ENVIRONMENTAL PROTECTION AGENCY
REGION V
230 SOUTH DEARBORN ST
CHICAGO, ILLINOIS 60604

July 14, 1975

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Brigadier General W. O. Bachus
U. S. Army Corps of Engineers
North Central Division
536 South Clark Street
Chicago, Illinois 60605

Dear General Bachus:

Enclosed for your information are our resports on the bottom sediments surveys conducted at Monroe, Michigan and Port Clinton, Michigan.

None of the sediments at Monroe are suitable for open lake disposal. All of the sediments at Port Clinton are suitable for open lake disposal under the restriction recommended in the report. Additional information concerning these classifications can be found in the discussion of results section found in each report.

As we obtain additional information on Great Lakes harbors, we will send you the necessary information to keep your reports up-to-date.

Sincerely yours,

Christopher M. Timm
Director, Surveillance and
Analysis Division

Enclosures - 2

US EPA RECORDS CENTER REGION 5
429071

MONROE, MICHIGAN

REPORT ON THE DEGREE OF POLLUTION OF BOTTOM SEDIMENTS

1975 HARBOR SEDIMENT SAMPLING PROGRAM

APRIL 9, 1975

U.S. Environmental Protection Agency
Region V
Great Lakes Surveillance Branch

DISCUSSION OF RESULTS

The sediments in the Monroe, Michigan navigation channel consist largely of silts and clays and have been heavily impacted by the activities of man. With the exception of stations MON 75-1, 3, and 8 more than 50% of the material passes a #200 sieve (Table III).

Chemical results from the bulk sediment analysis (Table II) indicate that sediments from stations MON 75-2, 4, 5, 8, 9 and 10 are heavily polluted and not suitable for open lake disposal. These stations are all characterized by high organic content, high oil and grease, and high concentrations of heavy metals. Station MON 75-6 is moderately polluted but has a concentration of mercury that exceeds the 0.1 mg/kg limit. Stations MON 75-1 and 3, which contain higher proportions of sand were substantially cleaner except for STA 75-1 which violated the mercury limit and had a moderate concentration of oil and grease. The only sample that would be suitable for unrestricted open lake disposal is MON 75-3.

This project is generally characterized by heavily polluted sediments. There may be a few pockets of less polluted material but it would be impractical to attempt to segregate these. In addition, there is a substantial amount of mercury in the area. All sediments from this project should be placed in a confined disposal site.

Elutriate tests were run on samples from stations MON 75-8 and 10 (Table IV). Both of these stations are heavily polluted according to the bulk sediment analyses. Elutriate-lake water ratios exceeded 15 for Ammonia (41.6) and Manganese (82) at Station MON 75-8 and COD (23.8), TKN (38), Ammonia (104), Total Phosphorus (17.6), Iron (170) and Manganese (164) at Station MON 75-10.

Benthic organisms found (Table V) consisted of pollution tolerant or facultative taxa dominated by the pollution tolerant oligochaeta Limonodrilus sp and the facultative diptera Procladius sp. The cleaner stations (MON 75-1, 3) had a large variety of taxa and a large number of organisms. The low total number of organisms found at stations MON 75-8, 9 and 10 could be indicative of toxic conditions.

TABLE I
FIELD OBSERVATIONS

HARBOR: Monroe, Michigan

SAMPLED: April 8, 1975

STATION NO.	DEPTH (ft)	OBSERVATIONS				
		COLOR	SAMPLE DESCRIPTION	ODOR	OIL	GENERAL REMARK
MON-1	26	Brown w/gray streaks	Mostly sand with silt	Fishy	None	Some clams and noted
MON-2	28	Gray	Silt with some sand	None	None	
MON-3	26	Brown/Gray	Sand and silt with some clay clumps	None	None	Two grabs requ to obtain suff sample
MON-4	24	Brown	Sand and silt	None	None	
MON-5	24	Brown	Sand and silt	None	None	
MON-6	18	Brown	Silty sand with some clay	Beach	None	Similar to MON-
MON-7	28	Brown	Silty sand	None	None	
MON-8	12	Dark Gray	Sandy silt	None	None	Much organic d

FIELD OBSERVATIONS (continued)

HARBOR: Monroe, Michigan

SAMPLED: April 8, 1975

STATION NO.	DEPTH (ft)	OBSERVATIONS				
		COLOR	SAMPLE DESCRIPTION	ODOR	OIL	GENERAL
MON-9	10	Gray	Silty material with some fine sand	Decay	None	Some or detritu
MON-10	14	Gray w/ brown surface streaks	Silty material	Fishy	None	
MON-11	24		Sand and silt	None	None	

Lake Channel

River Channel

Turning Basin

TABLE II
BULK SEDIMENT ANALYSIS RESULTS

HARBOR: Monroe, Michigan

SAMPLED: April 8, 1975

Parameter	MON 75-1	MON 75-2	MON 75-3	MON 75-4	MON 75-5	MON 75-6	MON 75-7	MON 75-8	MON 75-9	MON 75-10
Total Solids %	64.1	31.5	75.0	36.3	32.6	49.8	51.2	46.1	36.2	27.4
Volatile Solids %	2.0	8.3	0.4	8.3	7.7	4.2	4.6	10.1	10.1	14.1
Chem. Oxy. Demand	23,000	110,000	3,900	110,000	98,000	58,000	61,000	140,000	140,000	180,000
T. Kjel. Nitrogen	700	3,100	120	3,400	3,300	1,800	1,700	2,500	3,500	6,400
Oil-Grease	1,700	1,700	800	1,500	2,900	1,600	1,100	14,000	6,000	1,400
Mercury	0.2	0.6	< 0.1	0.5	0.6	0.2	0.1	0.3	< 0.1	0.1
Lead	20	100	6.0	110	75	40	25	75	110	120
Zinc	100	340	33	330	240	140	120	970	390	340
T. Phosphorus	440	1,500	180	1,000	960	550	470	1,200	1,300	2,000
Ammonia Nitrogen	55	330	26	280	370	140	96	260	470	620
Cyanide	—	—	—	—	—	—	—	7.6	—	1.1
Phenols	—	—	—	—	—	—	—	< 2	—	< 2
Manganese	160	580	140	550	420	340	340	330	460	600
Nickel	42	97	18	96	67	39	35	230	95	45
Arsenic	3	10	3	11	12	6	10	9	8	11
Barium	31	57	23	44	23	22	27	19	39	62
Cadmium	< 1	7.0	< 1	7.4	4.6	2.0	2.3	1.2	2.1	2.2
Chromium	58	190	23	190	140	68	62	530	260	110
Magnesium	3,700	13,100	2,600	13,700	11,500	12,600	11,500	10,400	13,700	13,700
Copper	28	100	8.1	110	84	63	54	1,450	380	110
Iron	9,100	25,500	6,200	25,000	22,500	13,800	12,600	18,400	22,100	23,900

All values mg/kg dry weight unless otherwise

TABLE III
SIEVE ANALYSIS RESULTS

HARBOR: Monroe, Michigan

SAMPLED: April 8, 1975

Sediment Size Analysis by Percent at Each Station

Sieve No. and Description	MON 75-1	MON 75-2	MON 75-3	MON 75-4	MON 75-5	MON 75-6	MON 75-7	MON 75-8	MON 75-9	MON 75-10	MON 7
Retained on #10 Medium Gravel and larger	7	3	3	4	4	5	4	12	6	5	5
Retained on #20 Fine Gravel	4 (11)	5 (8)	4 (7)	6 (10)	4 (8)	5 (10)	5 (9)	11 (23)	8 (14)	8 (13)	9 (1
Retained on #60 Medium and Coarse sand	39 (50)	27 (35)	75 (82)	12 (22)	8 (16)	6 (16)	8 (17)	20 (43)	14 (28)	17 (30)	25 (
Retained on #200 Fine sand	13 (63)	7 (42)	13 (95)	7 (29)	7 (23)	17 (33)	10 (27)	15 (58)	18 (46)	7 (37)	11 (
Passing #200 silts and clays	37(100)	58(100)	5(100)	71(100)	77(100)	67(100)	73(100)	42(100)	54(100)	63(100)	50(1

TABLE IV
ELUTRIATE TEST RESULTS

HARBOR: Monroe, Michigan

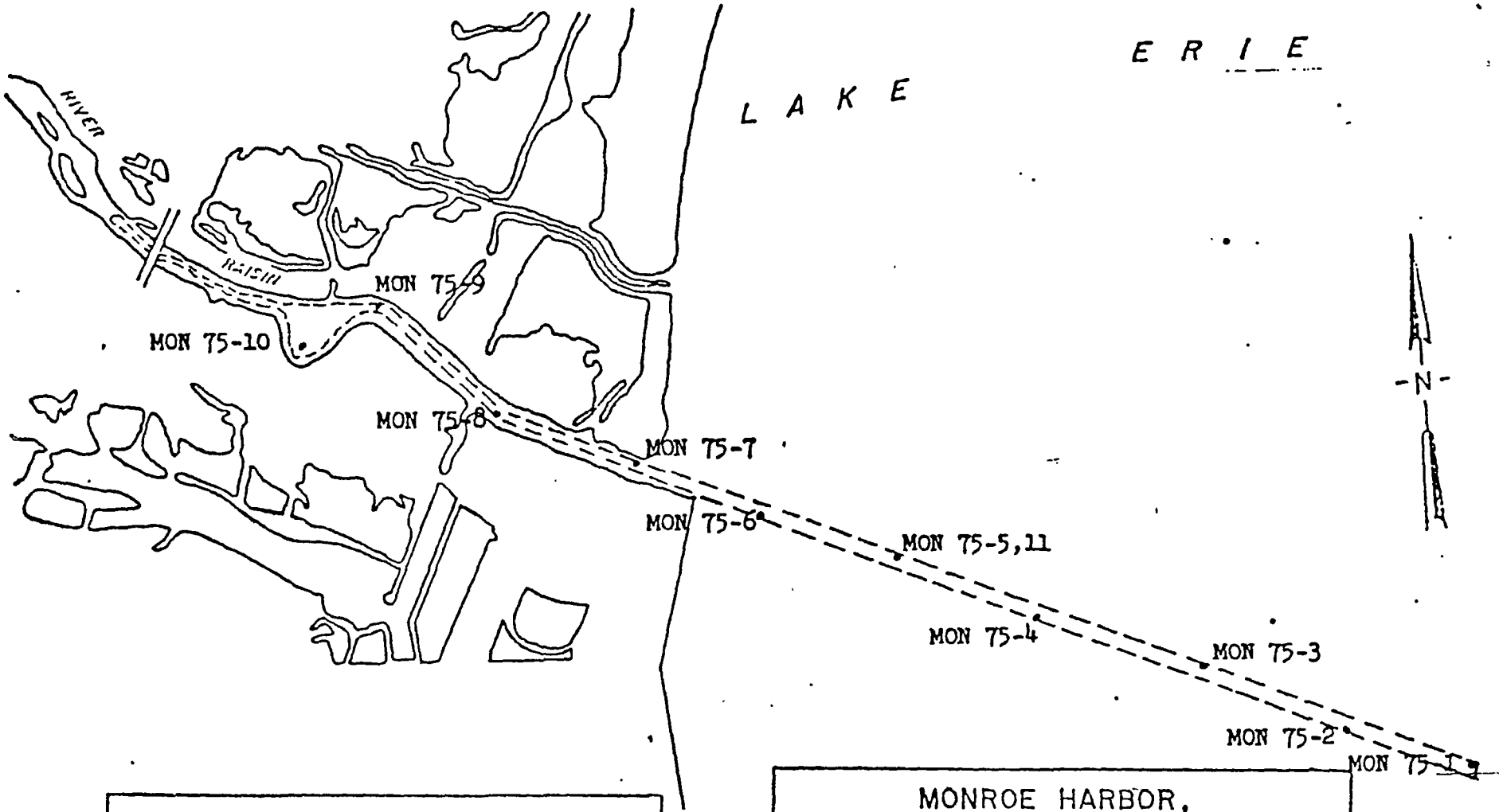
SAMPLED: April 8, 1975

Evaluated Parameter		Water From Disposal Site	Elutriate Water Using Sediments at Each Station			
			MON 75-8	Elut/lake	MON 75-10	Elut/la
Chem. Oxy. Demand	(mg/l)	10	77	7.7	238	23.8
T. Kjel. Nitrogen	"	0.99	12.2	12.3	37.6	38
Ammonia Nitrogen	"	0.24	9.98	41.6	25.1	104
T. Phosphorus	"	0.021	0.032	1.5	0.369	17.6
Cyanide	"	4	14	3.5	11	2.75
Phenols	(μg/l)	20	48	2.4	70	3.5
Arsenic	"	< 2	6	> 3	6	> 3
Barium	"	<50	<50	--	<50	--
Cadmium	"	<0.2	<0.2	--	<0.2	--
Chromium	"	1	5	5	5	5
Copper	"	3	11	3.6	7	2.3
Iron	"	20	35	1.7	3,400	170
Lead	"	2	2	--	6	3
Manganese	"	< 5	410	> 82	820	> 164
Mercury	"	<0.1	0.1	--	0.3	> 3
Zinc	"	8	23	2.9	< 5	--
Aluminum	"	<200	<200	--	<200	--

TABLE V

BIOLOGICAL RESULTS

	MON 75-1	MON 75-2	MON 75-3	MON 75-4	MON 75-5	MON 75-6	MON 75-7	MON 75-8	MON 75-9	MON 75-1
Diptera										
Procladius sp	43	11	18	14	70	54	5		7	
Crypto chironomus sp	1			2						
Chironomus sp		2	39		1	4	1			1
Oligochaeta										
Limnodrilus sp	153	137	185	118	162	423	157	94	130	104
Tubifex sp	13		2	1						
Peloscolex multisetosus	5	1	1		1					
Branchiura sowerbyi			1							
Hirudinea										
Helobdella stagnalus	2	1								
Amphipoda										
Gammarus fasciatus				1						
Total Organisms	217	152	247	136	234	481	163	94	137	105
No. Taxa	6	5	6	5	4	3	3	1	2	2



1975 SEDIMENT SAMPLING STATIONS

U.S. ENVIRONMENTAL PROTECTION AGENCY

GREAT LAKES SURVEILLANCE BRANCH

MONROE HARBOR,
MICHIGAN

April 8, 1975

Scale of Feet

1000 0 1000 2000 3000 4000 5000

From Port-of-Monroe Scoring Packet
-prepared 10/85 by Steve C., SAM

IF ANY CONTAINMENT STRUCTURE HAS BEEN SAMPLED AND CHEMICALS IDENTIFIED, THEN PROCEED IN CALCULATING QUANTITY FOR EACH CHEMICAL. IF NOT, PROCEED TO PAGE 5.

IDENTIFIED CHEMICALS:

	Name	Average C Concentrations	Q Waste Quantity of Structure Sampled (Page 1)	C x Q Amount (Kg)
Consolidated packaging sludges in lagoons	PCB	14.3 PPM	251,602,500 kg	3597.9 Kg
	Chromium	128.0	"	32205.1
	Lead	433.0	"	108943.4
	Zinc	1296.6	"	326227.8
Ford Motor Co all 5 Areas (A-E)	Chromium	42509.	1779609797	75649932.0
	Lead	1365.	"	2429167.3
	Nickel	63155.	"	112391250.0
	Zinc	21015.	"	737398499.0
	samples taken 7-17-80 by DNR, averaged for all areas			
Detroit Edison Dredge Spoils	PCB	7.79	2720224049	21190.5
	Arsenic	7.9	"	21489.8
	Chromium	8073	"	2196036.8
	lead	88.87	"	241746.3
	Zinc	403.9	"	1098698.4
	Copper	1074.	"	2921520.6
	Samples results taken from 1975, 1976 & 1981 data, and then averaged. Materials from the river were deposited on Detroit Edison property from 1971-1983			
1983-1984 Raisin River Sediment Data	PCB	2.14	134992005	288.9
	Cu	115.14	"	15543.0
	Zn	224.14	"	30257.1
	Cr	87.84	"	11857.7
Plumb Creek Sediments 1976	Arsenic	5.80	222026365	1287.8
	Copper	104.0	"	23090.7
	Zinc	660.0	"	146537.4
	Nickel	67.5	"	14986.8
	Lead	100.0	"	222026.4
		TOTALS		
	PCB			25077.3 Kg
	CHROMIUM			77889531.6
	LEAD			3001883.9
	ZINC			739000219.7
	NICKEL			112406236.8
	ARSENIC			22777.6
	COPPER			2960154.3