ENDED, DATE: 8/ 6/87 (JUN 8, 1987), TIME: 700

DEPTH: .00 METERS, TIDE:
NARRATIVE: WOODEN'S RIVER

---- SAMPLE ANALYSIS ----

	PARAMETER	VALUE	UNITS
1:	001 /PH	5.0	
2:	022 /MAGNESIUM (TOTAL)	256.	MG/L
3:	036 /CALCIUM (TOTAL)	87.6	MG/L
4:	044 /ARSENIC (TOTAL)	L0.05	MG/L
5:	046 /CADMIUM (TOTAL)	L0.01	MG/L
6:	047 /CHROMIUM (TOTAL)	0.04	MG/L
7:	048 /COPPER (TOTAL)	L0.01	MG/L
8:	049 /IRON (TOTAL)	0.11	MG/L
9:	051 /LEAD (TOTAL)	L0.02	MG/L
10:	054 /ZINC (TOTAL)	L0.01	MG/L
11:	159 /NICKEL (TOTAL)	L0.01	MG/L
12:	160 /MANGANESE (TOTAL)	0.02	MG/L
13:	162 /ALUMINUM (TOTAL)	L0.025	MG/L
14:	237 /COBALT (CO)	L0.01	MG/L

X

Y

YAVA MINE

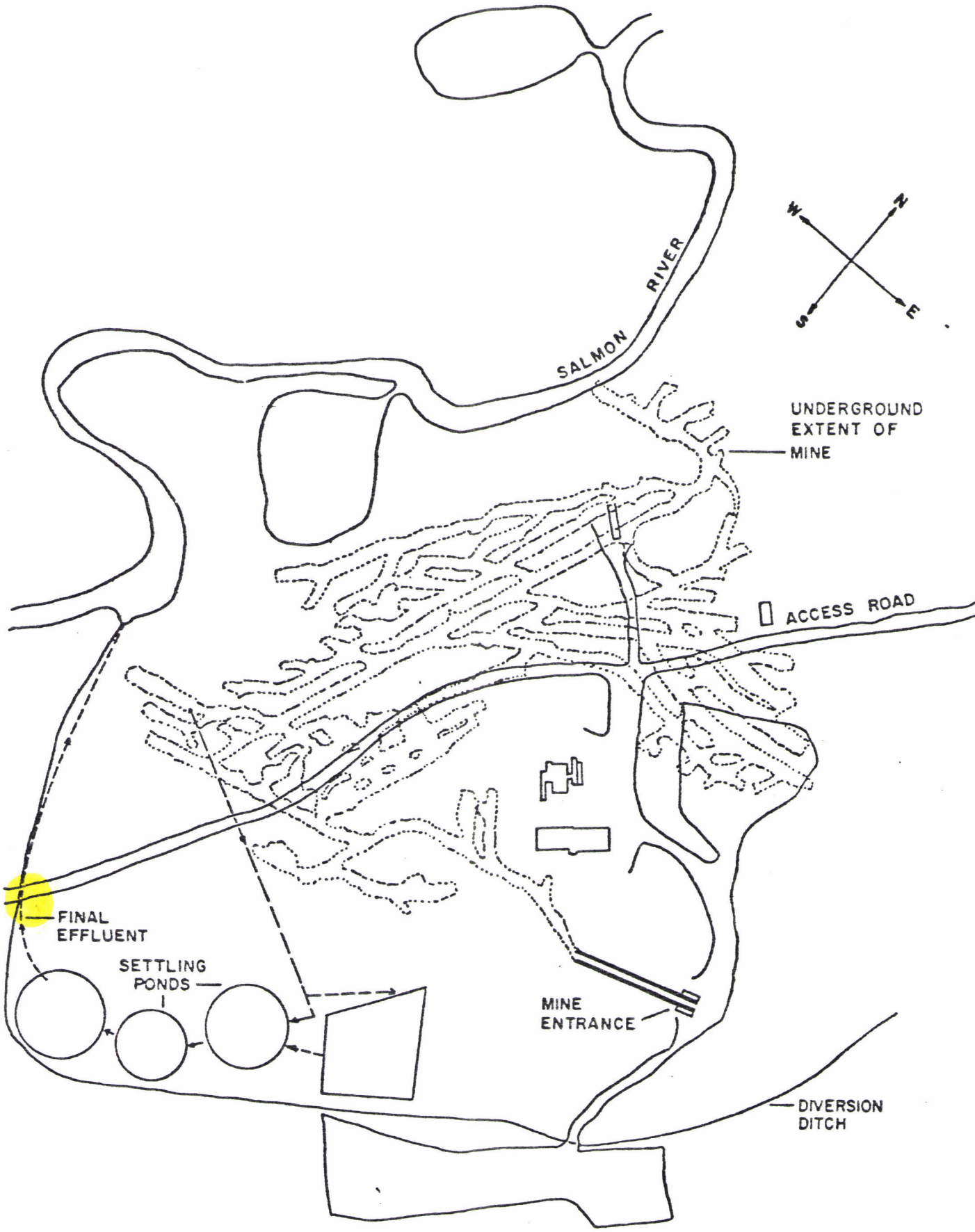


FIGURE 24
YAVA MINES

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* 87RP048 - ROY PARKER                          STATUS AS OF AUG 11, 1987 *

REGISTERED ON: JUL 23, 1987,  BY :ANDRE

LOCATOR: YAUMIN11/YAUA MINES
                  LAGOON EFFLUENT(FINAL)                      PROV: NS
PROJECT CODE: 235/ENV. CONTROL METAL MINING

SAMPLING BEGAN, DATE: 22/ 7/87 (JUL 22, 1987), TIME:    0, FREQ:   1
SAMPLING ENDED, DATE: 22/ 7/87 (JUL 22, 1987), TIME:    0

DEPTH:    .00 METERS, TIDE:
NARRATIVE: WATER FROM LAST SETTLING POND
           NO DISCHARGE
                        ---- SAMPLE ANALYSIS ----
    .............PARAMETER ..... ..... VALUE ..... UNITS
 1: 001 /PH.............................  8.0
 2: 001F/PH.............................  8.2
 3: 005 /HARDNESS.......................  80.                    MG/L
 4: 018 /SOLIDS, TOTAL (TS).............  160.                   MG/L
 5: 020 /SUSPENDED SOLIDS (SS)..........  L5.                    MG/L
 6: 022 /MAGNESIUM (TOTAL)..............  5.08                   MG/L
 7: 036 /CALCIUM (TOTAL)................  24.                    MG/L
 8: 044 /ARSENIC (TOTAL)................ L0.05                   MG/L
 9: 046 /CADMIUM (TOTAL)................ L0.01                   MG/L
10: 047 /CHROMIUM (TOTAL)............... L0.01                   MG/L
11: 048 /COPPER (TOTAL)................. L0.01                   MG/L
12: 049 /IRON (TOTAL)...................  0.04                   MG/L
13: 051 /LEAD (TOTAL)................... L0.02                   MG/L
14: 054 /ZINC (TOTAL)................... L0.01                   MG/L
15: 131 /TOTAL DISSOLVED SOLIDS (TDS)...  160.                   MG/L
16: 159 /NICKEL (TOTAL)................. L0.01                   MG/L
17: 160 /MANGANESE (TOTAL).............  0.02                   MG/L
18: 162 /ALUMINUM (TOTAL)............... L0.025                  MG/L
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