1263434 - R8 SDMS

UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
REGION VIII
1860 LINCOLN STREET
DENVER, COLORADO 80295

SF File Number 5.5

MAY 8 1985

RECEIVED
MAY 09 1985
WASTE MANAGEMENT DIVISION

Ref: 8HWM-ER

MEMORANDUM

TO: Robert L. Duprey, Director
Waste Management Divison

FROM: C. Alvin Yorke, Chief
Emergency Respose Branch

SUBJECT: PRELIMINARY ENDANGERMENT ASSESSMENT

Since 1901, a tie treating plant owned and operated by the Burlington Northern Railroad, near the north shore of Flathead Lake, just east of Somers, Flathead County, Montana, has been periodically discharging contaminants into the lake. The site was proposed for inclusion on the NPL on Ochober 15, 1984. A small body of open water (the swamp pond) and a marsh area lie between the process area and the lake. The swamp pond and marsh (exposed to lake wave action during high water) contain creosote and related compounds.

Chemical analyses of solid and liquid material in the swamp pond, ditch, and adjacent wetland and lake areas show that they contain zinc and other heavy metals, and constituents of creosote, which frequently contains substantial amounts of polynuclear aromatic hydrocarbons (PAH). On February 28, 1984, representatives of the Montana Department of Health and Environmental Sciences (MDHES) collected samples of sludge from the swamp pond. Analysis of these samples indicated that the following creosote constituents were present:

HAZARDOUS SUBSTANCES	ug/g(ppm)
Naphthalene	7500
Acenaphthene	2000
Fluorene	3500
Phenanthrene	4200
Anthracene	1700
Fluoranthene	1300
Pyrene	1000
Benzo(a)anthracene	230
Chrysene	200
Benzo(b)fluoranthene	57
Benzo(a)pyrene	38

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Sludge samples taken from the swamp pond by BN consultants during October 1984 indicated the presence of the following metals and creosote constituents:

HAZARDOUS SUBSTANCES	:	ug/g(ppm)
Arsenic	:	12
Copper	:	42
Nickel	:	83
Zinc	:	420
Phenols	:	16
Acenaphthene	:	4760
Benzo(a)anthracene	:	550
Fluoranthene	:	5760
Fluorene	:	4040
Naphthalene	:	1310
Phenanthrene	:	15800
Pyrene	:	4810

Total PAH concentrations found in the groundwater on site exceeds the EPA Water Quality Criteria of 28 ng/l for a carcinogenic risk of $1x10^{-5}$.

Groundwater monitoring wells, installed as part of the RI/FS process, are located throughout the area (See attached Figure 2). In the immediate vicinity of the swamp pond, total PAH concentrations have been recorded at 5.3 mg/l (See attached Table 2). PAH concentrations in the ground water drop considerably (less than 1000 ng/l) at points upgradient from the swamp pond, indicating the swamp pond may be an acute source of contamination. Field evidence of creosote contamination, determined either visually or by smell from soil test holes bored around the swamp pond (See attached Figure I and Table 1), support this observation. Soils in areas away from the pond, containing lesser amounts of contamination, also pose an exposure risk via incidental contact or through groundwater percolation.

PAH concentrations in the ground water at the BN tie treating facility have been recorded as high as 5826 mg/l in the vicinity of the old creosote waste lagoon and 189,316 ng/l around the RCRA lagoons (See attached Figure 2 and Table 2). The surface water monitoring station in Kalispell Bay, just south of the site, has yielded PAH concentrations of 180 ng/l (See attaced Figure 3 and Table 3) in water samples obtained in July 1984. The Town of Somers' water supply, taken directly from the lake approximately one-half mile west of the pond, could therefore become contaminated by the catastraphic release of the highly contaminated pond sludges into the lake. The full extent of site contamination is being determined by a continuing RI/FS conducted by EPA through the Montana office. The RI/FS is approximately one year away from completion.

EPA considers creosote to be an animal carcinogen, and a probable human carcinogen. Several individual constituents of creosote, such as chrysene, benzo(a)anthracene, and benzo(b)fluoranthene, are mutagenic. Benzo(a)pyrene, another constituent of creosote, is a known human carcinogen. Still others, such a pyrene and fluoranthene are co-carcinogenic or tumor-promoting. Arsenic compounds can be acutely and chronically poisonous and can be fatal if ingested in sufficient quantities by humans, livestock, and wildlife. EPA

considers arsenic to be a human carcinogen. Some copper and zinc compounds are toxic, at elevated levels, to a number of animal species, including humans. Fish are notably sensitive to copper and zinc toxicity. Severe illness and/or death can result from exposure of humans, livestock, and wildlife to toxic levels of arsenic, copper, and zinc.

Continued erosion of the narrow shoreline separating the swamp pond from the lake by wave action is likely during the next high pool (expected any time after May 31). A breach of the swamp pond would result in the unrestrained release of lightly contaminated pond water and heavily contaminated sludges into Flathead Lake. The lakeshore areas adjacent to the pond, (waterfowl and wildlife production area inland, and beach areas lakeward) are continuously used by local and migrating waterfowl and wildlife, and the general public. Therefore, such a release would significantly increase the present risk of harm to human life or health or the environment. Removal Actions are recommended to reduce this risk until such time as the RI/FS is completed and Remedial measures are determined.

Attachments

Figures and Tables

(following)

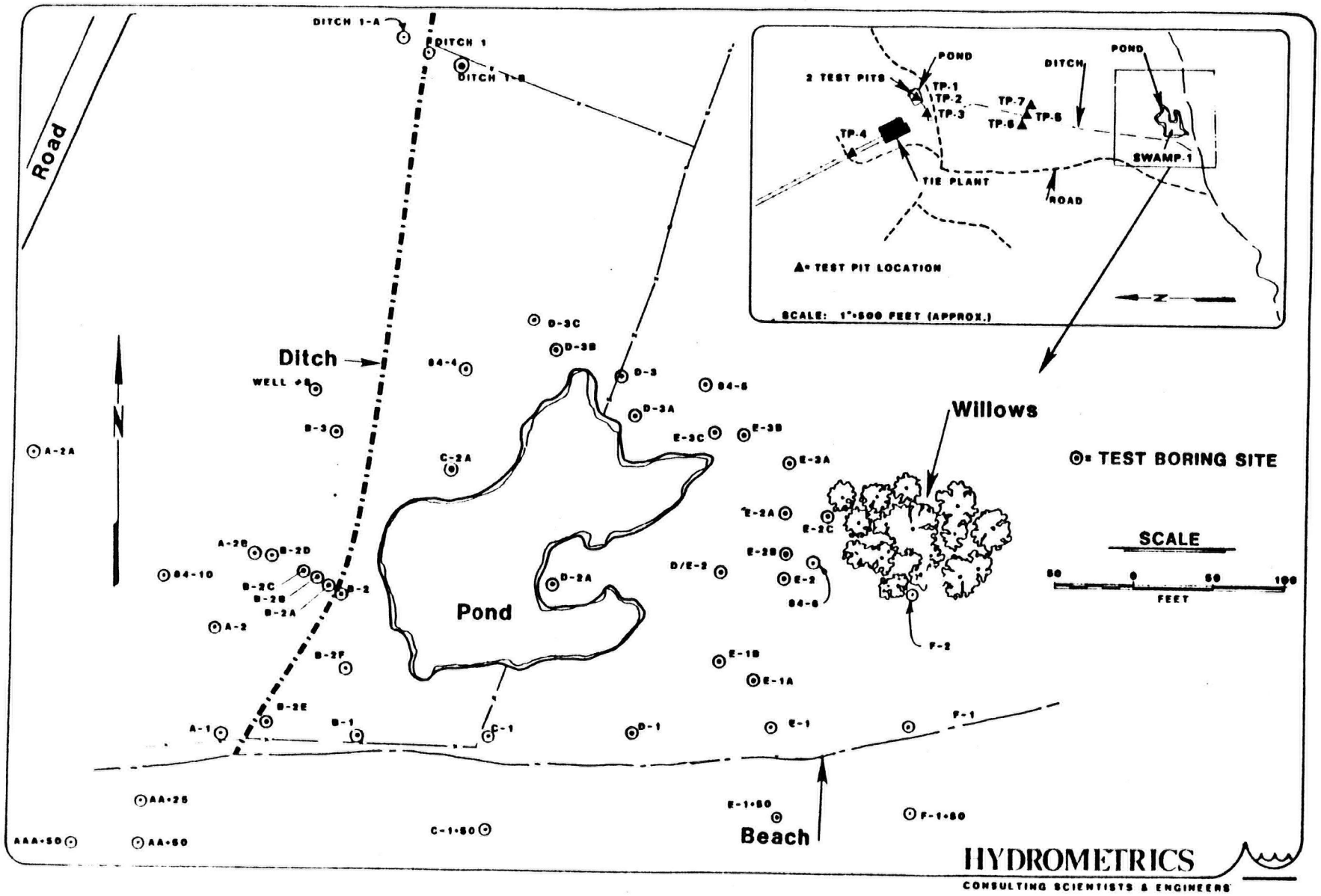


Figure 1 BN - Somers Soil Sample Sites

TABLE 1

SOIL TEST HOLES - FIELD EVIDENCE OF CREOSOTE CONTAMINATION

Test Hole Designation[1]	Total Depth Augered (ft)	Evidence of Creosote Contamination[2]	Soil Samples Collected
AAA + 50	4	No	No
AAA + 100	4	No	No
AAA + 200	4	No	No
AA + 25	4	No	No
AA + 50	4	Yes (1-4)	No
AA + 100	3	Yes (0.5-3)	No
A-1	14	Yes (3.5-12.5)	Yes
A-1 +200	4	No	No
A-2	3	No	Yes
A-2A	86	No	No
A-2B	102	No	No
B-1	15	Yes (6-15)	No
B-1 +300	4	No	No
B-2	4	Yes (2.2-4)	Yes
B-2A	4	Yes (1.7-4)	Yes
B-2B	9	Yes (2.5-9)	No
B-2C	68	Yes (5-12)	No
B-2D	12	Yes (1-3)	No
B-2E	6	Yes (3-3.5)	No
B-2F	6	Yes (0.5-6)	No
B-3	4	No	Yes
C-1	8	Yes (2.2-3.4)	Yes
C-1 + 50	4	Yes (1.5-3)	No
C-1 + 100	3	Yes (1.5-3)	No
C-1 + 150	3	Yes (2-3)(?)	No
C-1 + 200	4	Yes (2-4)(?)	No
C-1 + 300	5	No	No
C-2A	3	Yes (2-3)	No
D-1	18	Yes (1.8-18)	Yes
D-2A	16	Yes (1.3-16)	Yes
D/E-2	4	Yes (0.5-4)	Yes
D-3	4	No	Yes
D-3A	9	Yes (6-9)	No
D-3B	3	Yes (0-3)	No
D-3C	6	No	No
E-1	3	Yes (0-2)	No
E-1 + 50	8	No	No
E-1A	3	Yes (0-2)	No
E-1B	2.5	Yes (0-2.5)	No
E-2	4	Yes (2-3.5)	Yes
E-2A	3	Yes (0-3)	No
E-2B	3	Yes (0-1.5)	No

TABLE 1 (CONTINUED)

Test Hole Designation[1]	Total Depth Augered (ft)	Evidence of Creosote Contamination[2]	Soil Samples Collected
E-2C	3	No	No
E-3A	3	No	No
E-3B	3	No	No
E-3C	3	No	No
F-1	6	No	No
F-1 + 50	5	No	No
F-1 + 200	4	No	No
F-1 + 300	5	No	No
F-2	8	No	Yes
BG-A	2	No	Yes
BG-B	2	No	Yes
BG-C	2	No	Yes
BG-D	2	No	Yes
Ditch-1	8	Yes (0.6-4)	Yes
Ditch-1A	4	No	Yes
Ditch-1B	3	No	No
84-4	10	No	No
84-5	11	No	No
84-9	18	No	No
84-10	18	No	No
Swamp 1	0.5	Yes	Yes
TP-1	4.0	Yes (0-4)	Yes
TP-2	5.5	Yes (0-4.5)	Yes
TP-3	9.0	Yes (0-8.0)	Yes
TP-4	4.0	Yes (0-0.5)	No
TP-5	5.0	Yes (0-1)	No
TP-6	5.0	No	No
TP-7	8.0	No	No

[1]See Figure 1 for hole locations.

[2]Creosote or oily substance observed visually or by smell in field.

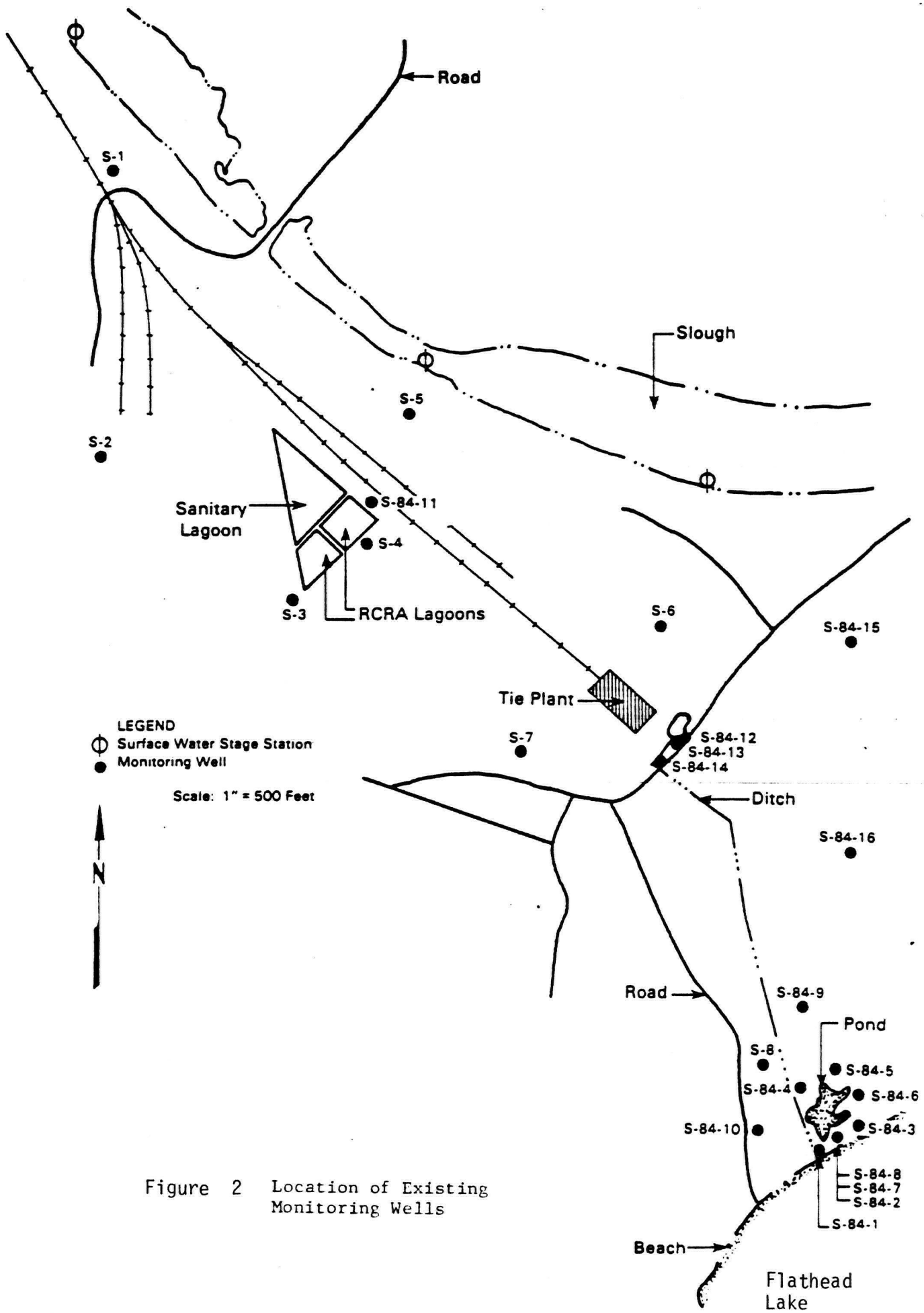


Figure 2 Location of Existing Monitoring Wells

TABLE 2

SUMMARY OF SOMERS GROUND WATER SAMPLING

(All Data in ng/l Unless Noted Otherwise)

		Total PAH
Well S-1	(July)	160
Well S-2	(June)	60,410
	(July)	138
	(July)*	395
Well S-3	(June)	483
	(July)	285
Well S-4	(June)	872
	(July)	699
Well S-5	(June)	811
	(July)	571
Well S-6	(June)	1235
Well S-8	(June)	786
	(June)+	1280
	(July)	980
Well S-84-2	(June)	5.3**
Well S-84-6	(June)	212,740
Well S-84-7	(June)	3.4**
Well S-84-9	(June)	774
	(July)	635
Well S-84-10	(July)	287
Well S-84-11	(June)	189,316
	(July)	154,428
	(July)*	26,026
Well S-84-12	(June)	5826**
Well S-84-13	(June)	515**
Well S-84-14	(June)	11.1**
Well S-84-15	(June)	1346
	(July)	1030
	(July)*	242
	(July)*+	103
Well S-84-16	(June)	1010
	(July)	1313
Slough	(July)	329
	(July)++	227

*Filtered
**mg/ℓ
+Duplicate
++Lab. Duplicate

Note: EPA Water Quality Criteria for total PAH = 28 ng/l for carcinogenic risk of 1 X 10^{-5}; 2.8 ng/l for risk of 1 X 10^{-6}; 0.28 ng/l for risk of 1 X 10^{-7}.

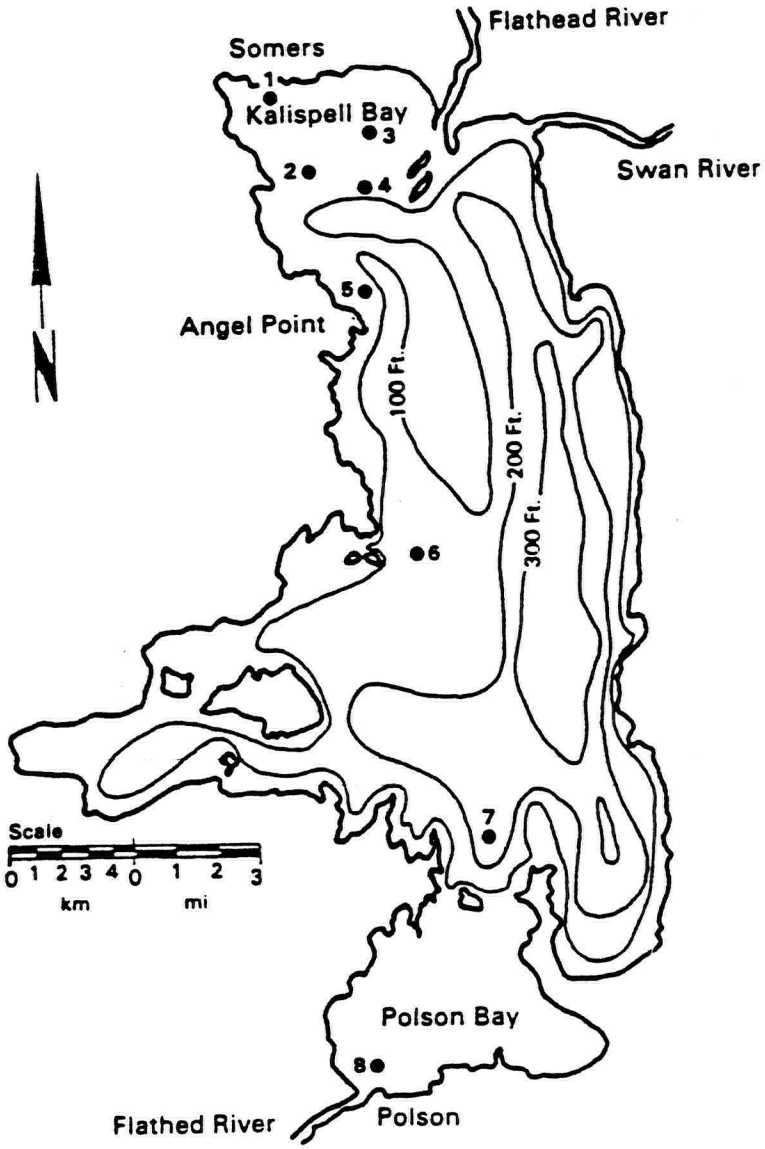
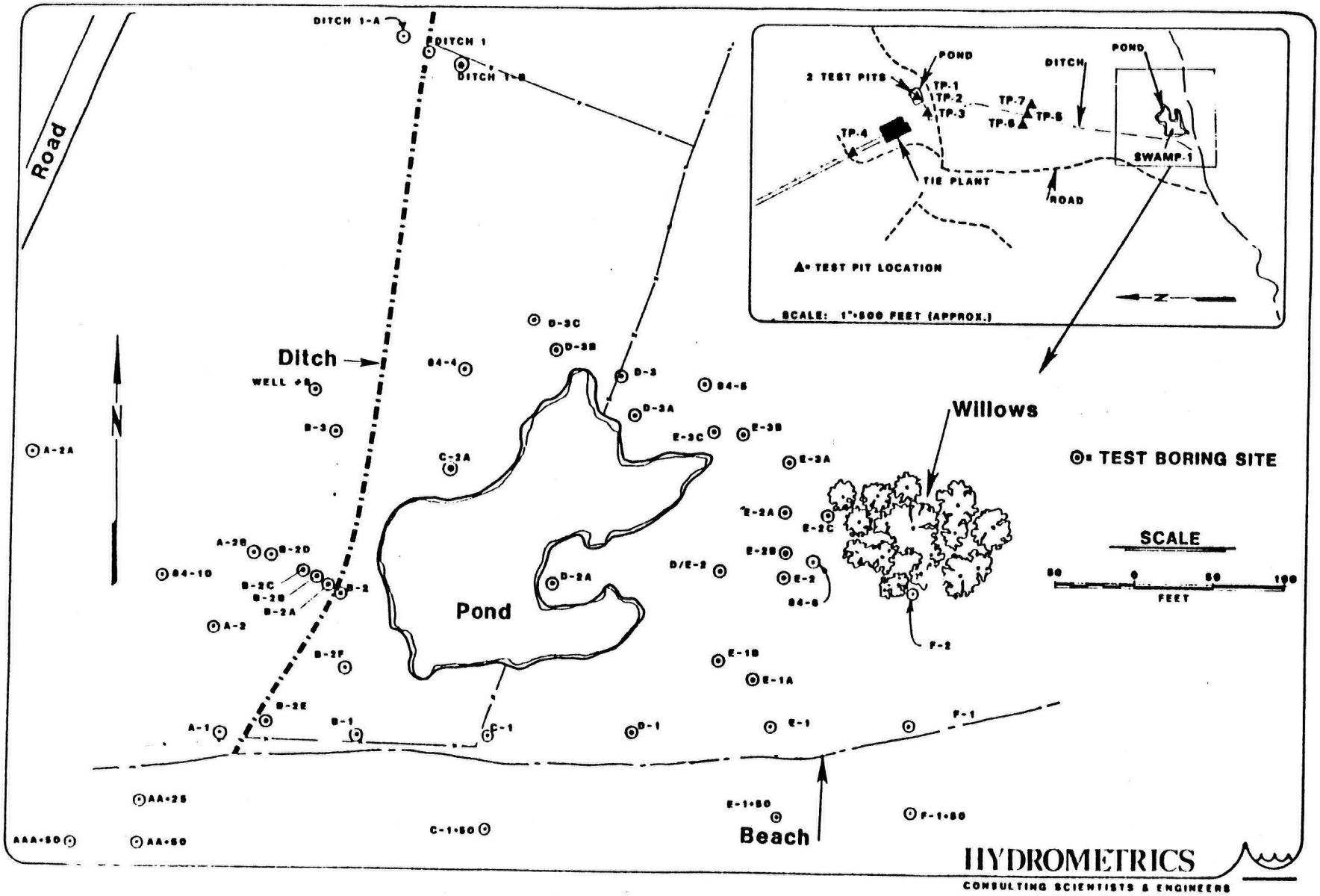


Figure 3
Location of Surface Water Monitoring Sites

TABLE 3

FLATHEAD LAKE WATER QUALITY SURVEY RESULTS JULY 27-28, 1984

PARAMETER	SHIPPING BLANK 23349	STA.1 23372	STA.2 23351	STA.3 23352	STA.4 23353	STA.5 23354	STA.5 DUP 23355	STA.6 23356	STA.7 23373	STA.7A 23374	STA.8 23375
NAPHTHALENE	<2	62	10	<2	<2	<2	<2	<2	<2	<2	<2
ACENAPTHYLENE	<2	<2	<2	<2	<2	<2	<2	<2	<2	<2	<2
ACENAPHTHENE	<2	7	<2	<2	<2	<2	<2	<2	<2	<2	<2
FLUORENE	<2	22	3	<2	<2	<2	<2	<2	<2	<2	<2
PHENANTHRENE/ ANTHRACENE	<2	23	<2	<2	<2	<2	<2	<2	<2	<2	<2
FLUORANTHENE	<2	22	<2	<2	<2	<2	<2	<2	<2	<2	<2
PYRENE	<2	41	3	<2	<2	<2	<2	<2	<2	<2	<2
BENZO(A) ANTHRACENE/ CHRYSENE	<2	3	<2	<2	<2	<2	<2	<2	<2	<2	<2
BENZO(B&K) FLUORANTHENE	12	<6	6	9	13	7	11	8	<6	<6	19
BENZO(A)PYRENE	<2	<6	<2	<2	<2	3	10	3	10	<2	<2
BENZO(GHI) PERYLENE	<6	<6	<6	<6	<6	<6	<6	<6	<6	<6	<6
DIBENZO(AH) ANTHRACENE	<6	<6	<6	<6	<6	<6	<6	<6	<6	<6	<6
INDENO(123-CD) PYRENE	<6	<6	<6	<6	<6	<6	<6	<6	<6	<6	<6
TOTAL PAH	12	180	22	9	13	10	21	11	10	2	19
NON.CARC.PAH	0	177	16	0	0	0	0	0	0	2	0
CARC. PAH	12	3	6	9	13	10	21	11	10	0	19
TSS ,MG/L	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
SECCHI DEPTH,METER	--	--	7.5	--	--	--	--	7.5	--	--	>4.5
SURROGATES, PER CENT RECOVERED											
CHRYSENE-D12	15	100	64	68	44	36	44	75	61	214	29
FLUORENE-D10	159	81	60	48	57	58	51	59	59	44	96
NAPHTHALENE-D8	117	65	115	90	110	109	92	96	98	91	99



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AAA + 200	4	No	No
AA + 25	4	No	No
AA + 50	4	Yes (1-4)	No
AA + 100	3	Yes (0.5-3)	No
A-1	14	Yes (3.5-12.5)	Yes
A-1 +200	4	No	No
A-2	3	No	Yes
A-2A	86	No	No
A-2B	102	No	No
B-1	15	Yes (6-15)	No
B-1 +300	4	No	No
B-2	4	Yes (2.2-4)	Yes
B-2A	4	Yes (1.7-4)	Yes
B-2B	9	Yes (2.5-9)	No
B-2C	68	Yes (5-12)	No
B-2D	12	Yes (1-3)	No
B-2E	6	Yes (3-3.5)	No
B-2F	6	Yes (0.5-6)	No
B-3	4	No	Yes
C-1	8	Yes (2.2-3.4)	Yes
C-1 + 50	4	Yes (1.5-3)	No
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C-1 + 200	4	Yes (2-4)(?)	No
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C-2A	3	Yes (2-3)	No
D-1	18	Yes (1.8-18)	Yes
D-2A	16	Yes (1.3-16)	Yes
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BG-A	2	No	Yes
BG-B	2	No	Yes
BG-C	2	No	Yes
BG-D	2	No	Yes
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Ditch-1A	4	No	Yes
Ditch-1B	3	No	No
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84-5	11	No	No
84-9	18	No	No
84-10	18	No	No
Swamp 1	0.5	Yes	Yes
TP-1	4.0	Yes (0-4)	Yes
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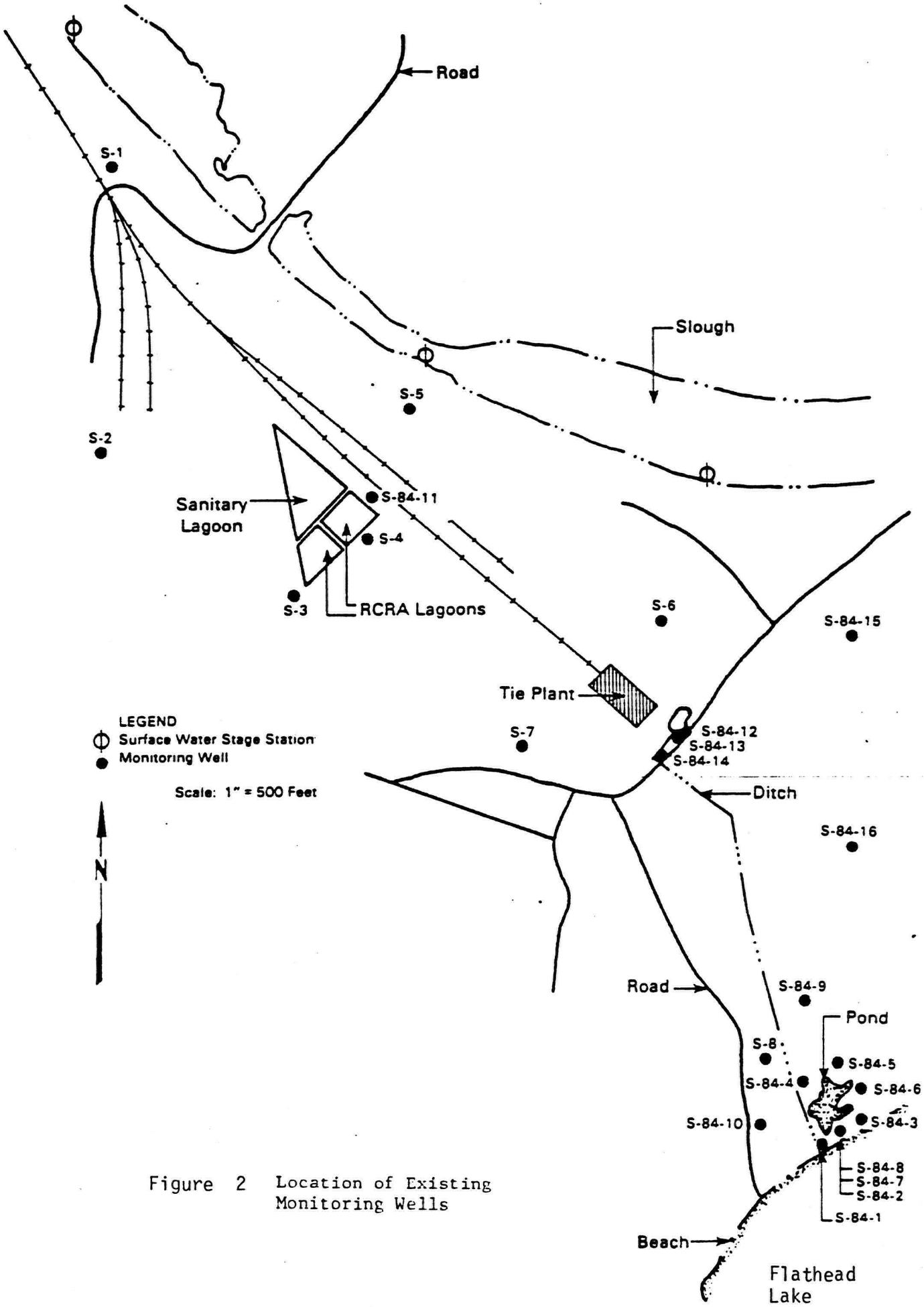
TP-3	9.0	Yes (0-8.0)	Yes
TP-4	4.0	Yes (0-0.5)	No
TP-5	5.0	Yes (0-1)	No
TP-6	5.0	No	No
TP-7	8.0	No	No

[1]See Figure 1 for hole locations.

[2]Creosote or oily substance observed visually or by smell in field.



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Well S-84-13	(June)	515**
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	(July)	1030
	(July)*	242
	(July)*+	103
Well S-84-16	(June)	1010
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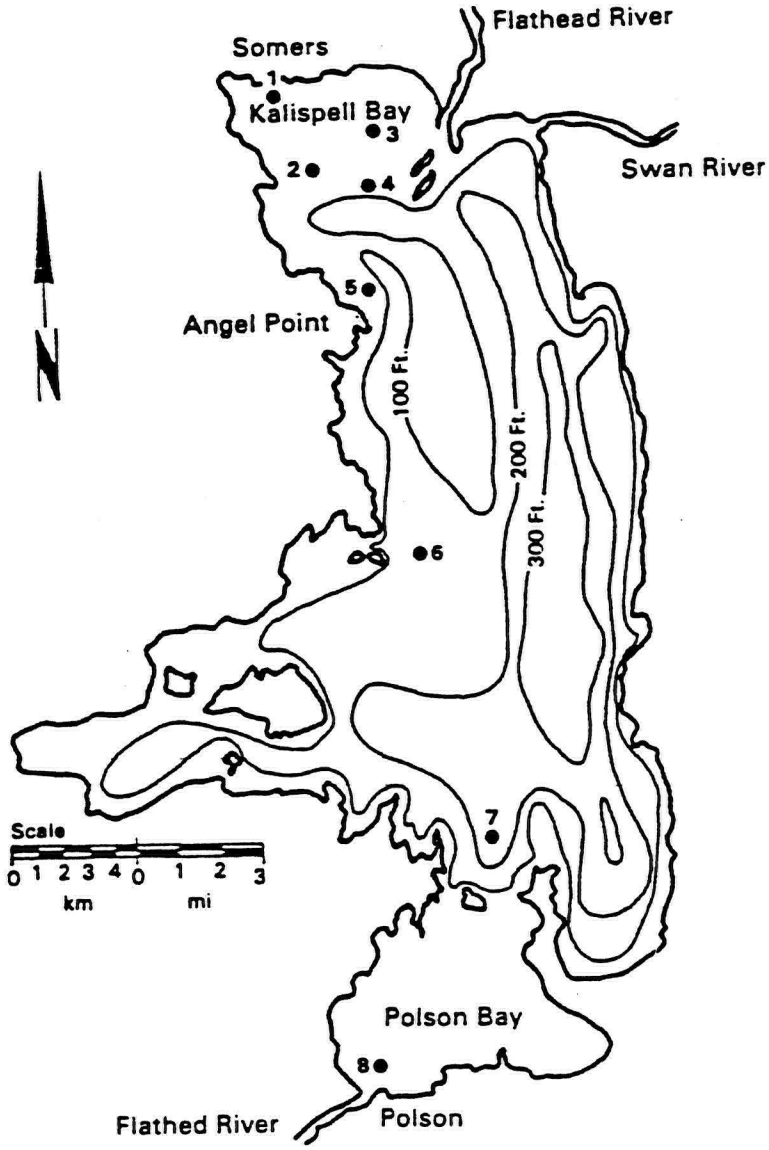
Note: EPA Water Quality Criteria for total PAH = 28 ng/l for carcinogenic risk of 1 X 10^{-5}; 2.8 ng/l for risk of 1 X 10^{-6}; 0.28 ng/l for risk of 1 X 10^{-7}.



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ACENAPHTHENE	<2	7	<2	<2	<2	<2	<2	<2	<2	<2	<2
FLUORENE	<2	22	3	<2	<2	<2	<2	<2	<2	<2	<2
PHENANTHRENE/ ANTHRACENE	<2	23	<2	<2	<2	<2	<2	<2	<2	<2	<2
FLUORANTHENE	<2	22	<2	<2	<2	<2	<2	<2	<2	<2	<2
PYRENE	<2	41	3	<2	<2	<2	<2	<2	<2	<2	<2
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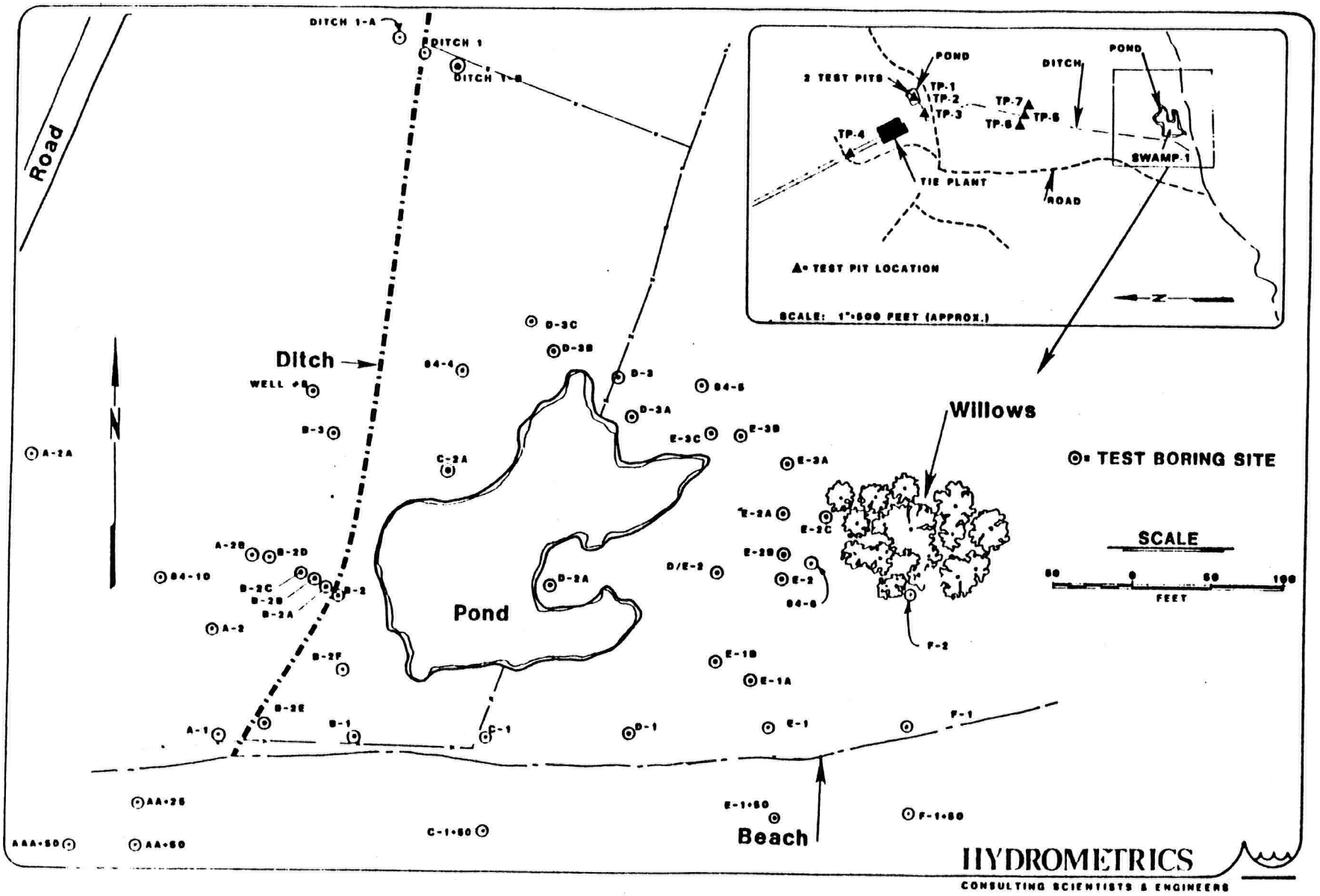
BENZO(GHI) PERYLENE	<6	<6	<6	<6	<6	<6	<6	<6	<6	<6	<6
DIBENZO(AH) ANTHRACENE	<6	<6	<6	<6	<6	<6	<6	<6	<6	<6	<6
INDENO(123-CD) PYRENE	<6	<6	<6	<6	<6	<6	<6	<6	<6	<6	<6
TOTAL PAH	12	180	22	9	13	10	21	11	10	2	19
NON.CARC.PAH	0	177	16	0	0	0	0	0	0	2	0
CARC. PAH	12	3	6	9	13	10	21	11	10	0	19
TSS ,MG/L	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
SECCHI DEPTH,METER	--	--	7.5	--	--	--	--	7.5	--	--	>4.5
SURROGATES, PER CENT RECOVERED											
CHRYSENE-D12	15	100	64	68	44	36	44	75	61	214	29
FLUORENE-D10	159	51	60	48	57	58	51	59	59	44	96
NAPHTHALENE-D8	117	65	115	90	110	109	92	96	98	91	99



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A-1 +200	4	No	No
A-2	3	No	Yes
A-2A	86	No	No
A-2B	102	No	No
B-1	15	Yes (6-15)	No
B-1 +300	4	No	No
B-2	4	Yes (2.2-4)	Yes
B-2A	4	Yes (1.7-4)	Yes
B-2B	9	Yes (2.5-9)	No
B-2C	68	Yes (5-12)	No
B-2D	12	Yes (1-3)	No
B-2E	6	Yes (3-3.5)	No
B-2F	6	Yes (0.5-6)	No
B-3	4	No	Yes
C-1	8	Yes (2.2-3.4)	Yes
C-1 + 50	4	Yes (1.5-3)	No
C-1 + 100	3	Yes (1.5-3)	No
C-1 + 150	3	Yes (2-3)(?)	No
C-1 + 200	4	Yes (2-4)(?)	No
C-1 + 300	5	No	No
C-2A	3	Yes (2-3)	No
D-1	18	Yes (1.8-18)	Yes
D-2A	16	Yes (1.3-16)	Yes
D/E-2	4	Yes (0.5-4)	Yes
D-3	4	No	Yes
D-3A	9	Yes (6-9)	No
D-3B	3	Yes (0-3)	No
D-3C	6	No	No
E-1	3	Yes (0-2)	No
E-1 + 50	8	No	No
E-1A	3	Yes (0-2)	No
E-1B	2.5	Yes (0-2.5)	No
E-2	4	Yes (2-3.5)	Yes
E-2A	3	Yes (0-3)	No
E-2B	3	Yes (0-1.5)	No

TABLE 1 (CONTINUED)

Test Hole Designation[1]	Total Depth Augered (ft)	Evidence of Creosote Contamination[2]	Soil Samples Collected
E-2C	3	No	No
E-3A	3	No	No
E-3B	3	No	No
E-3C	3	No	No
F-1	6	No	No
F-1 + 50	5	No	No
F-1 + 200	4	No	No
F-1 + 300	5	No	No
F-2	8	No	Yes
BG-A	2	No	Yes
BG-B	2	No	Yes
BG-C	2	No	Yes
BG-D	2	No	Yes
Ditch-1	8	Yes (0.6-4)	Yes
Ditch-1A	4	No	Yes
Ditch-1B	3	No	No
84-4	10	No	No
84-5	11	No	No
84-9	18	No	No
84-10	18	No	No
Swamp 1	0.5	Yes	Yes
TP-1	4.0	Yes (0-4)	Yes
TP-2	5.5	Yes (0-4.5)	Yes
TP-3	9.0	Yes (0-8.0)	Yes
TP-4	4.0	Yes (0-0.5)	No
TP-5	5.0	Yes (0-1)	No
TP-6	5.0	No	No
TP-7	8.0	No	No

[1]See Figure 1 for hole locations.

[2]Creosote or oily substance observed visually or by smell in field.

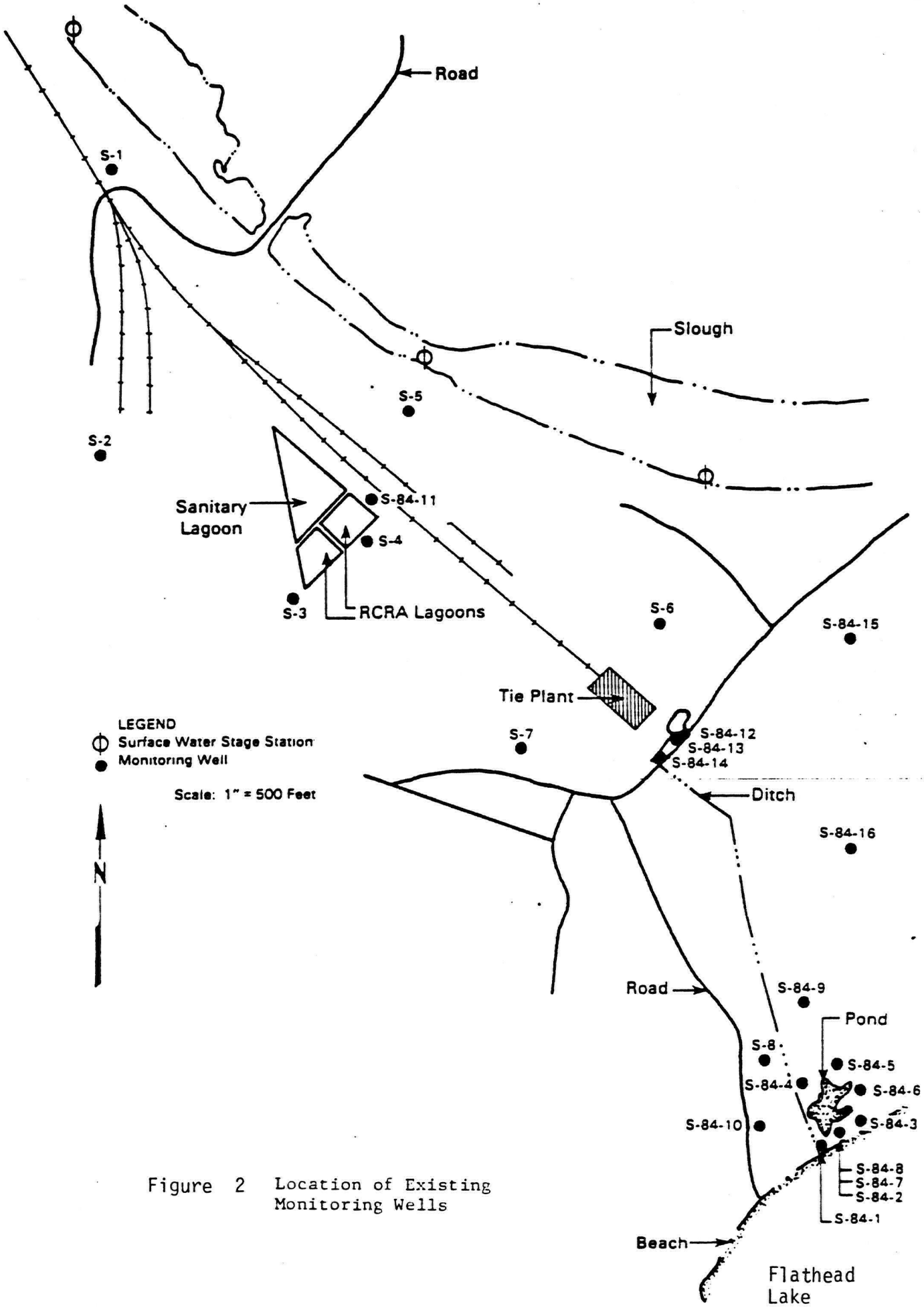

Figure 2 Location of Existing Monitoring Wells

TABLE 2

SUMMARY OF SOMERS GROUND WATER SAMPLING

(All Data in ng/l Unless Noted Otherwise)

		Total PAH
Well S-1	(July)	160
Well S-2	(June)	60,410
	(July)	138
	(July)*	395
Well S-3	(June)	483
	(July)	285
Well S-4	(June)	872
	(July)	699
Well S-5	(June)	811
	(July)	571
Well S-6	(June)	1235
Well S-8	(June)	786
	(June)+	1280
	(July)	980
Well S-84-2	(June)	5.3**
Well S-84-6	(June)	212,740
Well S-84-7	(June)	3.4**
Well S-84-9	(June)	774
	(July)	635
Well S-84-10	(July)	287
Well S-84-11	(June)	189,316
	(July)	154,428
	(July)*	26,026
Well S-84-12	(June)	5826**
Well S-84-13	(June)	515**
Well S-84-14	(June)	11.1**
Well S-84-15	(June)	1346
	(July)	1030
	(July)*	242
	(July)*+	103
Well S-84-16	(June)	1010
	(July)	1313
Slough	(July)	329
	(July)++	227

*Filtered
**mg/ℓ
+Duplicate
++Lab. Duplicate

Note: EPA Water Quality Criteria for total PAH = 28 ng/l for carcinogenic risk of 1 X 10^{-5}; 2.8 ng/l for risk of 1 X 10^{-6}; 0.28 ng/l for risk of 1 X 10^{-7}.

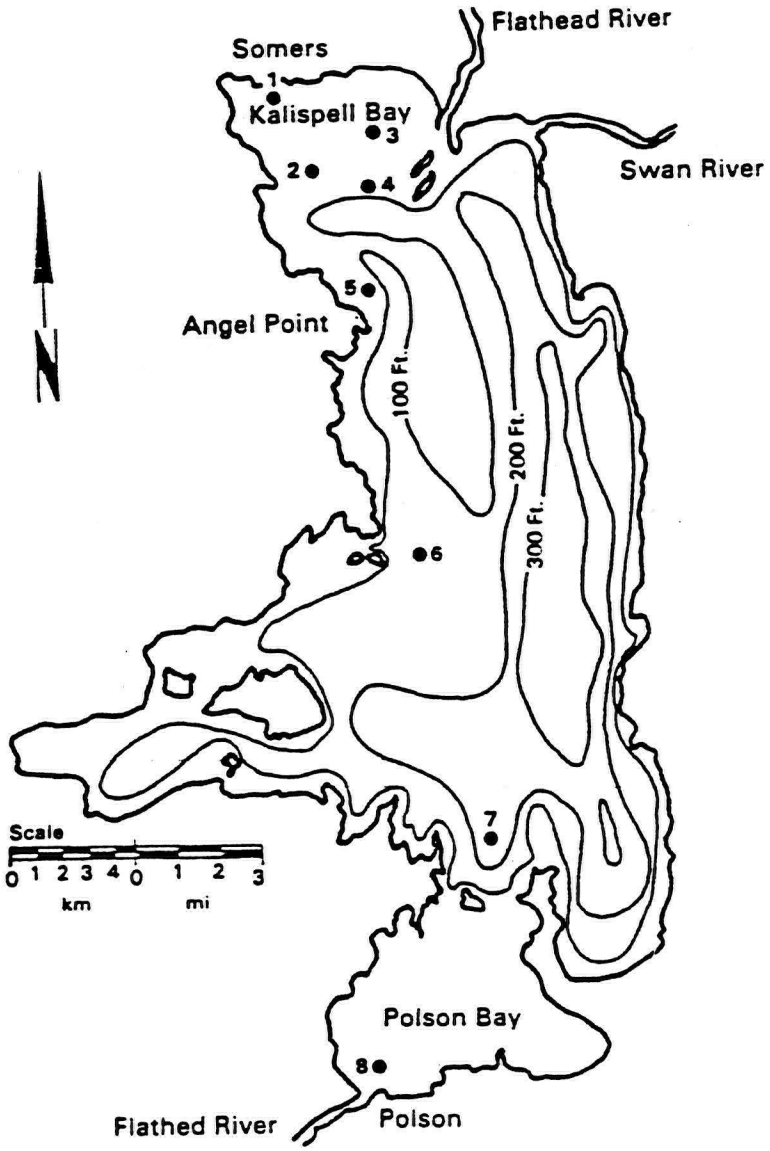

Figure 3
Location of Surface Water Monitoring Sites

TABLE 3

FLATHEAD LAKE WATER QUALITY SURVEY RESULTS JULY 27-28, 1984

PARAMETER	SHIPPING BLANK 23349	STA.1 23372	STA.2 23351	STA.3 23352	STA.4 23353	STA.5 23354	STA.5 DUP 23355	STA.6 23356	STA.7 23373	STA.7A 23374	STA.8 23375
NAPHTHALENE	<2	62	10	<2	<2	<2	<2	<2	<2	<2	<2
ACENAPTHYLENE	<2	<2	<2	<2	<2	<2	<2	<2	<2	<2	<2
ACENAPHTHENE	<2	7	<2	<2	<2	<2	<2	<2	<2	<2	<2
FLUORENE	<2	22	3	<2	<2	<2	<2	<2	<2	<2	<2
PHENANTHRENE/ ANTHRACENE	<2	23	<2	<2	<2	<2	<2	<2	<2	<2	<2
FLUORANTHENE	<2	22	<2	<2	<2	<2	<2	<2	<2	<2	<2
PYRENE	<2	41	3	<2	<2	<2	<2	<2	<2	<2	<2
BENZO(A) ANTHRACENE/ CHRYSENE	<2	3	<2	<2	<2	<2	<2	<2	<2	<2	<2
BENZO(B&K) FLUORANTHENE	12	<6	6	9	13	7	11	8	<6	<6	19
BENZO(A)PYRENE	<2	<6	<2	<2	<2	3	10	3	10	<2	<2
BENZO(GHI) PERYLENE	<6	<6	<6	<6	<6	<6	<6	<6	<6	<6	<6
DIBENZO(AH) ANTHRACENE	<6	<6	<6	<6	<6	<6	<6	<6	<6	<6	<6
INDENO(123-CD) PYRENE	<6	<6	<6	<6	<6	<6	<6	<6	<6	<6	<6
TOTAL PAH	12	180	22	9	13	10	21	11	10	2	19
NON.CARC.PAH	0	177	16	0	0	0	0	0	0	2	0
CARC. PAH	12	3	6	9	13	10	21	11	10	0	19
TSS ,MG/L	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
SECCHI DEPTH,METER	--	--	7.5	--	--	--	--	7.5	--	--	>4.5
SURROGATES, PER CENT RECOVERED											
CHRYSENE-D12	15	100	64	68	44	36	44	75	61	214	29
FLUORENE-D10	159	51	60	48	57	50	51	59	59	44	96
NAPHTHALENE-D8	117	65	115	90	110	109	92	96	98	91	99

MAY 8 1985

22-7-14

Ref: 8HWM-ER

MEMORANDUM

TO: Robert L. Duprey, Director
Waste Management Divison

FROM: C. Alvin Yorke, Chief
Emergency Respose Branch

SUBJECT: PRELIMINARY ENDANGERMENT ASSESSMENT

Since 1901, a tie treating plant owned and operated by the Burlington Northern Railroad, near the north shore of Flathead Lake, just east of Somers, Flathead County, Montana, has been periodically discharging contaminants into the lake. The site was proposed for inclusion on the NPL on Ochober 15, 1984. A small body of open water (the swamp pond) and a marsh area lie between the process area and the lake. The swamp pond and marsh (exposed to lake wave action during high water) contain creosote and related compounds.

Chemical analyses of solid and liquid material in the swamp pond, ditch, and adjacent wetland and lake areas show that they contain zinc and other heavy metals, and constituents of creosote, which frequently contains substantial amounts of polynuclear aromatic hydrocarbons (PAH). On February 28, 1984, representatives of the Montana Department of Health and Environmental Sciences (MDHES) collected samples of sludge from the swamp pond. Analysis of these samples indicated that the following creosote constituents were present:

HAZARDOUS SUBSTANCES	ug/g(ppm)
Naphthalene	7500
Acenaphthene	2000
Fluorene	3500
Phenanthrene	4200
Anthracene	1700
Fluoranthene	1300
Pyrene	1000
Benzo(a)anthracene	230
Chrysene	200
Benzo(b)fluoranthene	57
Benzo(a)pyrene	38

ORC
R. Callaway
May 9, 1985

Sludge samples taken from the swamp pond by BN consultants during October 1984 indicated the presence of the following metals and creosote constituents:

HAZARDOUS SUBSTANCES	:	ug/g(ppm)
Arsenic	:	12
Copper	:	42
Nickel	:	83
Zinc	:	420
Phenols	:	16
Acenaphthene	:	4760
Benzo(a)anthracene	:	550
Fluoranthene	:	5760
Fluorene	:	4040
Naphthalene	:	1310
Phenanthrene	:	15800
Pyrene	:	4810

Total PAH concentrations found in the groundwater on site exceeds the EPA Water Quality Criteria of 28 ng/l for a carcinogenic risk of $1x10^{-5}$.

Groundwater monitoring wells, installed as part of the RI/FS process, are located throughout the area (See attached Figure 2). In the immediate vicinity of the swamp pond, total PAH concentrations have been recorded at 5.3 mg/l (See attached Table 2). PAH concentrations in the ground water drop considerably (less than 1000 ng/l) at points upgradient from the swamp pond, indicating the swamp pond may be an acute source of contamination. Field evidence of creosote contamination, determined either visually or by smell from soil test holes bored around the swamp pond (See attached Figure I and Table 1), support this observation. Soils in areas away from the pond, containing lesser amounts of contamination, also pose an exposure risk via incidental contact or through groundwater percolation.

PAH concentrations in the ground water at the BN tie treating facility have been recorded as high as 5826 mg/l in the vicinity of the old creosote waste lagoon and 189,316 ng/l around the RCRA lagoons (See attached Figure 2 and Table 2). The surface water monitoring station in Kalispell Bay, just south of the site, has yielded PAH concentrations of 180 ng/l (See attaced Figure 3 and Table 3) in water samples obtained in July 1984. The Town of Somers' water supply, taken directly from the lake approximately one-half mile west of the pond, could therefore become contaminated by the catastraphic release of the highly contaminated pond sludges into the lake. The full extent of site contamination is being determined by a continuing RI/FS conducted by EPA through the Montana office. The RI/FS is approximately one year away from completion.

EPA considers creosote to be an animal carcinogen, and a probable human carcinogen. Several individual constituents of creosote, such as chrysene, benzo(a)anthracene, and benzo(b)fluoranthene, are mutagenic. Benzo(a)pyrene, another constituent of creosote, is a known human carcinogen. Still others, such a pyrene and fluoranthene are co-carcinogenic or tumor-promoting. Arsenic compounds can be acutely and chronically poisonous and can be fatal if ingested in sufficient quantities by humans, livestock, and wildlife. EPA

considers arsenic to be a human carcinogen. Some copper and zinc compounds are toxic, at elevated levels, to a number of animal species, including humans. Fish are notably sensitive to copper and zinc toxicity. Severe illness and/or death can result from exposure of humans, livestock, and wildlife to toxic levels of arsenic, copper, and zinc.

Continued erosion of the narrow shoreline separating the swamp pond from the lake by wave action is likely during the next high pool (expected any time after May 31). A breach of the swamp pond would result in the unrestrained release of lightly contaminated pond water and heavily contaminated sludges into Flathead Lake. The lakeshore areas adjacent to the pond, (waterfowl and wildlife production area inland, and beach areas lakeward) are continuously used by local and migrating waterfowl and wildlife, and the general public. Therefore, such a release would significantly increase the present risk of harm to human life or health or the environment. Removal Actions are recommended to reduce this risk until such time as the RI/FS is completed and Remedial measures are determined.

Attachments

FDNICHOLS:cjp:4-30-85:3134a

8HWM-ER
FDN
5/6/85

8HWM-ER
Yorke
5/7/85

8HWM-WM
Bohn
5/8/85
Metal data
oversold