

Figure B-1. Sampling Point Locations in Model Reach Near Leavittsburg Bridge

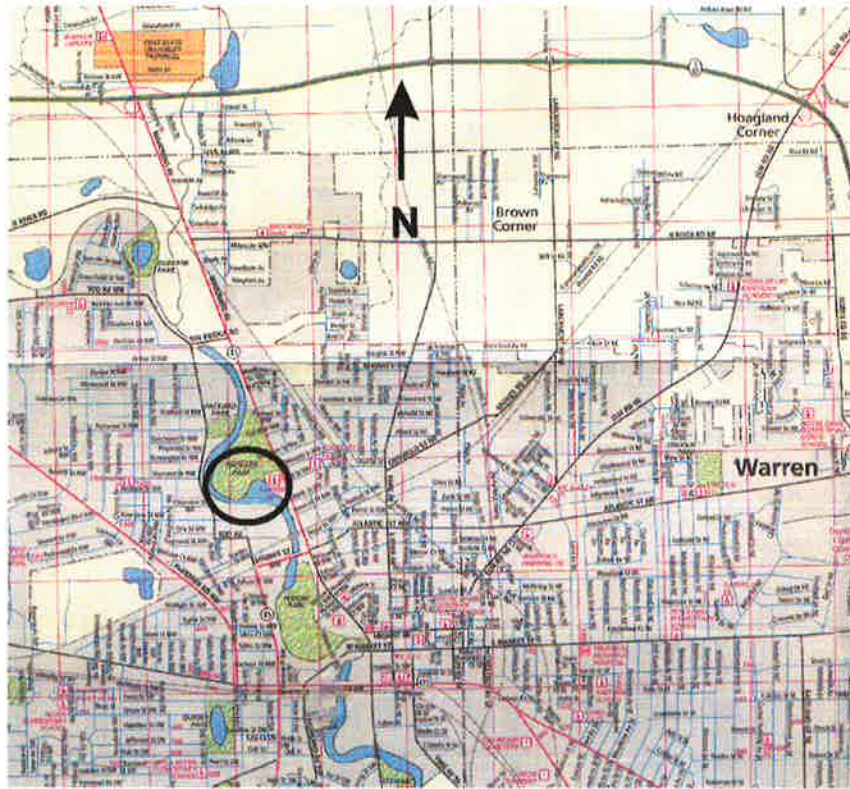


Figure B-2. Location of Recovering Area

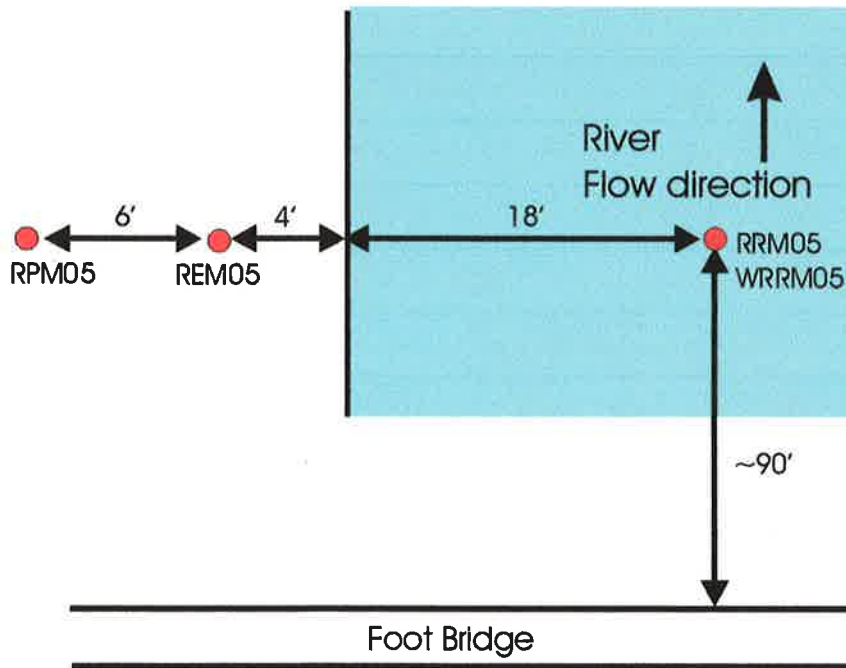


Figure B-3. Location of Recovering Area Samples

## Appendix C - Field Notes and Field Data Sheets

Mahoning River Biotreatability Study

Contract G-221

Girard & Warren, OH

Dates of Field Activities:

Initial Sampling: 5/31/03 - 6/1/03

Inoculation: 10/3/03 - 10/4/03

6-week Sampling: 11/22/03 (see J. Ford's logbook)

Final Sampling: 3/27/04 - 3/28/04 (see J. Ford's logbook)

Contacts:

Emergency = 911

Katy Makeig, Project Manager: 301-340-3301 office, 301-335-8823 cell

Barbara Cook, Site Manager: 301-681-4442 office, 301-602-4433 cell

Jared Ford, Field Biologist: 614-778-5945 cell

Jo Davison, Research Director: 614-278-2600 office

1205 Background PID

1210 Water sample WTRMOS

250 ml  
- 1 jar, no preserv  
- 1 jar, HCl preserv

Total water depth 24"

Spl depth ~12"

Horiba: pH 5.48

at  
1310 cond 43.9 mS/m

turb 20 NTU

DO 7.4<sup>SEC</sup> mg/L

temp 16.8 C

TDS 0.28 g/L

sal 0.0 ‰

ORP 221 mV

YSI DO 1.95 mg/L

at  
1320 temp 17.3 C

PID not functional in rain.

1220 Sed spl TRMOS 0-6" from top of sed, 2'

below water surface. Grab/homogenized over depth

5 jars, no preserv for chem lab; 1 plastic jar for bio lab.

Extra jar w head space for <sup>field</sup> gas readings.

Homogenize in dishpan, except head space sample.

Horiba	plt	5.63
1530	cond	0.0 mS/m
	DO	9.6 mg/L
	temp	14.7 C
	sal	0.0 ‰
	ORP	206 mV

Fill 5 extra jars (no preserv) for TEMOSMSM5D1.

1600 Begin augering TPMOS, 1st attempt.

TPMOS		PH	5.5
		DO	20.9
1630	O <sub>2</sub>	cond	0
		DO	10.
	H <sub>2</sub> S	temp	13.1 C
		sal	0
	CH <sub>4</sub>	ORP	213

No visibly contaminated sed. in TPMOS.

1645 Depart Girard site

2020 Begin augering for ecotone sample.

MEMOS w distilled water

Horiba  
or  
2050

pH 5.48

cond 8.7

DO 9.7

temp 12.2

sal 0.0 ‰

ORP 183 mV

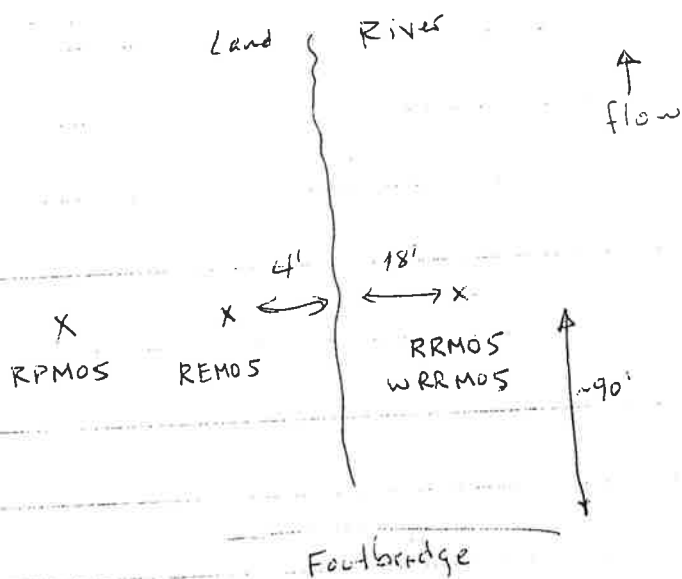
2100 Depart site. for hotel.

0915 Arrive Recovering Area site. Gate is open.

Unload gear, and Jared departs to pick up J. Davison.

Water level ~1' above yesterday; Footpath along river under water.

Location:



1100 J. Ford + J. Davison arrive at site.

Continue with boring RPMOS; no contamin sedgs  
apparent to 6.5'



1330

	REMOS	RPMOS
heat space → H <sub>2</sub> S	0	no readings - sitting out too long
CH <sub>4</sub>	0	
O <sub>2</sub>	20.0	
PID	0	0
pH	<del>6.4</del> 6.12 <sup>pc</sup>	6.11
DO	<del>8.0</del> <sup>8.6</sup> <del>mg</del> <sup>pc</sup> / L 23.4 <sup>pc</sup>	8.6
Temp	<del>22.9</del> °C	22.9
Sal	0.0	0.0
ORP	<del>153</del> <sup>145</sup> mV	153

Fill 5 extra jars for REMOS DVA.

1430 Depart Recovering Area site

Return to Test site to re-attempt riparian sample  
(1st attempt encountered no visibly contaminated sediments).

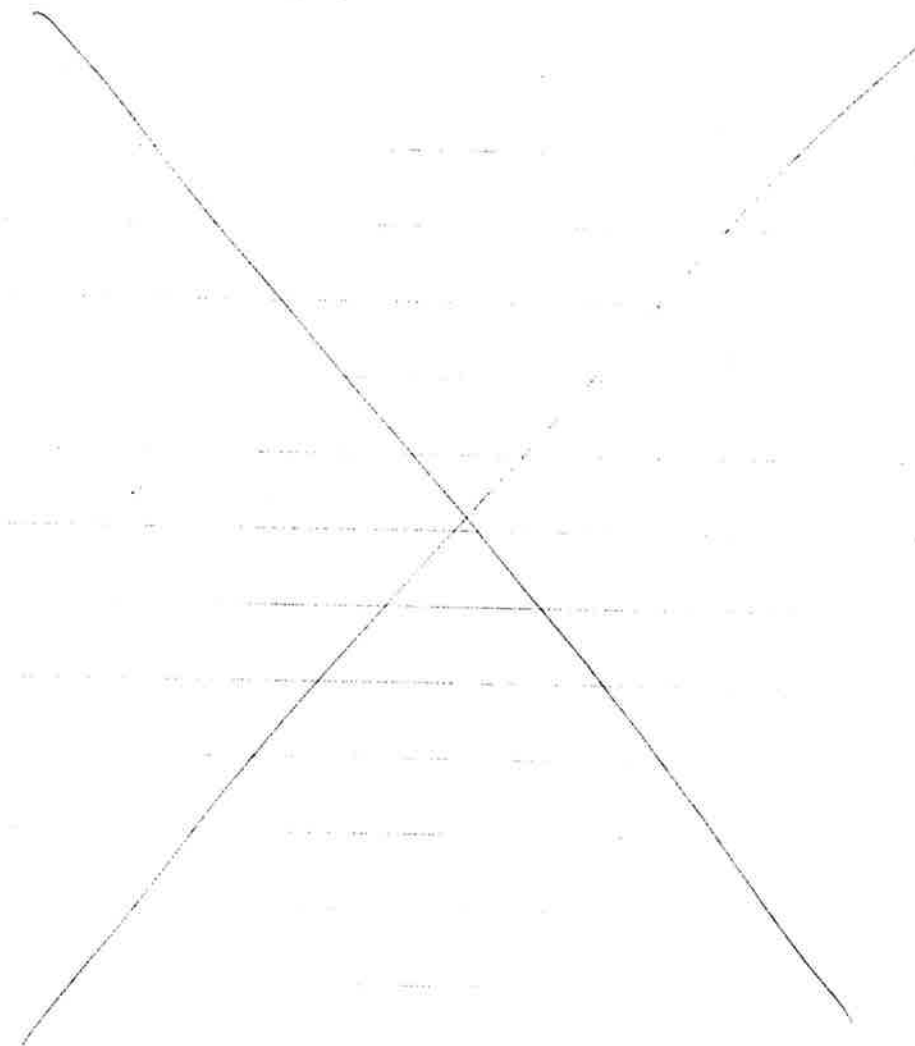
Discard TPMOS sample attempted 5/31/03.

INOCULATION 10/3/03-10/4/03

10/3/03 1230 K. Makeig and B. Cook arrive at site to clear heavy vegetation and set up inoculation grid.

Set up corner stakes for 50x50 test plot, and place ropes and flagging for sample locations.

~1730 Depart site for hotel.



1200 Kim Mascarella of Eastgate arrives.

1215 Begin spraying inoculum on ground surface  
in P zone. 160 psi

1225 Complete 20 gal in P. Refill gasoline in pump. 213  
Begin spraying in E.

1240 Complete spraying in E, 20 gal. 233

1255 Reinject 8 locs in R near shore row, 20 gal 253

1345 Complete 75 gal in 2 outer rows of R, injection. 328

Begin placing biocarb bags in outer rows, from boat.

1340 Mayor and press arrive.

1350 Complete biocarb bag placement.

Spray remaining inoculum on surface in <sup>P</sup>R + E.

1430 Depart site.

Waste Science Inc.  
1411 Fallswood Drive  
Rockville, MD 20854  
(301)340-3301

Boring or  
Well No. **MEM05**

WSI Contract No: **G221**  
Date Started: **5/31/03** Date Finished: **5/31/03**

Project Name: **Mahoning River BioTreat**

Ground Water Observations  
Date Time Level Caved

Drilling Company: **WSI**  
Drilling Method: **hand auger**  
Logger/Sampler: **Cook/Ford**  
Ground Surface Elevation: **-**

Date	Time	Level	Caved
5/31/03	2020	6"	
5/31/03	2040	6"	

Depth (ft)	Blows (N)	Sample	Description	Well Details	Comments
1			Dk brown sandy clayey silt w some organics (roots, leaves) (ML)	N.A.	Stickup: -
2			Grades w more sand, wet		
3					
4			40" Black clayey sand and silt, slight organic odor (SM/ML)		Sample MEM05 3'-5.6'
4			46" Gray sandy clayey silt (ML)		
5			60" Gray clayey silty sand (SM) Grades w more brown		
6			Bottom of hole 67"		
7					
8					
9					
10					

Total Boring Depth (feet): **5.6'**

Page **1** of **1**

Boring/Well No: **MEM05**

Waste Science Inc.  
1411 Fallswood Drive  
Rockville, MD 20854  
(301)340-3301

Boring or  
Well No. REMOS

WSI Contract No: G 221  
Date Started: 6/1/03 Date Finished: 6/1/03

Project Name: Mahoning River Biotreat

Ground Water Observations  
Date Time Level Caved

Drilling Company: WSI

First Encountered 6/1/03 1330 1"

Drilling Method: hand auger

At Completion 6/1/03 1400 1"

Logger/Sampler: Cook/Ford

24-Hrs Open Hole

Ground Surface Elevation: -

In Completed Well

Depth (ft)	Blows (N)	Sample	Description	Well Details	Comments
1			Gray sandy clay (CL), grass cover, wet	N.A.	Stickup: -
2			Black clayey sandy silt (ML), organic odor, wet REMOS composite of 18"-54" and REMOS DUP		
3					
4			Gray		
5			Gray sandy clay (CL), wet Bottom of hole 5'		
6					
7					
8					
9					
10					

Total Boring Depth (feet): 5.0

Page 1 of 1

Boring/Well No: REMOS

Waste Science Inc.  
1411 Fallswood Drive  
Rockville, MD 20854  
(301)340-3301

Boring or  
Well No. **RPM05**

WSI Contract No: **G 221**  
Date Started: **6/1/03** Date Finished: **6/1/03**

Project Name: **Mahoning River Biotreat**

Ground Water Observations

Drilling Company: **WSI**  
Drilling Method: **hand auger**  
Logger/Sampler: **Cook/Ford**  
Ground Surface Elevation: **-**

	Date	Time	Level	Caved
First Encountered	6/1/03	1100	6'	
At Completion	6/1/03	1350	6'	
24-Hrs Open Hole				
In Completed Well				

Depth (ft)	Blows (N)	Sample	Description	Well Details	Comments
1			Dk brown sandy clay with organics (topsoil, CL), mowed grass cover, moist 3" Grades to yellow brown, fewer organics 6" Grades to mottled yellow brown and gray, moist	NA	Stickup:  PID = 0
2					
3			2.5-6' composite RPM05 no visible contain		
4					
5			4" Gravel 1" subangular pieces		
6			6' more gravel		
7			Bottom of hole 6.5'		
8					
9					
10					

Waste Science Inc.  
1411 Fallswood Drive  
Rockville, MD 20854  
(301)340-3301

Boring or  
Well No. **TPM05**

WSI Contract No: **G 221**  
Date Started: **6/1/03** Date Finished: **6/1/03**

Project Name: **Mahoning River Biotreat**

Drilling Company: **WSI**

Drilling Method: **hand auger**

Logger/Sampler: **Cook / Ford**

Ground Surface Elevation: **-**

Ground Water Observations  
Date Time Level Caved

First Encountered	6/1/03	1545	9"	
At Completion				
24-Hrs Open Hole				
In Completed Well				

Depth (ft)	Blows (N)	Sample	Description	Well Details	Comments
1			<p>Dk red/brown sandy silty clay with occ fragments of glass, gravel (CL) Grades mottled gray and brown, wet</p> <p>Composite 4.5-6' for <sup>T</sup>TPM05</p> <p><del>Bottom</del></p> <p>Bottom of hole 12'</p>	N.A.	Stickup: PID = 0
2					
3					
4					
5					
6					
7					
8					
9					
10					

sampled hole is ~25' W of old R

# Waste Science Inc.

## Health and Safety Air Monitoring Form

Project Name: <u>Mahoning River Bio Feas</u> Project Location: <u>Girard + Warren, OH</u> Project Number: <u>G-221</u>	Instrument and No.: <u>PIED (MiniRae #0043)</u> Technician: <u>B. Cook</u> Emergency Phone: _____
--	---

Chemical or Chemical Type	Threshold Limit Value	Mitigative Action Value (from SAHP)

Date	Time	Reading	Location	Remarks
6/1/03	0730	0.0	Model Reach	Background
	0830	0.0	↓	MPMOS
	1130	0.0	Recovering Area	Background
	1130	0.0	↓	RRMOS
	1330	0.0	↓	REMOS
	1330	0.0	↓	RPMOS
	1630	0.0	Test Site	Background
	1630	0.0	↓	TPMOS
	1650	0.0	↓	TPMOS

Site Manager: <u>B. Cook</u> H&S Officer: _____	
--	--



# Waste Science Inc.

## Health and Safety Air Monitoring Form

Project Name: <u>Mahoning River Bio Feas</u> Project Location: <u>Girard + Warren, OH</u> Project Number: <u>G-221</u>	Instrument and No.: <u>PID (Mini Rar #0043)</u> Technician: <u>B. Cook</u> Emergency Phone: _____
--	---

Chemical or Chemical Type	Threshold Limit Value	Mitigative Action Value (from SAHP)			
Date	Time	Reading	Location	Remarks	
5/31/03	1205	0.0	Background TS	Girard	
	1215	80	Test site	Lamp fogged - invalid reading	
	1220	170	↓	↓	
	1225	420			
	1320	800+			
	1410	800+			
	1600	800+			
	1900	800+			Model Reach. DC
	2020	800+			

Site Manager: <u>B. Cook</u> H&S Officer: _____	
--	--

USACE AND MANNING RIVER PROJECT GS2BT1

FIELD SAMPLING DATA TASK 5.2

FRI 5/30/03 PLAN MEETING - HOLIDAY INN GIRARD, OH 10-11 PM.

SAT. 5/31/03 DROVE TO TEST SITE ABOVE GIRARD DAM - GOT KEY - HAD TAILGATE SAFETY BRIEFING - UNLOADED GEAR - SET UP (STAKED 50' X 50' PERIMETER - SUITED UP, SET SAFETY ROPE FOR WATER ENTRY - BROKE TRAIL TO RIPARIAN ZONE - NETTLES & JEWEL WEED PREDOMINATE PLANTS - CALIBRATED INSTRUMENTS - ACTUAL START @ 11:30 AM. - TEMP 46° - RAIN HEAVY - WIND - MODERATE TO STRONG - RIVER RUNS N -> S, ALT. 850' ASL. BAROMETER 29.2 - HUMIDITY 100% - NASTY!

RIVER

PICTURE #1 - POSITION STAKE - RIPARIAN ZONE

PICTURE #2 - RIVER ZONE

SAMPLE #1 @ 2' SOIL/WATER INTERFACE IN RIVER 12:05 PM

SAMPLE #2 @ 2'-6' DEEP INTO SEDIMENT IN RIVER 12:35 PM

PICTURE #3 ECOTONE (FLOOD PLAIN) 25' - 50' S CONTAMINATED BLACK 'POODIE' LIKE SLUDGE W/ ODR AT

PICTURE #4 " " 25' - 0' N 2 1/2' - 6' IN SEDIMENT

PICTURE #5 RIPARIAN ZONE (W/ CAMP) @ 25' E TOP 2 1/2' GRAY-BROWN NO ODR

PICTURE #6 GIRARD DAM & BRIDGE S (DOWN-GRADIENT) OF SITE

CHEM READS (MINI RAE RID, YSI DO, GASTECH METER)

WATER = PH = 6.48, TURB = 20 ntu, DO = 7.4 ppm, Temp = 16.8 C, Salinity = 0, H2S = 0, CH4 = 0

TDS = 0.28 ppm, ORP = +221 mv, 2nd DO = 1.95 ppm, Temp = 17.3 C,

COLOR = DARK BROWN & BLACK

SOILS (SW INTERFACE) - O2 = 20%, H2S = 1 ppm, CH4 = 0, pH = 5.6

SEDIMENT DO = 9.3 ppm, Temp = 16.8 C, pH = 5.6, SALINITY = 0

3:10 PM SAMPLE #3 ECOTONE - COMPOSIT - 2 1/2' - 6' (SOIL ONLY)

BLACK SOIL W/ CHEMICAL ODOR FROM 2 1/2' TO 6' DOWN - TOP 2 1/2' REDDISH-BROWN

CHEMISTRIES ON COMPOSIT 2 1/2' - 6' DOWN (GASTECH & MINI RAE RID) CLAY = LOAMY - NO ODR

DO = 9.0 ppm, H2S = 0, CH4 = 0

PH = 5.63, TEMP = 14.7 C, SALINITY = 0, ORP = +206 mv

ECOTONE (FLOOD PLAIN)

(2)

9/3/03

## USACOE MAHONING RIVER GSTL-1 TASK-5.2

## RIPARIAN ZONE

PICTURE #7 - RIPARIAN ZONE (TO 50' MARKER) VERY HIGH WEEDS, INCLUDING STINGING NETTLE & JEWEL WEED, SOME HYDRIC SMALL TO LARGE TREES (WILLOW, ELM, ETC.) & VIRGINIA CREEPER. ALSO TANGLE WOOD: LOW GROWING VINES & RIVER GRASSES. HAD TO BREAK DOWN FLORA TO CLEAR AREA LARGE ENOUGH TO HAND AUGER SAMPLES

SAMPLE #1 To 6' - GRAY/BROWN CLAY & CLAY LOAM DOWN TO 6' NO ODOOR

SAMPLE #2 GROUND H<sub>2</sub>O LAYER @ 4' - SAMPLE TAKEN - CLOUDY NO ODOOR

SAMPLE #3 4-6' - GRAY CLAY - BROWN SILTY LOAM NO ODOOR

## CHEMISTRIES

GROUND H<sub>2</sub>O DO = 20.9 ppm H<sub>2</sub>S = 0, CH<sub>4</sub> = 0

SOILS (COMPOSIT) DO = 10 ppm, PH = 5.5, TEMP. = 13.1 °C,

SALINITY = 0, ORP = +213 mV

TORE DOWN CAMP, PACKED GEAR, LOCKED GATE - LEFT KEY 4:30 PM

## NOTES FOR INOCULATION

1. Use 3' injector rod in place of sprayer to power inject microbes down 2 1/2 - 3' into river study.
2. Place 1 large bag on SW interface every 10' (5 large bags of BIO-CARB) place 1 small bag between the big bags (4 small bags of BIO-CARB)
3. Power Auger holes down to 6' into floodplain (cottonwood) place minute imbedded corn cobs after inoculating holes (holes at 5' intervals 10 holes up to river - 10 holes between cottonwood and riparian zone. Depending on chemistries do some w/ 3 holes at 50' marker in Riparian zone.

3

USACE MAHONING RIVER GSI - TASKING 2.2003

5/31/03

DROVE 30 MIN. TO PACKARD PARK (RECOVERING AREA) - PARK

45° WINDY RAINING

LOCKED - STOPPED AT BURGER KING FOR SUPPER - DROVE 30 MIN. TO MODEL REACH - CANOE CITY. ARRIVED 6:30PM PICTURES 8, 9, 10, 11, 12, 13, OF (RIVER, FLOOD PLAIN), RIPARIAN ZONE PICTURES 14 - TO TEM. POLE, 16-16, RIVER, SAMPLES MODEL REACH

SAMPLE #1 SOIL/H<sub>2</sub>O INTERFACE - 2 1/2' - 3' SAND TAN/BROWN

CHEMISTRIES RIVER H<sub>2</sub>O - TURBID (COLOR)

GASES (SOIL/H<sub>2</sub>O COMPOSIT) - DO = 20.99%, H<sub>2</sub>S = 0, CH<sub>4</sub> = 0

MINI RAE PID - H<sub>2</sub>O - PH = 5.57, COND. 28.7 millsiemens per L, TURB = 110 NTU, DO = 7.05 ppm, TEMP = 13.8°C, SALINITY = 0, TDS = 0.191 ppm ORP = +197 mV.

RIVER

S/H<sub>2</sub>O INTERFACE - PH = 5.83, COND. 21.7 ms/L, TURB - INCONCLUSIVE,

DO = 6.4, TEMP = 13.6°C, COND = 29 ms/L, TURB -

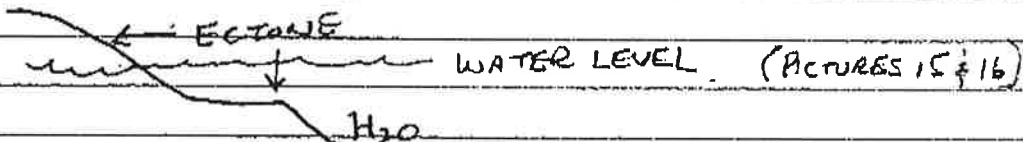
SALINITY = 0, TDS. 0.19 ppm, ORP = +190 mV.

1/2' - 6' SEDIMENT COLOR - GRAY/BROWN WET. (COMPOSIT)

PH = 5.64, COND. 21.7 ms/L, TURB - INCONCLUSIVE,

DO = 6.4 ppm, TEMP. 13.6°C, SALINITY = 0, ORP = +196 mV

7:30-8:30 PM. ECOTONE (FLOOD PLAIN). FLOODED FOR 3'-6' UP BANK



42° WINDY RAINING DARKENING FAST

DID COMPOSIT SAMPLE

BROWN SOIL W/HEAVY ORGANIC DECAYING MATERIAL TO 40"

AT 43" DARK GRAY W/ SLIGHT PETROLEUM ODOR - MOIST -

AT 50" BACK TO LIGHT GRAY CLAY - NO ODOR - DRIER.

AT 60" DRY - SAME LIGHT GRAY CLAY - NO ODOR.

AT 67" DRY = " " " " - " "

ECOTONE

CHEMISTRIES GASES - DO - 11.0%, H<sub>2</sub>S = 0, CH<sub>4</sub> = 0

MINI-RAE PID - PH = 5.98, COND. 37 ms/L, TEMP = 12.2°C

SALINITY = 0, ORP = +184 mV

USACOE MONONGAHEA RIVER PROJECT (G572D) TASK 8.2

(4)

6/31/03

8:30 - 9:30 AM

42°-43°F

COLD, WET WINDY

RIPARIAN ZONE

RIPARIAN ZONE

PICTURES 17, 18, 19

SAMPLES (COMPOSIT) 6'-8' - NORMAL RIPARIAN SOILS

W/ DECAYING ORGANIC MATERIAL DOWN TO 8' TO 4'

MOIST GROUND WATER ZONE ABOUT 5'-6' DOWN -

NORMAL GRAY CLAY - STREAKS OF BROWN SILTY LOAM.

MULTIPLE TREES - SPANANDE, BEECH, HYCORY, ASH, WILLOW, O

MANICURED PARK ZONE WITH PATHS (ASPHALT) - MOST

AREAS FLOODED FROM HEAVY RAINS

CHEMISTRIES

PI0 = 0, H2S = 0, CH4 = 0, DO = 20.97%

PH = 6.02, COND. = 86  $\mu$ S/L, DO = 9.9  $\mu$ m, TEMP = 9.5°C,

SALINITY = 0, ORP = +191 mV.

RETURNED TO HOTEL 10:00 AM AFTER CLEAN-UP AND REPACKING GEAR.

FINISHED 8:00 AM 6/1/03 WHEN WE COULD SEE

USACOE MAKONING RIVER PROJECT 6522-1 TASK 5,2

5

6/1/03

PACKARD PARK - RECOVERING ZONE (MILE 4.1)

WINDY, COOL  
48-50°F)  
NO PRECIP.  
9:30AM

RIVER ZONE - WATER, SOIL H<sub>2</sub>O INTERFACE, SEDIMENT

PICTURES 20, 21, 22...

WILLOWS 6'-10' OUT INTO RIVER - RIVER HIGH, FAST, LARGE TREES AND OTHER DEBRIS FLOATING DOWN STREAM - DIFFICULT TO DISCERN RIVER-ECOTONE

LINE - FLOOD PLAIN - PROBABLY 90% OR MORE UNDER WATER JARED WENT OUT 10'-12' BEFORE DROP-OFF INTO RIVER CURRENT FOR RIVER SAMPLES

CHEMISTRIES - S/H<sub>2</sub>O INTERFACE 4' BROWNISH MUD,

TURBID H<sub>2</sub>O GASES - DO = 20.8 ppm, H<sub>2</sub>S = 0 ppm, CH<sub>4</sub> = 0 ppm

SOIL - S/H<sub>2</sub>O INTERFACE - DO = 20.8 ppm, H<sub>2</sub>S = 0, CH<sub>4</sub> = 0

SEDIMENT SLUDGE - DO = 20.8 ppm, H<sub>2</sub>S = 0, CH<sub>4</sub> = 0

MINI-RAE - WATER - PID = 0, PH = 5.93, COND. 23 ms/c, TURB = 150 ntu,

DO = 8.1 ppm, TEMP = 21.1°C, SALINITY = 0, TDS = 1.6 ppm

ORP = +1.87 mv

S/H<sub>2</sub>O INTERFACE PID = 0, PH = 5.94, DO = 8.7 ppm, TEMP = 20.8°C,

SEDIMENT SALINITY = 0, ORP = +121 mv - NO ODOR OR GRAY-BLACK

COLOR IN SEDIMENT - ALL BROWNISH SILT.

RIVER ZONE

ECOTONE (FLOOD PLAIN)

10:05 AM

PICTURE 23 - FLOODED ECOTONE

SIDE VIEW

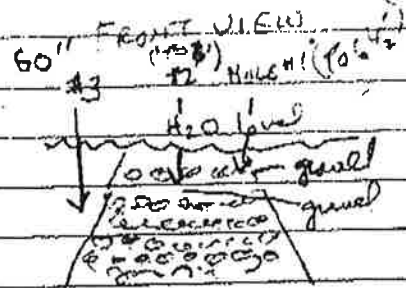
ECOTONE

RIPARIAN ZONE

ECOTONE

WATER LEVEL

RIVER



HOLE #1 WAS 6 1/2' DIFFICULT FOOT THRU GRAVEL - SOME SILTY LEAM

PICTURE #27 - ABOVE, SOME GRAY CLAY - MOSTLY COBBLE TO MEDIUM SILT

SAMPLE #1 GRAY CLAY PID = 0

HOLE #2 (10' SOUTH) SAME AS HOLE #1 BUT MOSTLY GRAVEL TO

6' - PID = 0

USACE MANAWAGO RIVER PROJECT GS 22-1 TASK 5,2

6

ECOTONE

HOLE #3 (APPROX. 25' FURTHER SOUTH) SUBTY LOAM (TAN-BROWN) TO 36',  
DARKER GRAY AT 36" - PRODUCES OIL SHEEN WHEN MUD -  
BLACK AT 42" - MAKES OIL SHEEN WHEN MUD -  
CONTAMINATED AT 36" TO 60" - REFSUSAL @ 60"  
BUT CONTINUES AS IMPERVIOUS GRAY COMPACT CLAY  
BELOW 60". USED #3 AS ECOTONE SAMPLE

GASES DO = 20.2%, H<sub>2</sub>S = 0, CH<sub>4</sub> = 0

PID = 0, PH = 6.12, DO = 8 PPM, TEMP = 23.4°C, SALINITY = 0,  
ORP = +145 MV.

1:15 PM

RIPIARIAN ZONE

PICTURES 25, 26

SAMPLE TO 6' - SIMILAR TO ECOTONE #1, BUT NO GRAVEL

SOIL PID = 0, PH = 6.1, DO = 5.6 PPM, TEMP = 22.9°C, SALINITY = 0,  
ORP = +153 MV

RIPIARIAN ZONE

PARK SETTING - TREES RUN FROM WATER TO ROAD  
STREET FOR GRASSY AREA LEADING TO CLUSE  
WHERE WE CAMPED FOR SAMPLES.

USACE MANNING RIVER GS22-1 TASH R.M.

(7)

6/1/03

PROJECT MANAGER NOT SATISFIED W/ RESULTS FROM RIPARIAN ZONE AND ASKED US TO RETURN TO TEST SITE TO RETEST.

30 MIN. DRIVE TO SITE - STOPPED AT MCDONALD'S FOR SUPPER - ARRIVED AT SITE APPROX 4:50 PM.

AREA FLOODED - ORANGE FLAGS COVERED, SO MARKERS IN ECOTONE PRACTLY SUBMERGED - PATH AND CAMP FROM YESTERDAY AM UNDER WATER - ENTERED THROUGH BACK OF RIPARIAN ZONE BEHIND ECOTONE AREA FROM YESTERDAY, BROKE THRU WEEDS & CLEARED AREA FOR SAMPLES

RE-TEST RIPARIAN ZONE

SAMPLE #1 WENT DOWN 8' BEFORE REFUSAL - SOIL BROWN SANDY SILT W/ GROUND H<sub>2</sub>O AT 9" - BELOW GROUND W/ 10" LAYER, SOIL BECAME MORE & MORE MIXED W/ DARK & MEDIUM TO LIGHT CLAY, MOSTLY MOTTLED AT 8' WHERE WE HIT IMPERVIOUS CLAY LAYER. USED COMPOSIT FOR SAMPLE.

2nd RIPARIAN ZONE AT TEST SITE

CHEMISTRIES

CASES - DO = 2170, H<sub>2</sub>S = 0, CN<sub>4</sub> = 0

DID - PID = 0, pH 6.11, DO = 7.2 ppm, TEMP = 24.6°C,

SALINITY = 0, ORP = +170 mV

ENDED AND LEFT AT APPROX 6 PM. SUN. 6/1/03.

Respectfully Submitted

Jo Larson  
Research Director

Lambda Bioremediation Systems, Inc.  
Project Microbiologist / Field Ecologist  
6/1/03

6/1/03



ENVIRONMENTAL MICROBIOLOGY  
CONSULTING

**lambda**  
**BIOREMEDIATION**  
systems, inc.

WETLANDS TECHNOLOGY  
PROBLEM SOLVING

Interim Sampling

FAX TRANSMITTAL

DATE: 11/24/03

FAX #: 800 869-1763

TO: KATY MAKEIG

COMPANY: WASTE SCIENCE

FROM: LAMBDA

NO. OF PAGES 6

MESSAGE:

KATY, HERE ARE THE RESULTS  
FROM SAT. SAMPLING. THE SAMPLES  
WERE MAILED AND THE FED-EX #  
IS ON THE TOP OF THE COC.  
EVERYTHING WENT PRETTY SMOOTH.  
I WILL MAIL THE HARDCOPIES OF  
ALL THESE TO BARBARA ALONG  
WITH HER COOLER AND OTHER  
SUPPLIES.

JARED

## Waste Science Inc. Sediment Sampling Record

Project Name: <u>Mahoning River Biotreatability Study</u>		Sample ID: <u>TAM 11</u>			
Project Location: <u>Mahoning River, OH</u>		Site: <u>GIRARD TEST SITE</u>			
Project Number: <u>G-221</u>		Area of Sampling Plot: <u>RIVER</u>			
Depth of sample below sediment surface: <u>0-6"</u>					
Total water depth: <u>2 1/2'</u>					
Sediment description (color, gradation, odor): <u>BLACK, OILY</u>					
Date	Time	Field Analyte	Reading	Units	Remarks
<u>11/22</u>	<u>8:55</u>	<u>CH4</u>	<u>0</u>	<u>%</u>	
		<u>O2</u>	<u>20.9</u>	<u>%</u>	
		<u>H2S</u>	<u>0</u>	<u>%</u>	
		<u>ORP</u>	<u>-452</u>	<u>mV</u>	<u>NOT SURE IF CORRECT</u>
		<u>pH</u>	<u>7.57</u>		
	<u>9:05</u>	<u>TEMP</u>	<u>10.5</u>	<u>°C</u>	
Sampling Technician: _____					
Site Manager: <u>J. FORD</u>					
H&S Officer: _____					

### Waste Science Inc. Surface Water Sampling Record

Project Name: <u>Mahoning River Biotreatability Study</u>		Sample ID: <u>WTRM 11</u>			
Project Location: <u>Mahoning River, OH</u>		Site: <u>TEST SITE</u>			
Project Number: <u>G-221</u>		Area of Sampling Plot: <u>River</u>			
Depth of sample from water surface: <u>2'</u>					
Total water depth: <u>2 1/2'</u>					
River flow (fast/mod/slow): <u>SLOW</u>					
Turbidity of sample (clear/mod/very turbid): <u>CLEAR</u>					
Date	Time	Field Analyte	Reading	Units	Remarks
<u>11/22</u>	<u>9:20AM</u>	<u>CH4</u>	<u>0</u>	<u>%</u>	
		<u>O2</u>	<u>20.9</u>	<u>%</u>	
		<u>H2S</u>	<u>0</u>		
		<u>ORP</u>	<u>31.5</u>	<u>mV</u>	<u>NOT SURE IF CORRECT READING</u>
		<u>pH</u>	<u>7.86</u>		
	<u>9:30</u>	<u>TEMP</u>	<u>11.3</u>	<u>°C</u>	
Sampling Technician: _____					
Site Manager: <u>J. FORD</u>					
H&S Officer: _____					

## Waste Science Inc. Sediment Sampling Record

Project Name: <u>Mahoning River Biotreatability Study</u>		Sample ID: <u>TEM 11</u>			
Project Location: <u>Mahoning River, OH</u>		Site: <u>GIRARD TEST SITE</u>			
Project Number: <u>G-221</u>		Area of Sampling Plot: <u>ECOTONE</u>			
Depth of sample below sediment surface: <u>5'-6'</u>					
Total water depth: <u>∅</u>					
Sediment description (color, gradation, odor): <u>BLACK STICKY SOIL, PETROLEUM ODOR</u>					
Date	Time	Field Analyte	Reading	Units	Remarks
<u>11/22</u>	<u>9:45</u>	<u>CH<sub>4</sub></u>	<u>0</u>	<u>%</u>	
		<u>O<sub>2</sub></u>	<u>21.0</u>	<u>%</u>	
		<u>H<sub>2</sub>S</u>	<u>0</u>	<u>%</u>	
		<u>ORP</u>	<u>-232.6</u>	<u>mV</u>	<u>NOT SURE IF CORRECT READING</u>
		<u>pH</u>	<u>7.11</u>		
	<u>9:55</u>	<u>TEMP</u>	<u>15.2</u>	<u>°C</u>	
Sampling Technician: _____					
Site Manager: <u>J. FORD</u>					
H&S Officer: _____					

## Waste Science Inc. Sediment Sampling Record

Project Name: <u>Mahoning River Biotreatability Study</u>		Sample ID: <u>TAM 11</u>			
Project Location: <u>Mahoning River, OH</u>		Site: <u>GIRARD TEST SITE</u>			
Project Number: <u>G-221</u>		Area of Sampling Plot: <u>RIPARIAN</u>			
Depth of sample below sediment surface: <u>5 1/2' - 6 1/2'</u>					
Total water depth: <u>∅</u>					
Sediment description (color, gradation, odor): <u>NO ODOR, BROWN SANDY SOIL, SOME BLACK SOIL</u>					
Date	Time	Field Analyte	Reading	Units	Remarks
11/22	11:11	CH <sub>4</sub>	0	%	
		O <sub>2</sub>	21.0	%	
		H <sub>2</sub> S	0	%	
		ORP	102.8	mV	NOT SURE IF CORRECT
		pH	7.25		
	11:20	TEMP	13	°C	
Sampling Technician: _____					
Site Manager: <u>J. FORD</u>					
H&S Officer: _____					

Mahoning River Biotreatability Study  
Contract G-221, Waste Science Inc.  
Girard, OH

Dates of Field Activities:

6-week sampling: 11/22/03

Contacts:

Girard emergency: 911

WSI Project Manager, Katy Making: cell 301-335-8823  
office 301-340-3301

WSI Field Manager, Barbara Cook: cell 301-602-4433  
office 301-681-4442

410 326-4544

11/22 Arrived at 8:30, 48°, sunny.  
Sampled soil/water at ~ 8:55  
Brown, no odor, slight sheen.  
sample taken ~ 4' offshore - midline

9:19 - water sample taken ~ 6" from  
sediment. Water - no odor, almost  
clear, slightly murky. Sampled 4' offshore.  
Depth 2 1/2' feet.

9:45 - began Ecotone hole ~ 16' from  
East edge ~ 1' away from original sampling  
hole. Observed some black soil  
around 40". Slight smell of oil.  
~ 5' all black soil and grey grainy  
soil. Soil samples collected from  
5' - 6'.

Water level - 16" from top of hole

11:11 - began Riparian hole ~ 25' from  
East edge ~ 1' away from rope. Some  
brown sandy soil around 3'. Very small  
amount of black soil, no odor. Water  
26" from top. 5 1/2' - Brown sandy soil

Riparian zone. - Sampled 5 1/2' - 6 1/2'.

Began clean-up around 12:30.

Packed up samples and left site  
to feed-EX ~ 1:30.



3/27/04 FINAL SAMPLING

Arrived at site around 8:35.

58° cloudy, wet. River was high  
Bio-Bag TRS on bank of river.

8:50, slight oily smell, blackish ~ 3.5'

TRNO3

CH <sub>4</sub>	0
O <sub>2</sub>	21.1
H <sub>2</sub> S	0
ORP	-6.8
pH	<del>7.24</del> 7.24
Temp	10.0

9:27, oily smell, very black, cold  
Sampled about 4' deep

TRMO3

CH <sub>4</sub>	0
O <sub>2</sub>	21.1
H <sub>2</sub> S	0
ORP	-2.3
pH	7.14
TEMP	9.6

9:55, blackish, oily smell, ~ 3-4'

TRSO3

CH <sub>4</sub>	0
O <sub>2</sub>	21.3
H <sub>2</sub> S	0
ORP	-1.7
pH	7.02
TEMP	10.9

10:34, 45" hit black soil, oily smell  
Apt to 11/03 sampling location. 60" hit grey sandy  
oil.

CH <sub>4</sub>	0	started new hole for more soil. water 12" from top of hole. Sample taken from 40"-55"
O <sub>2</sub>	21.4	
H <sub>2</sub> S	0	
ORP	24.6	
pH	6.55	
TEMP	11.8	

11:20, 40" hit black oily soil, shiny.  
sampled 40"-50". Had to dig  
2 holes because water was  
9" from top.

TEM03

CH <sub>4</sub>	0
O <sub>2</sub>	21.3
H <sub>2</sub> S	0
ORP	7.2
pH	6.89
TEMP	12.6

12:10, sampled from 45"-60", blackish  
grey soil. Only smell.

TEN03

CH <sub>4</sub>	0
O <sub>2</sub>	21.3
H <sub>2</sub> S	0
ORP	12.7
pH	6.83
TEMP	13.8

1:30, sampled from 60"-70". Gray clay like  
Soil w/ spots of black stuff.

TPN 03

CH <sub>4</sub>	0
O <sub>2</sub>	21.2
H <sub>2</sub> S	0
ORP	16.7
pH	6.76
TEMP	13.5

2:25, sampled from 60"-75". Greenish and  
Brownish soil, clay like. Next to old hole.

TPM 03

CH <sub>4</sub>	0
O <sub>2</sub>	21.3
H <sub>2</sub> S	0
ORP	14.4
pH	6.61
TEMP	14.3

3:20 sampled from 55"-70". Brown oil.

TPS 03

CH <sub>4</sub>	0
O <sub>2</sub>	21.4
H <sub>2</sub> S	0
ORP	12.5
pH	6.86
TEMP	12.3

3:50. cleared up and packaged STL  
samples to be taken to FEDEX.

**Waste Science Inc.**  
**Sediment Sampling Record**

Project Name: <u>Mahoning River Biotreatability Study</u>		Sample ID: <u>TRM 11</u>			
Project Location: <u>Mahoning River, OH</u>		Site: <u>GIRARD TEST SITE</u>			
Project Number: <u>G-221</u>		Area of Sampling Plot: <u>RIVER</u>			
Depth of sample below sediment surface: <u>0-6"</u>					
Total water depth: <u>2 1/2'</u>					
Sediment description (color, gradation, odor): <u>BLACK, OILY</u>					
Date	Time	Field Analyte	Reading	Units	Remarks
<u>11/22</u>	<u>8:55</u>	<u>CH4</u>	<u>0</u>	<u>%</u>	
		<u>O2</u>	<u>20.9</u>	<u>%</u>	
		<u>H2S</u>	<u>0</u>	<u>%</u>	
		<u>ORP</u>	<u>-452</u>	<u>mV</u>	<u>NOT SURE IF CORRECT</u>
		<u>pH</u>	<u>7.57</u>		
	<u>9:05</u>	<u>TEMP</u>	<u>10.5</u>	<u>°C</u>	
Sampling Technician: _____					
Site Manager: <u>J. FORD</u>					
H&S Officer: _____					

**Waste Science Inc.**  
**Surface Water Sampling Record**

Project Name: <u>Mahoning River Biotreatability Study</u>	Sample ID: <u>WTRM 11</u>
Project Location: <u>Mahoning River, OH</u>	Site: <u>TEST SITE</u>
Project Number: <u>G-221</u>	Area of Sampling Plot: <u>River</u>

Depth of sample from water surface: 2'  
 Total water depth: 2 1/2'  
 River flow (fast/mod/slow): SLOW  
 Turbidity of sample (clear/mod/very turbid): CLEAR

Date	Time	Field Analyte	Reading	Units	Remarks
11/22	9:20am	CH <sub>4</sub>	0	%	
		O <sub>2</sub>	20.9%	%	
		H <sub>2</sub> S	0		
		ORP	31.5	mV	NOT SURE IF CORRECT READING
		pH	7.86		
	9:30	TEMP	11.3	°C	

Sampling Technician: \_\_\_\_\_  
 Site Manager: J. FORD  
 H&S Officer: \_\_\_\_\_

**Waste Science Inc.**  
**Sediment Sampling Record**

Project Name: <u>Mahoning River Biotreatability Study</u>		Sample ID: <u>TEM 11</u>			
Project Location: <u>Mahoning River, OH</u>		Site: <u>GIRARD TEST SITE</u>			
Project Number: <u>G-221</u>		Area of Sampling Plot: <u>ECOTONE</u>			
Depth of sample below sediment surface: <u>5'-6'</u>					
Total water depth: <u>∅</u>					
Sediment description (color, gradation, odor): <u>BLACK STICKY SOIL, PETROLEUM ODOR</u>					
Date	Time	Field Analyte	Reading	Units	Remarks
11/22	9:45	CH <sub>4</sub>	0	%	
↓	↓	O <sub>2</sub>	21.0	%	
↓	↓	H <sub>2</sub> S	0	%	
↓	↓	ORP	-232.6	mV	NOT SURE IF CORRECT READING
↓	↓	pH	7.11		
	9:55	TEMP	15.2	°C	
Sampling Technician: _____					
Site Manager: <u>J. FORD</u>					
H&S Officer: _____					



**Waste Science Inc.**  
**Sediment Sampling Record**

Project Name: <u>Mahoning River Biotreatability Study</u>	Sample ID: <u>TAM 11</u>
Project Location: <u>Mahoning River, OH</u>	Site: <u>GIRARD TEST SITE</u>
Project Number: <u>G-221</u>	Area of Sampling Plot: <u>RIPARIAN</u>
Depth of sample below sediment surface: <u>5 1/2' - 6 1/2'</u>	
Total water depth: <u>∅</u>	
Sediment description (color, gradation, odor): <u>NO ODOR, BROWN SANDY SOIL, SOME BLACK SOIL</u>	

Date	Time	Field Analyte	Reading	Units	Remarks
11/22	11:11	CH <sub>4</sub>	0	%	
↓	↓	O <sub>2</sub>	21.0	%	
		H <sub>2</sub> S	0	%	
		ORP	102.8	mV	NOT SURE IF CORRECT
		pH	7.25		
		TEMP	13	°C	

Sampling Technician: _____	
Site Manager: <u>J. FORD</u>	
H&S Officer: _____	

**Waste Science Inc.**  
**Sediment Sampling Record**

Project Name: <u>Mahoning River Biotreatability Study</u>		Sample ID: <u>TRN 03</u>			
Project Location: <u>Mahoning River, OH</u>		Site: <u>GIRARD TEST SITE</u>			
Project Number: <u>G-221</u>		Area of Sampling Plot: <u>RIVER SEDIMENT</u>			
Depth of sample below sediment surface: <u>0-6"</u>					
Total water depth: <u>3.5'</u>					
Sediment description (color, gradation, odor): <u>BLACK, OILY SMELL, LOTS OF DEBRIS</u>					
Date	Time	Field Analyte	Reading	Units	Remarks
<u>3/27/04</u>	<u>8:50 AM</u>	<u>CH<sub>4</sub></u>	<u>0</u>	<u>%</u>	
↓	↓	<u>O<sub>2</sub></u>	<u>21.1</u>	<u>%</u>	
↓	↓	<u>H<sub>2</sub>S</u>	<u>0</u>	<u>%</u>	
↓	↓	<u>ORP</u>	<u>-6.8</u>	<u>mV</u>	
↓	↓	<u>pH</u>	<u>7.24</u>		
↓	↓	<u>temp</u>	<u>10.5</u>	<u>°C</u>	
Sampling Technician: <u>J. FORD</u>					
Site Manager: _____					
H&S Officer: _____					

**Waste Science Inc.**  
**Sediment Sampling Record**

Project Name: <u>Mahoning River Biotreatability Study</u>	Sample ID: <u>T12M03</u>
Project Location: <u>Mahoning River, OH</u>	Site: <u>GIRARD TEST SITE</u>
Project Number: <u>G-221</u>	Area of Sampling Plot: <u>RIVER SEDIMENT</u>

Depth of sample below sediment surface: 0-6"  
 Total water depth: 4'  
 Sediment description (color, gradation, odor): BLACK, OILY SMELL, DEBRIS

Date	Time	Field Analyte	Reading	Units	Remarks
<u>3/27/04</u>	<u>9:27</u>	<u>CH<sub>4</sub></u>	<u>0</u>	<u>%</u>	
↓	↓	<u>O<sub>2</sub></u>	<u>21.1</u>	<u>%</u>	
		<u>H<sub>2</sub>S</u>	<u>0</u>	<u>%</u>	
		<u>ORP</u>	<u>-2.3</u>	<u>mV</u>	
		<u>pH</u>	<u>7.14</u>		
		<u>temp</u>	<u>9.6</u>	<u>°C</u>	

Sampling Technician: J. FORD  
 Site Manager: \_\_\_\_\_  
 H&S Officer: \_\_\_\_\_

**Waste Science Inc.**  
**Sediment Sampling Record**

Project Name: <u>Mahoning River Biotreatability Study</u>	Sample ID: <u>TPS03</u>
Project Location: <u>Mahoning River, OH</u>	Site: <u>GIRARD TEST SITE</u>
Project Number: <u>G-221</u>	Area of Sampling Plot: <u>RIVER SEDIMENT</u>

Depth of sample below sediment surface: 0-6"  
 Total water depth: 3-4'  
 Sediment description (color, gradation, odor): BLACK, OILY SMELL, DEBRIS

Date	Time	Field Analyte	Reading	Units	Remarks
<u>3/27/04</u>	<u>9:55</u>	<u>CH<sub>4</sub></u>	<u>0</u>	<u>%</u>	
↓	↓	<u>O<sub>2</sub></u>	<u>21.3</u>	<u>%</u>	
		<u>H<sub>2</sub>S</u>	<u>0</u>	<u>%</u>	
		<u>ORP</u>	<u>-1.9</u>	<u>mV</u>	
		<u>pH</u>	<u>7.02</u>		
		<u>temp</u>	<u>10.9</u>	<u>°C</u>	

Sampling Technician: T. FORD  
 Site Manager: \_\_\_\_\_  
 H&S Officer: \_\_\_\_\_

**Waste Science Inc.**  
**Sediment Sampling Record**

Project Name: <u>Mahoning River Biotreatability Study</u>		Sample ID: <u>TES03</u>			
Project Location: <u>Mahoning River, OH</u>		Site: <u>GIRARD TEST SITE</u>			
Project Number: <u>G-221</u>		Area of Sampling Plot: <u>ECOTONE</u>			
Depth of sample below sediment surface: <u>45" - 60"</u>					
Total water depth: _____					
Sediment description (color, gradation, odor): <u>BLACK, OILY SMELL, PUDDING-LIKE</u>					
Date	Time	Field Analyte	Reading	Units	Remarks
3/27/04	10:34	CH <sub>4</sub>	0	%	
↓	↓	O <sub>2</sub>	21.4	%	
↓	↓	H <sub>2</sub> S	0	%	
↓	↓	ORP	24.6	mV	
↓	↓	pH	6.55		
↓	↓	temp	11.8	°C	
Sampling Technician: <u>JFORD</u>					
Site Manager: _____					
H&S Officer: _____					

**Waste Science Inc.**  
**Sediment Sampling Record**

Project Name: <u>Mahoning River Biotreatability Study</u>	Sample ID: <u>TEM03</u>
Project Location: <u>Mahoning River, OH</u>	Site: <u>GIRARD TEST SITE</u>
Project Number: <u>G-221</u>	Area of Sampling Plot: <u>ECOTONE</u>

Depth of sample below sediment surface: 40"-50"

Total water depth: \_\_\_\_\_

Sediment description (color, gradation, odor): BLACK, oily, slimy

Date	Time	Field Analyte	Reading	Units	Remarks
3/27/04	11:20	CH <sub>4</sub>	0	%	
↓	↓	O <sub>2</sub>	21.3	%	
↓	↓	H <sub>2</sub> S	0	%	
↓	↓	ORP	7.2	mV	
↓	↓	pH	6.89		
↓	↓	temp	12.6	°C	

Sampling Technician: V. FORD

Site Manager: \_\_\_\_\_

H&S Officer: \_\_\_\_\_

**Waste Science Inc.**  
**Sediment Sampling Record**

Project Name: <u>Mahoning River Biotreatability Study</u>	Sample ID: <u>TEN03</u>
Project Location: <u>Mahoning River, OH</u>	Site: <u>GIRARD TEST SITE</u>
Project Number: <u>G-221</u>	Area of Sampling Plot: <u>ECOTONE</u>

Depth of sample below sediment surface: 45"-60"  
 Total water depth: \_\_\_\_\_  
 Sediment description (color, gradation, odor): BLACKISH GREY, OILY

Date	Time	Field Analyte	Reading	Units	Remarks
<u>3/27/04</u>	<u>12:10</u>	<u>CH<sub>4</sub></u>	<u>0</u>	<u>%</u>	
↓	↓	<u>O<sub>2</sub></u>	<u>21.3</u>	<u>%</u>	
		<u>H<sub>2</sub>S</u>	<u>0</u>	<u>%</u>	
		<u>ORP</u>	<u>12.7</u>	<u>mV</u>	
		<u>pH</u>	<u>6.83</u>		
		<u>temp</u>	<u>13.8</u>	<u>°C</u>	

Sampling Technician: JFORD  
 Site Manager: \_\_\_\_\_  
 H&S Officer: \_\_\_\_\_

**Waste Science Inc.**  
**Sediment Sampling Record**

Project Name: <u>Mahoning River Biotreatability Study</u>		Sample ID: <u>TPN 03</u>			
Project Location: <u>Mahoning River, OH</u>		Site: <u>GIRARD TEST SITE</u>			
Project Number: <u>G-221</u>		Area of Sampling Plot: <u>RIPARIAN</u>			
Depth of sample below sediment surface: <u>60"-70"</u>					
Total water depth: _____					
Sediment description (color, gradation, odor): <u>GREY HARD CLAY LIKE SOIL, SPOTS OF BLACK</u>					
Date	Time	Field Analyte	Reading	Units	Remarks
<u>3/27/04</u>	<u>1:30</u>	<u>CH<sub>4</sub></u>	<u>0</u>	<u>%</u>	
		<u>O<sub>2</sub></u>	<u>21.2</u>	<u>%</u>	
		<u>H<sub>2</sub>S</u>	<u>0</u>	<u>%</u>	
		<u>ORP</u>	<u>16.7</u>	<u>mV</u>	
		<u>pH</u>	<u>6.76</u>		
		<u>temp</u>	<u>13.5</u>	<u>°C</u>	
Sampling Technician: <u>J FORD</u>					
Site Manager: _____					
H&S Officer: _____					



**Waste Science Inc.**  
**Sediment Sampling Record**

Project Name: <u>Mahoning River Biotreatability Study</u>		Sample ID: <u>TPM03</u>			
Project Location: <u>Mahoning River, OH</u>		Site: <u>GIRARD TEST SITE</u>			
Project Number: <u>G-221</u>		Area of Sampling Plot: <u>RIPARIAN</u>			
Depth of sample below sediment surface: <u>60"-75"</u>					
Total water depth: _____					
Sediment description (color, gradation, odor): <u>GREY-BROWN SOIL, CLAY LIKE</u>					
Date	Time	Field Analyte	Reading	Units	Remarks
<u>3/27/04</u>	<u>2:25</u>	<u>CH<sub>4</sub></u>	<u>0</u>	<u>%</u>	
↓	↓	<u>O<sub>2</sub></u>	<u>21.3</u>	<u>%</u>	
↓	↓	<u>H<sub>2</sub>S</u>	<u>0</u>	<u>%</u>	
↓	↓	<u>ORP</u>	<u>19.4</u>	<u>mV</u>	
↓	↓	<u>pH</u>	<u>6.61</u>		
↓	↓	<u>temp</u>	<u>14.3</u>	<u>°C</u>	
Sampling Technician: <u>T FORD</u>					
Site Manager: _____					
H&S Officer: _____					

**Waste Science Inc.**  
**Sediment Sampling Record**

Project Name: <u>Mahoning River Biotreatability Study</u>	Sample ID: <u>TP503</u>
Project Location: <u>Mahoning River, OH</u>	Site: <u>GIRARD TEST SITE</u>
Project Number: <u>G-221</u>	Area of Sampling Plot: <u>RIPARIAN</u>

Depth of sample below sediment surface: 55"-70"  
 Total water depth: \_\_\_\_\_  
 Sediment description (color, gradation, odor): BROWN SOIL, NO ODCR, NO OILY CONTAMINANTS

Date	Time	Field Analyte	Reading	Units	Remarks
<u>3/27/09</u>	<u>3:20</u>	<u>CH<sub>4</sub></u>	<u>0</u>	<u>%</u>	
↓	↓	<u>O<sub>2</sub></u>	<u>21.4</u>	<u>%</u>	
↓	↓	<u>H<sub>2</sub>S</u>	<u>0</u>	<u>%</u>	
↓	↓	<u>ORP</u>	<u>12.5</u>	<u>mV</u>	
↓	↓	<u>pH</u>	<u>6.86</u>		
↓	↓	<u>temp</u>	<u>12.3</u>	<u>°C</u>	

Sampling Technician: FORD  
 Site Manager: \_\_\_\_\_  
 H&S Officer: \_\_\_\_\_

## Chain-of-Custody Forms

FED EX TRACKING# 841837970399

# Chain of Custody Form

# Waste Science Inc.

Sampler: <b>Jared Ford</b>		Project No.: <b>G-221</b>		Date: <b>11/22/03</b>		Chain of Custody Number: <b>MR-6WK1</b>		
Laboratory: <b>GPL Laboratories</b> Laboratory Address: <b>202 Perry Plany, Gaithersburg MD</b> Lab Phone Number: <b>301-926-6802</b> Laboratory Contact: <b>Amy Edwards</b> Delivery Method: <b>F20 EX</b>				Page <b>1</b> of <b>1</b>				
Project Name: <b>Mahoning River Feasibility Study</b> Facility Address: <b>1411 Fallswood Drive</b> City: <b>Rockville</b> State: <b>MD</b> Zip Code: <b>20854</b> Contract or PO Number: <b>Eastgate G-221</b>				<b>Analyses and Method Numbers</b> TCEP Mn+Ba NH <sub>3</sub> , NO <sub>2</sub> , NO <sub>3</sub> PO <sub>4</sub> SO <sub>4</sub> TRPH PCB Analyt PAHs TOC TON				
Sample ID No.	Matrix	Date Collected	Time Collected	Sample Type	Total Volume	No. of Containers	Preservative	Condition on Receipt
WTRM11	water	11/22/03	9:19 AM	-	-	1	HCL	
"	water	11/22/03	9:19 AM	-	-	1	cool	
TRM11	soil	11/22/03	8:55 AM	-	-	4	cool	
TEM11	soil	11/22/03	9:45 AM	-	-	5	cool	
TPM11	soil	11/22/03	11:11 AM	-	-	4	cool	

Deliver Results to: **Waste Science Inc.**  
**1411 Fallswood Drive**  
**Rockville, MD 20854**  
 phone **301-340-3301**  
 fax **800-869-1763**

Return to Originator    
  Disposal by Lab    
  Archive for \_\_\_\_\_ months

Turnaround Time Required: \_\_\_\_\_

Special Instructions: \_\_\_\_\_

1. Relinquished By: <i>Jaw Jck</i>	Date: <b>11/22/03</b>	Time: <b>1:15 pm</b>	1. Received By:	Date:	Time:
2. Relinquished By:	Date:	Time:	2. Received By:	Date:	Time:
3. Relinquished By:	Date:	Time:	3. Received By:	Date:	Time:

FED EX TRACKING# 841837970399

# Chain of Custody Form

# Waste Science Inc.

Sampler: <b>Jared Ford</b> Project No.: <b>G-221</b>		Laboratory: <b>GPI Laboratories</b> Date: <b>11/22/03</b> Check-off Quality Number: <b>MR-6WK1</b>						
Project Name: <b>Machoning River Feasibility Study</b> Facility Address: <b>1411 Fallwood Drive</b>		Laboratory Address: <b>202 Perry Plany, Gaithersburg MD</b> Lab Phone Number: <b>301-928-6802</b>						
City: <b>Rockville</b> Contact at PO Number: <b>Elavigate G-221</b>		Laboratory Contact: <b>ARRY EDWARDS</b> Delivery Method: <b>Fed Ex</b>						
State: <b>MD</b> Zip Code: <b>20854</b>		Analyses and Method Numbers PCB Aroclor 1260 TRPH PCB Aroclor 504 P04 NH <sub>3</sub> , NO <sub>3</sub> , NO <sub>2</sub> Pesticides Fe, Cu, Pb, Zn TCLP Metals Salinity H <sub>2</sub> O <sub>2</sub>						
Sample ID No.	Matrix	Date Collected	Time Collected	Sample Type	Total Volume	No. of Containers	Preservatives	Condition on Receipt
WTRM11	water	11/22/03	9:19 AM	-	-	1	HCl	
"	water	11/22/03	9:19 AM	-	-	1	cool	
TRM11	soil	11/22/03	8:55 AM	-	-	4	cool	
TEM11	soil	11/22/03	9:45 AM	-	-	5	cool	
TPM11	soil	11/22/03	11:11 AM	-	-	4	cool	
Driver Name: <b>Waste Science Inc.</b> 1411 Fallwood Drive Rockville, MD 20854		Phone: <b>301-340-3301</b> Fax: <b>800-868-1763</b>						
Turnaround Time Required:		Sample Deposit: <input type="checkbox"/> Return to Originator <input checked="" type="checkbox"/> Disposal by Lab <input type="checkbox"/> Archive for _____ months						
1. Relinquished By: <i>Jared Ford</i>		Date:	Time:	1. Received By:	Date:	Time:		
2. Relinquished By:		Date:	Time:	2. Received By:	Date:	Time:		
3. Relinquished By:		Date:	Time:	3. Received By:	Date:	Time:		

# Chain of Custody Form

# Waste Science Inc.

<b>Sample:</b> Project No. G-221		<b>Laboratory:</b> GPL Laboratories Laboratory Address:		<b>Date:</b> 6/1/03		<b>Chain of Custody Number:</b> MK-INIT3		
<b>Project Name:</b> Mattoning River Bioremediability Study		<b>Facility Phone Number:</b> 301-340-3301		<b>Page:</b> 1 of 1				
<b>Facility Address:</b> 1411 Fallswood Drive		<b>Lab Phone Number:</b> 301-926-6802		<b>Analyses and Method Numbers</b>				
<b>City:</b> Rockville		<b>State:</b> MD		<b>Laboratory Contact:</b> Amy Edwards				
<b>Contract or PO Number:</b> Eastgate G-221		<b>Zip Code:</b> 20854						
<b>Delivery Address:</b> WSI to hand deliver		<b>Delivery Method:</b> WSI to hand deliver						
Sample ID No.	Matrix	Date Collected	Time Collected	Sample Type	Total Volume	No. of Containers	Preservative	Condition on Receipt
MRMOS	soil	5/31/03	1900			5	cool	✓
MEMOS	soil	5/31/03	2030			5	cool	✓
TRMOS	soil	5/31/03	1220			5	cool	✓
TEMOS	soil	5/31/03	1430			5	cool	✓
TEMOSMSMB1	soil	5/31/03	1430	MS/MSB		5	cool	✓

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**Deliver Results to:** Waste Science Inc.  
 1411 Fallswood Drive  
 Rockville, MD 20854

**phone/fax (301) 340-3301**

Return to Originator      Disposal by Lab      Archive for \_\_\_\_\_ months

**Turnaround Time Required:** \_\_\_\_\_

**Special Instructions:**

<b>1. Requested By:</b> B E Cook	<b>Date:</b> 6/2/03	<b>Time:</b> 2:30 pm	<b>1. Received By:</b> Chemo	<b>Date:</b> 6/2/03	<b>Time:</b> 2:30
<b>2. Requested By:</b>	<b>Date:</b>	<b>Time:</b>	<b>2. Received By:</b>	<b>Date:</b>	<b>Time:</b>
<b>3. Requested By:</b>	<b>Date:</b>	<b>Time:</b>	<b>3. Received By:</b>	<b>Date:</b>	<b>Time:</b>

# Chain of Custody Form

# Waste Science Inc.

Sampler: <b>BEC</b>		Project No.: <b>G-221</b>		Laboratory: <b>GPL Laboratories</b>		Date: <b>6/1/03</b>		Chain-of-Custody Number: <b>MR-INIT 1</b>	
Project Name: <b>Mahoning River Biotreatability Study</b>		Facility Phone Number/Fax Number: <b>301-340-3301</b>		Laboratory Address:		Page _____ of _____			
Facility Address: <b>1411 Fallswood Drive</b>				Lab Phone Number: <b>301-926-6802</b>		Analyses and Method Numbers			
City: <b>Rockville</b>		State: <b>MD</b>		Zip Code: <b>20854</b>					
Contract or PO Number: <b>Eastgate G-221</b>				Delivery Method: <b>WSI to hand deliver</b>					
Sample ID No.	Matrix	Date Collected	Time Collected	Sample Type	Total Volume	No. of Containers	Preservative	Condition on Receipt	
WRRM05	water	5/31/03	1900			1	cool	✓	salinity
"	"	"	"			1	HCL	✓	fat/oil/grease
WRRM05	water	6/1/03	1130			1	cool	✓	
"	"	"	"			1	HCL	✓	
WTRM05	water	5/31/03	1210			1	cool	✓	
"	"	"	"			1	HCL	✓	
Deliver Results to: <b>Waste Science Inc. 1411 Fallswood Drive Rockville, MD 20854</b>		phone/fax (301) 340-3301		Sample Disposal:		<input type="checkbox"/> Return to Originator <input checked="" type="checkbox"/> Disposal by Lab <input type="checkbox"/> Archive for _____ months			
Turnaround Time Required:		Special Instructions:							
1. Relinquished By: <b>BZ Cook</b>	Date: <b>6/2/03</b>	Time: <b>2:30 pm</b>	1. Received By: <i>[Signature]</i>	Date: <b>6/2/03</b>	Time: <b>2:30</b>				
2. Relinquished By:	Date:	Time:	2. Received By:	Date:	Time:				
3. Relinquished By:	Date:	Time:	3. Received By:	Date:	Time:				

# Chain of Custody Form

# Waste Science Inc.

<b>Sampler:</b> Project Name: Mahoning River Biotreatability Study Facility Address: 1411 Fallswood Drive City: Rockville State: MD Zip Code: 20854 Contract or PO Number: Eastgate G-221		<b>Project No.:</b> G-221 Facility Phone Number/fax Number: 301-340-3301		<b>Laboratory:</b> GPL Laboratories Laboratory Address: 6/1/03 Date: 6/1/03 Chain of Custody Number: MR-INIT 2 Page: 1 of 1				
<b>Analyses and Method Numbers</b> Lab Phone Number: 301-926-6802 Laboratory Contact: Amy Edwards Delivery Method: WSI to hand deliver		Salinity 2520B ✓ fth/ptl/gunk ✓ TCAP metals - As ✓ Ba, Cd, Cr, Cu, Pb ✓ Hg, Se, Fe, Mn, Ni, Zn ✓ Fe ✓ Potassium 6010g ✓ NH3 ✓ NO2 ✓ NO3 ✓ E353.2 ✓ E354.1 ✓ E350.3 ✓ Soluble POC E362.2 ✓ SO4 ✓ TRPH E418.1 ✓ PCBs SW8082 ✓ Pests SW8081A ✓ PAHs SW 8270 ✓						
Sample ID No.	Matrix	Date Collected	Time Collected	Sample Type	Total Volume	No. of Containers	Preservative	Condition on Receipt
TPM05	Soil	6/1/03	1400			5	cool	
MPM05	Soil	6/1/03	0810			5	cool	
RRM05	Soil	6/1/03	1130			5	cool	
REM05	Soil	6/1/03	1330			5	cool	
RPM05	Soil	6/1/03	1100			5	cool	
Deliver Results to: Waste Science Inc. 1411 Fallswood Drive Rockville, MD 20854 phone/fax (301) 340-3301 Sample Disposal: <input type="checkbox"/> Return to Originator <input checked="" type="checkbox"/> Disposal by Lab <input type="checkbox"/> Archive for _____ months								
Turnaround Time Required: _____ Special Instructions: _____								
1. Requested By:		Date:	Time:	1. Received By:		Date:	Time:	
2. Requested By: B.S. Cook		Date: 6/2/03	Time: 2:30 pm	2. Received By: <i>[Signature]</i>		Date: 6/2/03	Time: 2:30	
3. Requested By:		Date:	Time:	3. Received By:		Date:	Time:	

TON



**Barbara Cook**

**From:** "Barbara Cook" <b.cook25@verizon.net>  
**To:** "Edwards, Amy" <EdwardsA@glab.com>  
**Sent:** Tuesday, June 03, 2003 1:28 PM  
**Subject:** Re: Mahoning River TON and TOC

Amy,  
Please add TON and TOC to the Mahoning River analytes, as indicated in the initial requests for the work. I inadvertently left these off the chain-of-custody forms for the samples delivered to you on 6/2/03.

Thank you,  
Barbara

Barbara E. Cook, P.E.  
Waste Science Inc.  
216 Northwest Terrace  
Silver Spring, MD 20901  
301-681-4442  
b.cook25@verizon.net

6/3/03