APPENDIX G

BANK SAMPLING PROGRAM

OPTIONAL FORM 99 (7-90)
FAX TRANSMITTAL

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# of pages ▶ 11

NSN 7540-01-317-7368 5099-101 GENERAL SERVICES ADMINISTRATIO

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Thur:
Werner Loehlein ED-HW
Patience Nwanna ED-GD
Jeff Benedict PD-F
To:
Carmen Rozzi DL-M

Subject: Mahoning River Bank Sampling

Rosie and I got word on Monday 27 July 1998 of the $7,000 that AWK freed up, and initiated efforts to get a few Mahoning River bank samples on Tuesday 28 July 1998. Between 28 and 29 July we hammered a total of twelve holes (2 inch outside diameter , up to 7 feet deep) at four transect stations, and collected eleven samples from seven of the holes. At the other five holes, due to limited available funds, we just did visual and odor inspections of the cores. Nine of the sample sets submitted to Quanterra will be analyzed for a wide range of parameters, consistent with the sample sets collected by AWK for the river channel sediments. The other two samples –both from Lowellville- are just TRPH samples. As discussed previously, the total cost for analysis will be about $11,000.

Schematics of the transects of holes cored at the four stations are attached, and include some observations on the probable vertical and horizontal extent of river bank contamination at the sites. While capped with clean -or at least cleaner- material, based on the July 1998 and previous observations, it is likely that significantly "oil soaked" bank sediments occur along gently sloped depositional bank features all the way from Warren downstream to the stateline.

There is no apparent relationship at all between the upper elevation limit of the "oil" drenched bank materials and Ordinary High Water elevations. Rather, near shore, the upper elevation limit of contamination appears to very precisely follow the river water surface elevation that we schedule during our summer low flow regulation period. As you move back from the river's edge, this upper elevation limit of oil contaminated bank soils then gradually drops. At Girard, we found a lower elevation limit of contamination when we hit some very dense clays. At Lowellville, we found a lot of oil collected in deep gravel deposits.

I regret that we only had time and money to look at bank areas with gradual slopes, and didn't get any information from steeper sloped banks along the study reach. However, from our observations, I'd guess that there might be nearly as much contaminated sediments associated with the banks as there are in the river channel proper. Further, the shoreline of the Mahoning River is where we would expect maximum public contact and risk. I think that we'll have to direct more attention to defining the problems with the river banks during the next study phase if it goes to feasibility.

Michael Koryak
Michael Koryak

cf.
Lee Nageotte, AWK
Bob Davic OEPA

APPENDIX G
PAGE 1 OF 19

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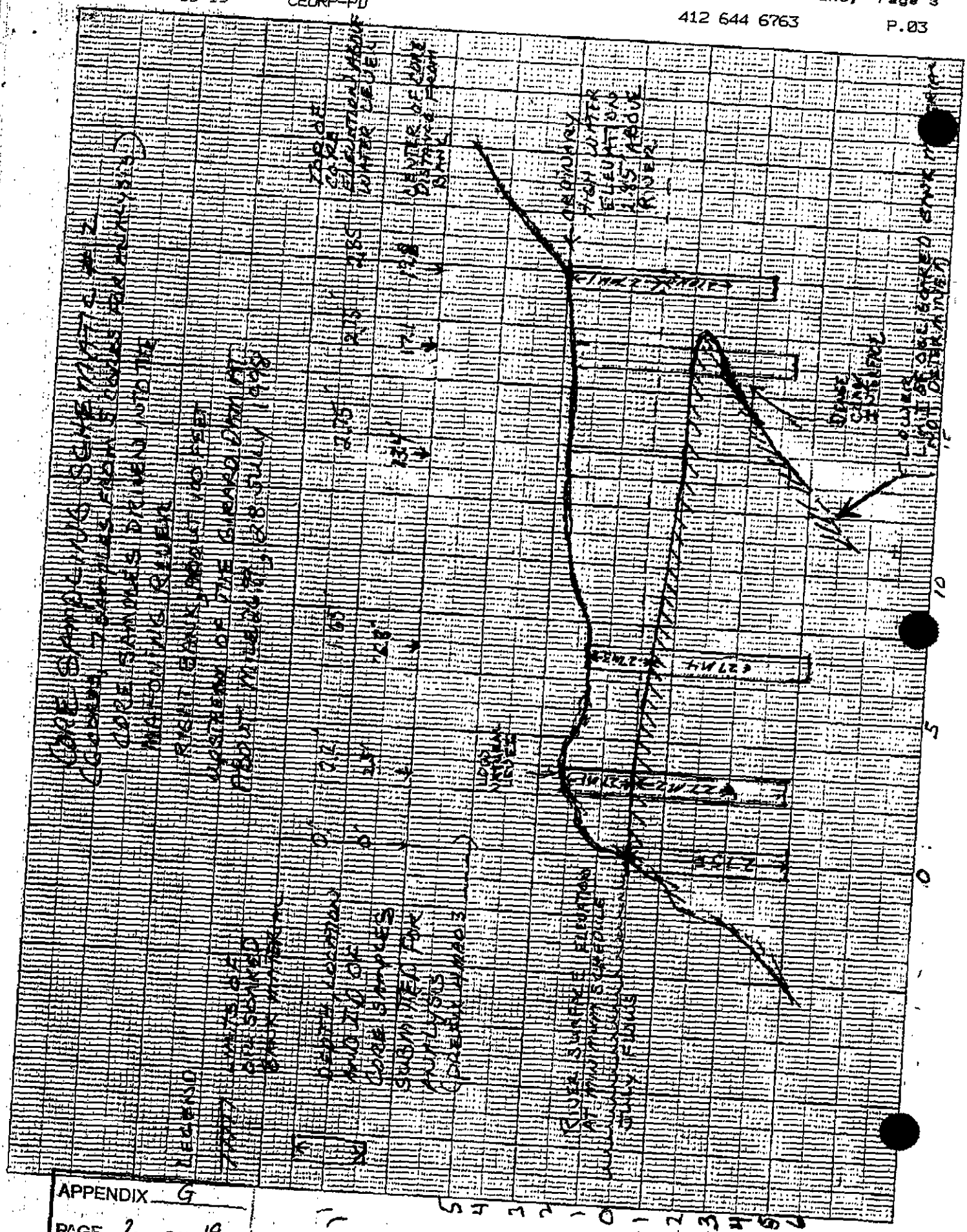
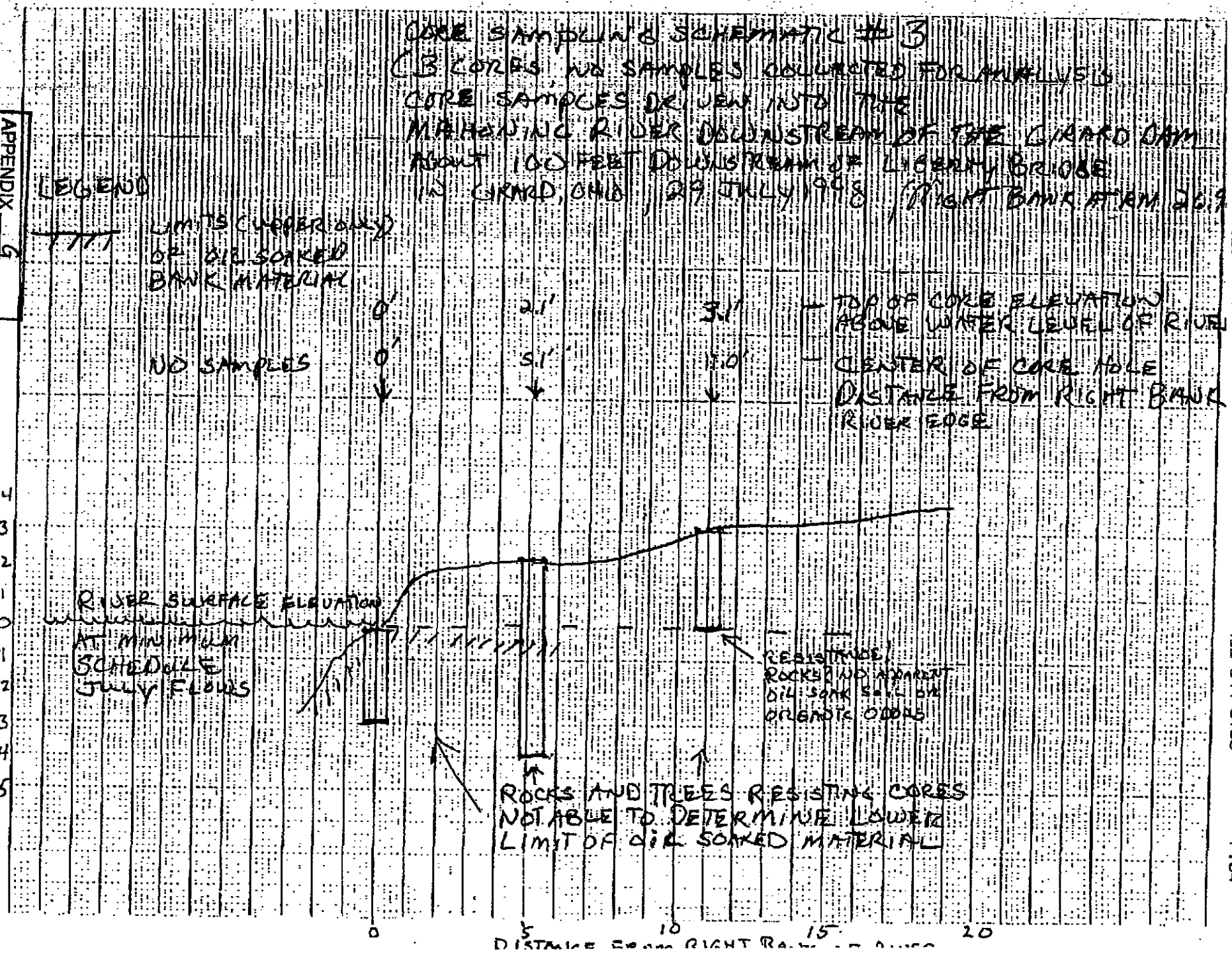


APPENDIX G

PAGE 2 OF 19

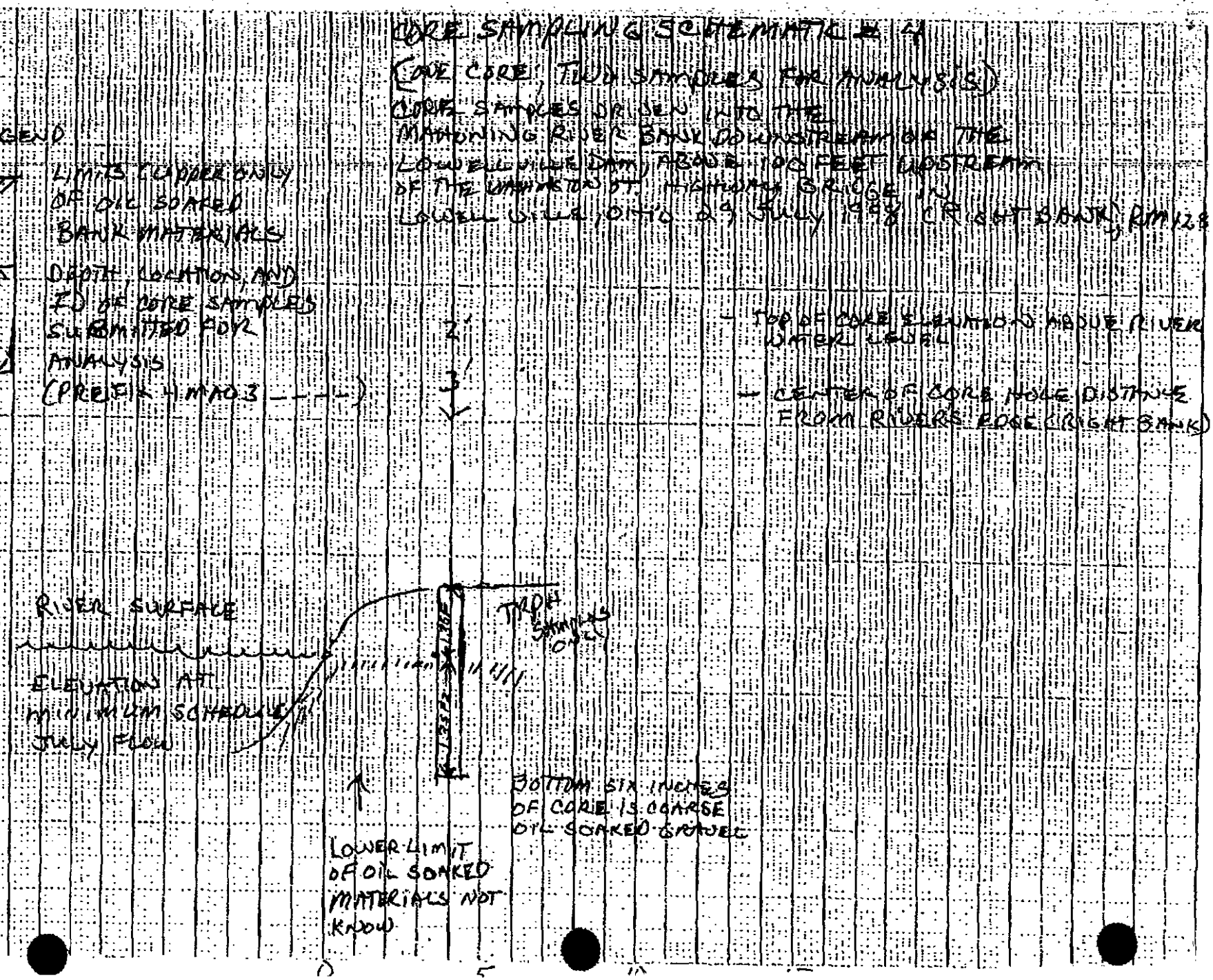

CORE SAMPLING SCHEMATIC #3
(3 CORES NO SAMPLES COLLECTED FOR ANALYSIS)
CORE SAMPLES DRILLED INTO THE
MAHONING RIVER DOWNSTREAM OF THE GIRARD DAM
ABOUT 100 FEET DOWNSTREAM OF LIBERTY BRIDGE
IN GIRARD, OHIO, 29 JULY 1998, RIGHT BANK ITEM 10.9
LEGEND
LIMITS CLEARLY OF OIL SOAKED BANK MATERIAL
NO SAMPLES
0'
0'
2.1'
5.1'
3.1'
10.0'
TOP OF CORE ELEVATION ABOVE WATER LEVEL OF RIVER
CENTER OF CORE HOLE
DISTANCE FROM RIGHT BANK RIVER EDGE
RIVER SURFACE ELEVATION AT MINIMUM SCHEDULE JULY FLOWS
RESISTANCE ROCKS NO APPARENT OIL SOAK SMELL OR ORGANIC ODORS
ROCKS AND TREES RESISTING CORES NOT ABLE TO DETERMINE LOWER LIMIT OF OIL SOAKED MATERIAL
3
2
0
-1
-2
-3
-4
-5
0
5
10
15
20

CORE SAMPLING SCHEMATIC #4
(ONE CORE, TWO SAMPLES FOR ANALYSIS)
CORE SAMPLES DRILLED INTO THE MAHONING RIVER BANK DOWNSTREAM OF THE LOWELLVILLE DAM, ABOUT 100 FEET UPSTREAM OF THE UNIONTOWN ST. MAHONING BRIDGE IN LOWELL, OHIO ON JULY 1998 CR CUT BANK, RM 128

LEGEND

LIMITS (UPPER ONLY) OF OIL SOAKED BANK MATERIALS

DEPTH, LOCATION, AND ID OF CORE SAMPLES SUBMITTED FOR ANALYSIS (PREFIX 4MA03 ----)



CORE SAMPLING SCHEMATIC #1 (CONTROL STATION)
(TWO CORES, TWO SEDIMENT SAMPLES COLLECTED FOR ANALYSIS)
CORE SAMPLES DRIVEN INTO THE LEFT BANK OF THE MAHONING RIVER AT A STATION LOCATED JUST UPSTREAM OF THE LEWISBURG DAM, ON THE DS END OF CANOE PARK AT RIVER MILE (CDE) 46.27 ON 24 JULY 1996

LEGEND

DEPTH, LOCATION, AND ID OF CORE SAMPLES SUBMITTED FOR ANALYSIS (PREFIX 4MAD3 - - - -)

0 ← TOP OF CORE ELEVATION ABOVE RIVER WATER LEVEL → 2.25'

0 ← CENTER OF CORE HOLE DISTANCE FROM RIVER'S EDGE (LEFT BANK) → 24.1

← ORDINARY HIGH WATER ELEVATION

RIVER SURFACE ELEVATION AT MINIMUM SCHEDULED JULY FLOWS

4.5'

← GRAVEL AT BASE, NO EVIDENCE OF OIL CONTAMINATION

ELEVATION (RELATIVE IN FEET) 4 3 2 1 0 -1 -2 -3 -4 -5

0 5 10 15 20 25

APPENDIX G
PAGE 5 OF 19

COMPLETE DATA TABULATIONS FOR BANK SAMPLES
GENERAL CHEMISTRY

Sample Number 4MA0- USACE River Mile	345OHW (45.0)	345SF (45.0)	327OHW (27.0)	327SF (27.0)	327M1 (27.0)	327M2 (27.0)
Total Cyanide (mg/kg)	ND(<3.1)	ND(<4.4)	**26.0**	ND(<6.8)	ND(<3.7)	ND(<5.2)
Percent Solids (%)	80.1	56.9	72.7	36.9	66.9	48.0
Total Recoverable Petroleum Hydrocarbons (TRPH) (mg/kg)	ND(<125)	**244**	**798**	**32900**	**205**	**3660**

Sample Number 4MA0- USACE River Mile	327OH2 (27.0)	327M3 (27.0)	327M4 (27.0)	313SF1 (13.0)	313SF2 (13.0)
Total Cyanide (mg/kg)	ND(<3.4)	ND(<3.9)	**6.1**	NA	NA
Percent Solids (%)	72.8	64.1	55.5	53.6	48.7
Total Recoverable Petroleum Hydrocarbons (TRPH) (mg/kg)	ND(<137)	**407**	**3620**	**323**	**4650**

APPENDIX G
PAGE 6 OF 19

COMPLETE DATA TABULATIONS FOR BANK SAMPLES
TOTAL HERBICIDES (ug/kg)

Sample Number 4MA0-	345OHW	345SF	327OHW	327SF	327M1	327M2
USACE River Mile	(45.0)	(45.0)	(27.0)	(27.0)	(27.0)	(27.0)
2,4 - D	ND(<100)	ND(<140)	ND(<110)	ND(<220)	ND(<120)	ND(<170)
2,4,5 - T	ND(<25)	ND(<35)	ND(<28)	ND(<54)	ND(<30)	ND(<42)
2,4,5 - TP(Silvex)	ND(<25)	ND(<35)	ND(<28)	ND(<54)	ND(<30)	ND(<42)

Sample Number 4MA0-	327OH2	327M3	327M4
USACE River Mile	(27.0)	(27.0)	(27.0)
2,4 - D	ND(<110)	ND(<120)	ND(<140)
2,4,5 - T	ND(<27)	ND(<31)	ND(<36)
2,4,5 - TP(Silvex)	ND(<27)	ND(<31)	ND(<36)

APPENDIX G
PAGE 7 OF 19

COMPLETE DATA TABULATIONS FOR BANK SAMPLES
TOTAL METALS (mg/kg)

Sample Number 4MA0-	345OHW	345SF	327OHW	327SF	327M1	327M2	327OH2
USACE River Mile	(45.0)	(45.0)	(27.0)	(27.0)	(27.0)	(27.0)	(27.0)
Silver (Ag)	0.30B	0.12B,U	2.8	8.2	1.9	6.1	0.35B
Aluminum (Al)	8620	7170	9010	13200	12700	9340	7530
Arsenic (Ar)	17.6	11.0	43.5	56.6	21.0	43.5	13.3
Barium (Ba)	241	88.0	139	167	134	126	58.6
Beryllium (Be)	0.73	0.48B	0.89B	1.1B	0.97	0.81B	0.47B
Cadmium (Cd)	0.90	0.98	5.6	7.0	2.3	5.0B	1.7
Cobalt (Co)	11.1	10.9	28.7	35.9	19.7	34.5	11.3
Chromium (Cr)	24.7	68.2	234	809	144	596	61.3
Copper (Cu)	36.8	44.2	436	537	133	455	91.3
Iron (Fe)	27800	23800	210000	254000	81300	255000	50500
Manganese (Mn)	2250	395	1970	1960	1830	1800	391
Nickel (Ni)	30.3	110	144	356	103	343	28.4
Lead (Pb)	117J	46.5J	278J	536J	132J	425J	76.3J
Antimony (Sb)	0.38B,U	0.93B,J	6.9B,J	6.4B,J	1.1B,J	5.3B,J	1.3B,J
Selenium (Se)	0.86B	0.75B	ND(<3.4)	ND(<2.7)	1.7	2.0B	ND(<0.69)
Thallium (Th)	5.0B	0.97B	6.2B	6.7	3.8	6.6B	1.2B
Vanadium (V)	16.8	12.2	26.2	41.2	24.2	31.4	13.3
Zinc (Zn)	227J	131J	1160J	3150J	751J	2530J	258J
Mercury (Hg)	0.12	0.069B	0.76	0.72	0.35	0.77	0.15
Sodium (Na)	77.5B	86.9B	164B	211B	174B	276B	85.9B
Calcium (Ca)	1510	2070	7050	36300	10800	41600	2170
Potassium (K)	634	763B	610B	1100B	998	708B	655B
Magnesium (Mg)	1720	1980	2170	4600	3580	3220	1780

APPENDIX G
PAGE 8 OF 19

COMPLETE DATA TABULATIONS FOR BANK SAMPLES
TOTAL METALS (mg/kg)

Sample Number 4MA0-	327M3	327M4
USACE River Mile	(27.0)	(27.0)
Silver (Ag)	3.0	6.1
Aluminum (Al)	12500	8500
Arsenic (Ar)	25.1	47.7
Barium (Ba)	133	110
Beryllium (Be)	0.97	0.79B
Cadmium (Cd)	2.7	5.4
Cobalt (Co)	22.1	33.0
Chromium (Cr)	216	556
Copper (Cu)	167	550
Iron (Fe)	102000	259000
Manganese (Mn)	1770	1730
Nickel (Ni)	140	273
Lead (Pb)	194J	335J
Antimony (Sb)	1.0B,J	8.5B,J
Selenium (Se)	1.0B	0.44B
Thallium (Th)	4.1	8.3B
Vanadium (V)	25.6	28.8
Zinc (Zn)	1040J	2120J
Mercury (Hg)	0.39	0.38
Sodium (Na)	167B	133B
Calcium (Ca)	15000	26300
Potassium (K)	1040	702B
Magnesium (Mg)	3490	2450

APPENDIX G
PAGE 7 OF 17

COMPLETE DATA TABULATIONS FOR BANK SAMPLES
TOTAL POLYCHLORINATED BIPHENYLS (ug/kg))

Sample Number 4MA0- USACE River Mile	345OHW (45.0)	345SF (45.0)	327OHW (27.0)	327SF (27.0)	327M1 (27.0)	327M2 (27.0)
Aroclor 1232	ND(<41)	ND(<58)	ND(<45)	ND(<450)	ND(<250)	ND(<690)
Aroclor 1016	ND(<41)	ND(<58)	ND(<45)	ND(<450)	ND(<250)	ND(<690)
Aroclor 1221	ND(<41)	ND(<58)	ND(<45)	ND(<450)	ND(<250)	ND(<690)
Aroclor 1242	ND(<41)	ND(<58)	ND(<45)	ND(<450)	ND(<250)	ND(<690)
Aroclor 1248	ND(<41)	ND(<58)	ND(<45)	ND(<450)	ND(<250)	ND(<690)
Aroclor 1254	ND(<41)	ND(<58)	ND(<45)	**1700**	ND(<250)	**2100**
Aroclor 1260	ND(<41)	ND(<58)	ND(<45)	**2300**	ND(<250)	**2800**
			350	**2300**	**680**	**2600**

Sample Number 4MA0- USACE River Mile	327OH2 (27.0)	327M3 (27.0)	327M4 (27.0)
Aroclor 1232	ND(<45)	ND(<51)	ND(<59)
Aroclor 1016	ND(<45)	ND(<51)	ND(<59)
Aroclor 1221	ND(<45)	ND(<51)	ND(<59)
Aroclor 1242	ND(<45)	ND(<51)	ND(<59)
Aroclor 1248	ND(<45)	ND(<51)	**440**
Aroclor 1254	ND(<45)	ND(<51)	**530**
Aroclor 1260	ND(<45)	**440**	**720**

APPENDIX G
NO. 19

COMPLETE DATA TABULATIONS FOR BANK SAMPLES
TOTAL PESTICIDES (ug/kg)

Sample Number 4MA0- USACE River Mile	345OHW (45.0)	345SF (45.0)	327OHW (27.0)	327SF (27.0)	327M1 (27.0)	327M2 (27.0)	327OH2 (27.0)
Aldrin	ND(<2.1)	ND(<3.0)	ND(<2.3)	ND(<23)	ND(<13)	ND(<35)	ND(<2.3)
alpha-BHC	ND(<2.1)	ND(<3.0)	ND(<2.3)	ND(<23)	ND(<13)	ND(<35)	ND(<2.3)
beta-BHC	ND(<2.1)	ND(<3.0)	ND(<2.3)	ND(<23)	ND(<13)	ND(<35)	ND(<2.3)
delta-BHC	ND(<2.1)	ND(<3.0)	ND(<2.3)	ND(<23)	ND(<13)	ND(<35)	ND(<2.3)
gamma-BHC (Lindane)	ND(<2.1)	ND(<3.0)	ND(<2.3)	ND(<23)	ND(<13)	ND(<35)	ND(<2.3)
alpha-Chlordane	ND(<2.1)	ND(<3.0)	ND(<2.3)	ND(<23)	**35**	ND(<35)	ND(<2.3)
gamma-Chlordane	ND(<2.1)	ND(<3.0)	ND(<2.3)	ND(<23)	**32**	ND(<35)	ND(<2.3)
4,4'-DDD	ND(<2.1)	**4.0**	ND(<2.3)	ND(<23)	**110**	ND(<35)	ND(<2.3)
4,4'-DDE	ND(<2.1)	ND(<3.0)	ND(<2.3)	ND(<23)	**47**	ND(<35)	ND(<2.3)
4,4'-DDT	ND(<2.1)	ND(<3.0)	ND(<2.3)	ND(<23)	**65**	ND(<35)	ND(<2.3)
Dieldrin	ND(<2.1)	ND(<3.0)	ND(<2.3)	ND(<23)	ND(<13)	ND(<35)	ND(<2.3)
Endosulfan I	ND(<2.1)	ND(<3.0)	ND(<2.3)	ND(<23)	ND(<13)	ND(<35)	ND(<2.3)
Endosulfan II	ND(<2.1)	ND(<3.0)	ND(<2.3)	ND(<23)	ND(<13)	ND(<35)	ND(<2.3)
Endosulfan sulfate	**2.2**	**3.2**	**12**	ND(<23)	ND(<13)	ND(<35)	ND(<2.3)
Endrin	ND(<2.1)	ND(<3.0)	ND(<2.3)	ND(<23)	ND(<13)	ND(<35)	ND(<2.3)
Endrin aldehyde	ND(<2.1)	ND(<3.0)	ND(<2.3)	ND(<23)	ND(<13)	ND(<35)	ND(<2.3)
Endrin ketone	ND(<2.1)	ND(<3.0)	ND(<2.3)	ND(<23)	ND(<13)	ND(<35)	ND(<2.3)
Heptachlor	ND(<2.1)	ND(<3.0)	ND(<2.3)	ND(<23)	ND(<13)	ND(<35)	ND(<2.3)
Heptachlor epoxide	ND(<2.1)	ND(<3.0)	ND(<2.3)	ND(<23)	ND(<13)	ND(<35)	ND(<2.3)
Methoxychlor	ND(<21)	ND(<30)	ND(<23)	ND(<230)	ND(<130)	ND(<350)	ND(<23)
Toxaphene	ND(<84)	ND(<120)	ND(<92)	ND(<910)	ND(<500)	ND(<1400)	ND(<92)

APPENDIX G
PAGE 11 OF 19

COMPLETE DATA TABULATIONS FOR BANK SAMPLES
TOTAL PESTICIDES (ug/kg)

Sample Number 4MA0- USACE River Mile	327M3 (27.0)	327M4 (27.0)
Aldrin	ND(<2.7)	ND(<3.1)
alpha-BHC	ND(<2.7)	ND(<3.1)
beta-BHC	ND(<2.7)	ND(<3.1)
delta-BHC	ND(<2.7)	ND(<3.1)
gamma-BHC (Lindane)	ND(<2.7)	ND(<3.1)
alpha-Chlordane	**4.7**	ND(<3.1)
gamma-Chlordane	**3.5**	ND(<3.1)
4,4'-DDD	**3.3**	ND(<3.1)
4,4'-DDE	ND(<2.7)	**14**
4,4'-DDT	ND(<2.7)	ND(<3.1)
Dieldrin	**3.0**	ND(<3.1)
Endosulfan I	ND(<2.7)	ND(<3.1)
Endosulfan II	ND(<2.7)	ND(<3.1)
Endosulfan sulfate	ND(<2.7)	ND(<3.1)
Endrin	ND(<2.7)	ND(<3.1)
Endrin aldehyde	ND(<2.7)	ND(<3.1)
Endrin ketone	ND(<2.7)	ND(<3.1)
Heptachlor	ND(<2.7)	ND(<3.1)
Heptachlor epoxide	ND(<2.7)	ND(<3.1)
Methoxychlor	ND(<27)	ND(<31)
Toxaphene	ND(<100)	ND(<120)

COMPLETE DATA TABULATIONS FOR BANK SAMPLES
TOTAL SEMIVOLATILE ORGANIC COMPOUNDS (ug/kg)

Sample Number 4MA0- USACE River Mile	345OHW (45.0)	345SF (45.0)	327OHW (27.0)	327SF (27.0)	327M1 (27.0)	327M2 (27.0)	327OH2 (27.0)
Acenaphthene	ND(<410)	ND(<580)	ND(<910)	ND(<890)	**79J**	**65J**	ND(<450)
Acenaphthylene	ND(<410)	ND(<580)	**440J**	ND(<890)	**200J**	**70J**	**45J**
Anthracene	ND(<410)	ND(<580)	**460J**	ND(<890)	**300J**	ND(<690)	**53J**
Benzo (a) anthracene	**83J**	ND(<580)	**1500**	ND(<890)	**850**	ND(<690)	**200J**
Benzo (b) fluoranthene	**68J**	ND(<580)	**2300**	ND(<890)	**1900**	**380J**	**150J**
Benzo (k) flouranthene	**84J**	ND(<580)	ND(<910)	ND(<890)	ND(<490)	ND(<690)	**200J**
Benzo (ghi) perylene	**72J**	ND(<580)	**730J**	ND(<890)	**480J**	ND(<690)	**150J**
Benzo (a) pyrene	**72J**	ND(<580)	**1600**	ND(<890)	**1200**	**470J**	**180J**
bis (2-Chloroethoxy) methane	ND(<410)	ND(<580)	ND(<910)	ND(<890)	ND(<490)	ND(<690)	ND(<450)
bis (2-Chloroethyl) ether	ND(<410)	ND(<580)	ND(<910)	ND(<890)	ND(<490)	ND(<690)	ND(<450)
bis (2-Chloroisopropyl) ether	ND(<410)	ND(<580)	ND(<910)	ND(<890)	ND(<490)	ND(<690)	ND(<450)
bis (2-Ethylhexyl) phthalate	**140J**	**110J**	**670J**	**160J**	**260J**	**370J**	**390J**
4-Bromophenyl phenyl ether	ND(<410)	ND(<580)	ND(<910)	ND(<890)	ND(<490)	ND(<690)	ND(<450)
Butyl benzyl phthalate	ND(<410)	ND(<580)	ND(<910)	ND(<890)	ND(<490)	ND(<690)	ND(<450)
4-Chloroaniline	ND(<410)	ND(<580)	ND(<910)	ND(<890)	ND(<490)	ND(<690)	ND(<450)
4-Chloro-3-methylphenol	ND(<410)	ND(<580)	ND(<910)	ND(<890)	ND(<490)	ND(<690)	ND(<450)
2-Chloronaphthalene	ND(<410)	ND(<580)	ND(<910)	ND(<890)	ND(<490)	ND(<690)	ND(<450)
2-Chlorophenol	ND(<410)	ND(<580)	ND(<910)	ND(<890)	ND(<490)	ND(<690)	ND(<450)
4-Chlorophenyl phenyl ether	ND(<410)	ND(<580)	ND(<910)	ND(<890)	ND(<490)	ND(<690)	ND(<450)
Chrysene	**110J**	ND(<580)	**1600**	ND(<890)	**1300**	**800**	**190J**
Dibenzofuran	ND(<410)	ND(<580)	**170J**	ND(<890)	**160J**	ND(<690)	ND(<450)
Di-n-butyl phthalate	**210J**	**130J**	**170J**	ND(<890)	**690**	**340J**	**420J**
1,2-Dichlorobenzene	ND(<410)	ND(<580)	ND(<910)	ND(<890)	ND(<490)	ND(<690)	ND(<450)
1,3-Dichlorobenzene	ND(<410)	ND(<580)	ND(<910)	ND(<890)	ND(<490)	ND(<690)	ND(<450)
1,4-Dichlorobenzene	ND(<410)	ND(<580)	ND(<910)	ND(<890)	ND(<490)	ND(<690)	ND(<450)
3,3'-Dichlorobenzidine	ND(<2000)	ND(<2800)	ND(<4400)	ND(<4300)	ND(<2400)	ND(<3300)	ND(<2200)
2,4-Dichlorophenol	ND(<410)	ND(<580)	ND(<910)	ND(<890)	ND(<490)	ND(<690)	ND(<450)
Diethyl phthalate	ND(<410)	ND(<580)	ND(<910)	ND(<890)	ND(<490)	ND(<690)	ND(<450)
2,4-Dimethylphenol	ND(<410)	ND(<580)	ND(<910)	ND(<890)	ND(<490)	ND(<690)	ND(<450)
Dimethyl phthalate	ND(<410)	ND(<580)	ND(<910)	ND(<890)	ND(<490)	ND(<690)	ND(<450)
Di-n-octyl phthalate	ND(<410)	ND(<580)	ND(<910)	ND(<890)	ND(<490)	ND(<690)	ND(<450)
2,4-Dinitrophenol	ND(<2000)	ND(<2800)	ND(<4400)	ND(<4300)	ND(<2400)	ND(<3300)	ND(<2200)
2,4-Dinitrotoluene	ND(<410)	ND(<580)	ND(<910)	ND(<890)	ND(<490)	ND(<690)	ND(<450)
2,6-Dinitrotoluene	ND(<410)	ND(<580)	ND(<910)	ND(<890)	ND(<490)	ND(<690)	ND(<450)
Fluoranthene	**130J**	**52J**	**2200**	ND(<890)	**1700**	**920**	**300J**
Fluorene	ND(<410)	ND(<580)	**140J**	ND(<890)	**140J**	**52J**	ND(<450)
Hexachlorobenzene	ND(<410)	ND(<580)	ND(<910)	ND(<890)	ND(<490)	ND(<690)	ND(<450)

COMPLETE DATA TABULATIONS FOR BANK SAMPLES
TOTAL SEMIVOLATILE ORGANIC COMPOUNDS (ug/kg)

Sample Number 4MA0-	345OHW	345SF	327OHW	327SF	327M1	327M2	327OH2
USACE River Mile	(45.0)	(45.0)	(27.0)	(27.0)	(27.0)	(27.0)	(27.0)
Hexachlorobutadiene	ND(<410)	ND(<580)	ND(<910)	ND(<890)	ND(<490)	ND(<690)	ND(<450)
Hexachlorocyclopentadiene	ND(<2000)	ND(<2800)	ND(<4400)	ND(<4300)	ND(<2400)	ND(<3300)	ND(<2200)
Hexachloroethane	ND(<410)	ND(<580)	ND(<910)	ND(<890)	ND(<490)	ND(<690)	ND(<450)
Indeno (1,2,3-cd)pyrene	**65J**	ND(<580)	**900J**	ND(<890)	**640**	**86J**	**130J**
Isophorone	ND(<410)	ND(<580)	ND(<910)	ND(<890)	ND(<490)	ND(<690)	ND(<450)
2-Methylnaphthalene	**85J**	ND(<580)	**300J**	ND(<890)	**310J**	**120J**	ND(<450)
2-Methylphenol	ND(<410)	ND(<580)	ND(<910)	ND(<890)	ND(<490)	ND(<690)	ND(<450)
Naphthalene	ND(<410)	ND(<580)	**340J**	ND(<890)	**440J**	**220J**	ND(<450)
2-Nitroaniline	ND(<2000)	ND(<2800)	ND(<4400)	ND(<4300)	ND(<2400)	ND(<3300)	ND(<2200)
3-Nitroaniline	ND(<2000)	ND(<2800)	ND(<4400)	ND(<4300)	ND(<2400)	ND(<3300)	ND(<2200)
4-Nitroaniline	ND(<2000)	ND(<2800)	ND(<4400)	ND(<4300)	ND(<2400)	ND(<3300)	ND(<2200)
Nitrobenzene	ND(<410)	ND(<580)	ND(<910)	ND(<890)	ND(<490)	ND(<690)	ND(<450)
2-Nitrophenol	ND(<410)	ND(<580)	ND(<910)	ND(<890)	ND(<490)	ND(<690)	ND(<450)
4-Nitrophenol	ND(<2000)	ND(<2800)	ND(<4400)	ND(<4300)	ND(<2400)	ND(<3300)	ND(<2200)
N-Nitrosodi-n-propylamine	ND(<410)	ND(<580)	ND(<910)	ND(<890)	ND(<490)	ND(<690)	ND(<450)
N-Nitrosodiphenylamine	ND(<410)	ND(<580)	ND(<910)	ND(<890)	ND(<490)	ND(<690)	ND(<450)
Pentachlorophenol	ND(<2000)	ND(<2800)	ND(<4400)	ND(<4300)	ND(<2400)	ND(<3300)	ND(<2200)
Phenanthrene	**120J**	**47J**	**1500**	ND(<890)	**1100**	**440J**	**200J**
Phenol	ND(<410)	ND(<580)	ND(<910)	ND(<890)	**68J**	**280J**	ND(<450)
Pyrene	**150J**	**71J**	**1800**	ND(<890)	**1400**	**340J**	**280J**
1,2,4-Trichlorobenzene	ND(<410)	ND(<580)	ND(<910)	ND(<890)	ND(<490)	ND(<690)	ND(<450)
2,4,5-Trichlorophenol	ND(<410)	ND(<580)	ND(<910)	ND(<890)	ND(<490)	ND(<690)	ND(<450)
2,4,6-Trichlorophenol	ND(<410)	ND(<580)	ND(<910)	ND(<890)	ND(<490)	ND(<690)	ND(<450)
3-Methylphenol & 4-Methylphenol	ND(<410)	ND(<580)	ND(<910)	ND(<890)	ND(<490)	**500J**	ND(<450)
2-Methyl-4, 6-dinitrophenol	ND(<2000)	ND(<2800)	ND(<4400)	ND(<4300)	ND(<2400)	ND(<3300)	ND(<2200)
Dibenz (a,h) anthracene	ND(<410)	ND(<580)	**330J**	ND(<890)	**260J**	ND(<690)	ND(<450)
Carbazole	ND(<410)	ND(<580)	**110J**	ND(<890)	**120J**	ND(<690)	ND(<450)

APPENDIX D
PAGE 14 OF 19

COMPLETE DATA TABULATIONS FOR BANK SAMPLES
TOTAL SEMIVOLATILE ORGANIC COMPOUNDS (ug/kg)

Sample Number 4MA0- USACE River Mile	327M3 (27.0)	327M4 (27.0)
Acenaphthene	ND(<1000)	**71J**
Acenaphthylene	**190J**	ND(<590)
Anthracene	**280J**	**70J**
Benzo (a) anthracene	**840J**	**130J**
Benzo (b) fluoranthene	**830J**	**82J**
Benzo (k) flouranthene	**810J**	**110J**
Benzo (ghi) perylene	**700J**	**81J**
Benzo (a) pyrene	**910J**	**95J**
bis (2-Chloroethoxy) methane	ND(<1000)	ND(<590)
bis (2-Chloroethyl) ether	ND(<1000)	ND(<590)
bis (2-Chloroisopropyl) ether	ND(<1000)	ND(<590)
bis (2-Ethylhexyl) phthalate	**380J**	**300J**
4-Bromophenyl phenyl ether	ND(<1000)	ND(<590)
Butyl benzyl phthalate	ND(<1000)	ND(<590)
4-Chloroaniline	ND(<1000)	ND(<590)
4-Chloro-3-methylphenol	ND(<1000)	ND(<590)
2-Chloronaphthalene	ND(<1000)	ND(<590)
2-Chlorophenol	ND(<1000)	ND(<590)
4-Chlorophenyl phenyl ether	ND(<1000)	ND(<590)
Chrysene	**980J**	**200J**
Dibenzofuran	**130J**	ND(<590)
Di-n-butyl phthalate	ND(<1000)	ND(<590)
1,2-Dichlorobenzene	ND(<1000)	ND(<590)
1,3-Dichlorobenzene	ND(<1000)	ND(<590)
1,4-Dichlorobenzene	ND(<1000)	ND(<590)
3,3'-Dichlorobenzidine	ND(<5000)	ND(<2900)
2,4-Dichlorophenol	ND(<1000)	ND(<590)
Diethyl phthalate	ND(<1000)	ND(<590)
2,4-Dimethylphenol	ND(<1000)	ND(<590)
Dimethyl phthalate	ND(<1000)	ND(<590)
Di-n-octyl phthalate	ND(<1000)	ND(<590)
2,4-Dinitrophenol	ND(<5000)	ND(<2900)
2,4-Dinitrotoluene	ND(<1000)	ND(<590)
2,6-Dinitrotoluene	ND(<1000)	ND(<590)
Fluoranthene	**1600**	**330J**
Fluorene	**93J**	**71J**
Hexachlorobenzene	ND(<1000)	ND(<590)

COMPLETE DATA TABULATIONS FOR BANK SAMPLES
TOTAL SEMIVOLATILE ORGANIC COMPOUNDS (ug/kg)

Sample Number 4MA0-	327M3	327M4
USACE River Mile	(27.0)	(27.0)
Hexachlorobutadiene	ND(<1000)	ND(<590)
Hexachlorocyclopentadiene	ND(<5000)	ND(<2900)
Hexachloroethane	ND(<1000)	ND(<590)
Indeno (1,2,3-cd)pyrene	**790J**	**74J**
Isophorone	ND(<1000)	ND(<590)
2-Methylnaphthalene	**270J**	ND(<590)
2-Methylphenol	ND(<1000)	ND(<590)
Naphthalene	**380J**	ND(<590)
2-Nitroaniline	ND(<5000)	ND(<2900)
3-Nitroaniline	ND(<5000)	ND(<2900)
4-Nitroaniline	ND(<5000)	ND(<2900)
Nitrobenzene	ND(<1000)	ND(<590)
2-Nitrophenol	ND(<1000)	ND(<590)
4-Nitrophenol	ND(<5000)	ND(<2900)
N-Nitrosodi-n-propylamine	ND(<1000)	ND(<590)
N-Nitrosodiphenylamine	ND(<1000)	ND(<590)
Pentachlorophenol	ND(<5000)	ND(<2900)
Phenanthrene	**980J**	**230J**
Phenol	ND(<1000)	**100J**
Pyrene	**1400**	**370J**
1,2,4-Trichlorobenzene	ND(<1000)	ND(<590)
2,4,5-Trichlorophenol	ND(<1000)	ND(<590)
2,4,6-Trichlorophenol	ND(<1000)	ND(<590)
3-Methylphenol & 4-Methylphenol	ND(<1000)	**260J**
2-Methyl-4, 6-dinitrophenol	ND(<5000)	ND(<2900)
Dibenz (a,h) anthracene	**250J**	ND(<590)
Carbazole	**110J**	ND(<590)

APPENDIX G
PAGE 16 OF 19

COMPLETE DATA TABULATIONS FOR BANK SAMPLES
TOTAL ORGANIC CARBON (mg/kg)

Sample Number 4MA0- USACE River Mile	345OHW (45.0)	345SF (45.0)	327OHW (27.0)	327SF (27.0)	327M1 (27.0)	327M2 (27.0)
Total Organic Compounds (TOC)	22800	34300	70500	97400	67300	83300

Sample Number 4MA0- USACE River Mile	327M3 (27.0)	327M4 (27.0)	327OH2 (27.0)
Total Organic Compounds (TOC)	59000	72700	13400

APPENDIX G
PAGE 17 OF 19

COMPLETE DATA TABULATIONS FOR BANK SAMPLES
TOTAL VOLATILE ORGANIC COMPOUNDS (ug/kg)

Sample Number 4MA0- USACE River Mile	345SF (45.0)	327SF (27.0)	327M4 (27.0)
cis-1,3-Dichloropropene	ND(<630)	ND(<5300)	ND(<1300)
trans-1,3-Dichloropropene	ND(<630)	ND(<5300)	ND(<1300)
Ethylbenzene	ND(<630)	ND(<5300)	ND(<1300)
1,2-Dichloroethane	ND(<630)	ND(<5300)	ND(<1300)
1,2-Dichloropropane	ND(<630)	ND(<5300)	ND(<1300)
2-Hexanone	ND(<2500)	ND(<21000)	ND(<5100)
Methylene chloride	ND(<630)	ND(<5300)	ND(<1300)
4-Methyl-2-pentanone	ND(<2500)	ND(<21000)	ND(<5100)
Styrene	ND(<630)	ND(<5300)	ND(<1300)
1,1,2,2-Tetrachloroethane	ND(<630)	ND(<5300)	ND(<1300)
Tetrachloroethene	ND(<630)	ND(<5300)	ND(<1300)
Toluene	ND(<630)	ND(<5300)	ND(<1300)
1,1,1-Trichloroethane	ND(<630)	ND(<5300)	ND(<1300)
1,1,2-Trichloroethane	ND(<630)	ND(<5300)	ND(<1300)
Trichlorethene	ND(<630)	ND(<5300)	ND(<1300)
Vinyl chloride	ND(<1300)	ND(<11000)	ND(<2500)
Xylenes (total)	ND(<630)	ND(<5300)	ND(<1300)
Acetone	ND(<2500)	ND(<21000)	ND(<5100)
Benzene	ND(<630)	ND(<5300)	ND(<1300)
Bromodichloromethane	ND(<630)	ND(<5300)	ND(<1300)
Bromoform	ND(<630)	ND(<5300)	ND(<1300)
Bromomethane	ND(<1300)	ND(<11000)	ND(<2500)
2-Butanone	ND(<2500)	ND(<21000)	ND(<5100)
Carbon disulfide	ND(<630)	ND(<5300)	ND(<1300)
Carbon tetrachloride	ND(<630)	ND(<5300)	ND(<1300)
Chlorobenzene	ND(<630)	ND(<5300)	ND(<1300)
Dibromochloromethane	ND(<630)	ND(<5300)	ND(<1300)
Chloroethane	ND(<1300)	ND(<11000)	ND(<2500)
Chloroform	ND(<630)	ND(<5300)	ND(<1300)
Chloromethane	ND(<1300)	ND(<11000)	ND(<2500)
1,1-Dichloroethane	ND(<630)	ND(<5300)	ND(<1300)
1,2-Dichloroethane	ND(<630)	ND(<5300)	ND(<1300)
1,1-Dichloroethene	ND(<630)	ND(<5300)	ND(<1300)

APPENDIX G
PAGE 11 OF 19

COMPLETE DATA TABULATIONS FOR BANK SAMPLES
TOTAL DIOXINS (pg/g)

Sample Number 4MA0- USACE River Mile	345SF (45.0)	327SF (27.0)
2,3,7,8-TCDD	0.40J,Q	13
Total TCDD	9.0Q,B	160Q,B
1,2,3,7,8-PeCDD	3.1J,B	25J,B
Total PeCDD	25B	210Q,B
1,2,3,4,7,8-HxCDD	2.4J,B	14J,B
1,2,3,6,7,8-HxCDD	7.6B	140B
1,2,3,7,8,9-HxCDD	9.9B	68B
Total HxCDD	76Q,B	1200Q,B
1,2,3,4,6,7,8-HpCDD	80B	1200B
Total HpCDD	150Q,B	2400B,Q
OCDD	450B	11000B
2,3,7,8-TCDF	1.3Q	26Q
Total TCDF	15Q	240Q
1,2,3,7,8-PeCDF	0.52J,B,U	9.0J,Q,B
2,3,4,7,8-PeCDF	0.68J,B,U	15J,B
Total PeCDF	18Q,B	320Q,B
1,2,3,4,7,8-HxCDF	0.96J,B	39J,B
1,2,3,6,7,8-HxCDF	1.1J,Q,B	22J,Q,B
2,3,4,6,7,8-HxCDF	0.51J,B,U	15J,B
1,2,3,7,8,9-HxCDF	ND(<0.50)	2.9J,B
Total HxCDF	13J,Q,B	850Q,B
1,2,3,4,6,7,8-HpCDF	5.0J,B	510B
1,2,3,4,7,8,9-HpCDF	0.56J,Q,B,U	24J,B
Total HpCDF	13Q,B,J	1600B,Q
OCDF	10B,J	720B
2,3,7,8-TCDF*	1.8Q	21Q

Note: * - Second column confirmation analysis for 2,3,7,8-TCDF